Dynamic Alliances*

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Abstract

Alliance arrangements frequently change despite the costs of forming new pacts and terminating existing ones. Scholars typically attribute states' alliance decisions to static considerations, such as the power balance, or retrospective changes, such as past power shifts. We highlight another factor: prospective changes, particularly anticipated military strength shifts. We analyze a three-country bargaining model of alliances and war that incorporates forward-looking power dynamics. The model, unlike those restricting players to set roles, flexibly allows players to ally in any arrangement. We find that alliance arrangements which are optimal when power is static are often suboptimal when power fluctuates. Accordingly, states strategically alter alliance arrangements in anticipation of military strength shifts. Extensive empirical analyses corroborate the expectation. Moving from a static power environment to one in which states anticipate sizable shifts increases expected alliance changes by 70%. Future considerations affect the alliances that states forge to navigate the changing international landscape.

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Member states endow alliances with credibility by bearing costs and generating commitments to fulfill their pledges (Morrow, 2000). Costly efforts to harmonize war-fighting capabilities can signal to observers that alliance members intend to honor their obligations. The prospect of being punished for reneging on public commitments—for instance, paying audience costs—further binds actors to fulfill alliance responsibilities (Fearon, 1994, 1997). Given these realized and latent costs, we might expect the alliance network to be stable. Forming new ones entails bearing new costs and generating new commitments. Terminating old ones forfeits the signaling value of costs already sunk and can impose reputation costs. Yet, despite these inertial forces, alliance arrangements frequently change. Diplomatic history is littered with rapid revisions—for example, the Diplomatic Revolution of the 18th century or the swift negotiation and even swifter violation of the Molotov-Ribbentrop Pact. On average, nearly 9% of alliances that exist at the start of the year no longer exist by the end. The new alliances formed in a given year are equivalent to roughly 12% of all alliances present at the start of the year.[1]

What explains this dynamism of alliance arrangements? Past inquiries typically study formation (Waltz, 1979; Walt, 1987; Lai and Reiter, 2000; Johnson, 2017) or termination (Morrow, 1991; Bennett, 1997; Leeds, 2003; Leeds and Savun, 2007) separately. Additionally, they emphasize either *static* conditions or *retrospective* changes—that is, changes in the past—to explain alliance formation and termination. In contrast, this paper offers a unified framework for alliance formation and change while emphasizing an often neglected factor: *prospective* changes. States strategically look to the future to identify optimal alliances in the present. Accordingly, anticipated changes, particularly shifts in military strength, induce alliance dynamism.

This study's expectation for dynamic alliances emerges from a three-country, complete information, bargaining model of alliance and war that incorporates a collection of features that have not been jointly studied. In the model, countries observe the initial distribution of power and recognize that military strength may shift as in typical commitment problem models (Fearon, 1995,

[1]Calculations based on alliances with either an offense or defensive component as coded in the Alliance Treaty Obligations and Provision (ATOP) data (Leeds et al., 2002).

2004; Powell, 1999, 2004, 2006). States anticipate strength shifts and optimize alliance choices accordingly. Unlike most existing approaches, states form alliances without pre-assigned roles. Once allied, countries commit to fight together and divide resources as they see fit. Individual countries then opt to initiate war or find a settlement through bargaining.

The model builds upon prior work in several ways. Models that allow for general dynamics such as power shifts (Fearon, 2004; Powell, 2004, 2006; Debs and Monteiro, 2014; Bas and Coe, 2012; Krainin, 2017) typically have two countries. Those with more than two countries often lack ongoing dynamics (Niou and Ordeshook, 1986; Morrow, 1994; Powell, 1999; Werner, 2000; Krainin, 2014; Jackson and Nei, 2015). Models that have both lack bargaining (Niou, Ordeshook, and Rose, 1989), examine alliances in the limiting case with very high patience (Krainin and Wiseman, 2016), or assign fixed arbitrary roles to the countries (Powell, 2017).[2] The point about arbitrary roles is critical since the assumption is dominant in the alliance literature. Many issues associated with alliance dynamism are precluded in models with pre-assigned adversarial relationships and potential alliance partnerships.

The flexibility of the model allows for new insights linking both the distribution and dynamics of power to alliance decisions. Alliance choices when power is static are crucial to understanding the effect of power shifting. For a static system we can specify the optimal alliance configuration. When states anticipate a shift in state capabilities, optimal alliance arrangements may also shift, whether in the form of alliance formation, termination, or both (i.e., alliance switching). War looms in the background, serving as an outside option for states, and creates the relationship between strength shifts and alliance shifts. Alliances enable members to aggregate capabilities which improves their expected war payoffs.[3] Higher war payoffs, in turn, affect bargaining payoffs which

[2]In Powell (2017), two countries engage in a war of attrition while another decides whether to join and, if so, which side to join. This is a significant relaxation of many previous models where potential alliance partners are pre-assigned. However, only one country is allowed this freedom of choice in that model.

[3]Capability aggregation implies a power-centric framework which is only one of several strands of alliance theorizing. Alternative approaches emphasize a security-autonomy tradeoff (Morrow, 1991), reputation considerations (Crescenzi et al., 2012), and common foreign policy interests

drive the alliance choices in a static setting. Given the linkages between military capabilities and alliance decisions, theories of the latter ought to incorporate dynamics in the former. This paper does so, recognizing that strategic states do not idly watch battlefield-relevant attributes change. Rather, they anticipate these changes when possible and act accordingly. Altering alliances in anticipation of a strength shift enables states to preserve peace whereas if they instead remained locked into existing alliance arrangements, sub-optimal outcomes including war would emerge.

Results from a series of quantitative empirical analyses strongly support the theory's implications. We analyze power and alliance dynamics within geographic regions. The outcome variable measures changes in intra-regional alliances—new alliances forming or old ones ending. The explanatory variable measures anticipated shifts in the military capabilities of all states of the region, building on the measurement approach in Bell and Johnson (2015). Consistent with the theory, moving from an instance where states expect the regional power balance to remain static to one where they anticipate large power shifts is associated with a 70% increase in the number of alliance changes. Alliance volatility is a fixture of international politics; expected strength shifts help explain the volatility.

The paper makes several contributions beyond demonstrating that states alter alliance behavior prospectively, and not just retrospectively. First, the formal model provides a flexible approach for studying a variety of issues related to alliances. These include specifying conditions when states balance versus bandwagon as well as analyzing whether alliance choices ameliorate or exacerbate power shifts that cause war, both of which we touch upon in building to the central theoretical result. Second, the paper contributes to recent efforts to move beyond the dyad given that consequential international behavior is often multilateral (Poast, 2010; Fordham and Poast, 2016). Alliances fall within this realm because they minimally involve state A allying with state B to counter a threat from state C. This study shows theoretically and empirically that an anticipated power shift in any of the relevant parties can alter the alliance structure among them all.

(Morrow, 1994; Gartzke and Weisiger, 2013). We thus do not offer a comprehensive theory of alliances but provide a flexible approach that could incorporate additional considerations.

Literature

Canonical accounts view alliances as a means to aggregate military capabilities in order to balance against a stronger (Waltz, 1979) or more threatening actor (Walt, 1987). These accounts are largely static. Given a set distribution of power (or threat), states pursue alliances to guard against any state achieving a position of preponderance. Many quantitative empirical analyses of alliance behavior adopt this static approach (Lai and Reiter, 2000; Johnson, 2017). Theories of bandwagoning (Schweller, 1994) in which weaker states ally with, rather than against, the preponderant power similarly generate expectations based on a given distribution of power. Theories that specify conditions amenable to balancing or bandwagoning (Christensen and Snyder, 1990; Powell, 1999) also take the static distribution of power as a point of departure.

Scholarship on alliances that does incorporate dynamics tends to be backward looking. States' alliance choices are reactionary rather than anticipatory. These studies theorize and find that recent strength shifts and war conclusions correlate with alliance termination (Morrow, 1991; Bennett, 1997). Christia (2012) analyzes sub-state actors during civil wars, showing that alliances shift in response to battlefield results. Expanding the temporal scope, others show that large capability shifts since the time of alliance formation are associated with states leaving alliance obligations unfulfilled (Leeds, 2003) and terminating alliances generally (Leeds and Savun, 2007). Along similar lines to Leeds and Savun (2007) and others, we contend that changes in prevailing conditions increase the probability of changes in alliance arrangements. In contrast though, states are forward looking in addition to backward looking in our account. Indeed, empirical robustness tests show that even when accounting for past strength shifts, anticipated strength shifts still influence alliance choices. Moreover, this study's framework subsumes both alliance formation and termination, rather than restricting attention to one or the other. Those studies that do consider anticipatory alliance changes do so in passing (Levy, 1987) or circumscribe the conditions for when states pursue this option (Schweller, 1992).

This paper departs from past studies by incorporating forward-looking dynamics into theory and empirics. The formal model, which introduces power shifts into a three-player game with alliances, war, and bargaining, builds on two lines of scholarship: a contest approach and a bargaining approach. Garfinkel (2004) provides a recent example in the contest tradition (Tullock 1980). Countries engage in a multi stage game in which they form alliances, allocate resources to arms or consumption, automatically engage in conflict between alliances, and compete with allies over the spoils. We relax this approach's assumption of automatic conflict.

We draw upon two strands of the bargaining approach, which explicitly deals with this issue. First, shifting power in a two player model can lead to inefficient war since rising countries cannot commit to not exploit future increased bargaining power (Fearon, 1995, 2004; Powell 2004, 2006). Second, a body of work brings the bargaining approach to study alliances. In these accounts, alliances may serve as signaling devices to demonstrate alliance credibility (Morrow, 1994) or tie the hands of allies, forcing them to fight or pay "honor costs" (Smith, 1995). Leaders can leverage alliances as signaling mechanisms by making hand-tying declarations or sinking costs—e.g, constructing military bases abroad (Fearon,1997). Numerous studies fruitfully develop and test these and related ideas (Yuen, 2009; Wolford, 2014; Fang, Johnson, and Leeds, 2014; Smith, 2016, Conrad, 2017). Crucially though, these models assign actors to set roles within the strategic interaction. We relax this restriction in order to capture the full array of alliance dynamics—formation, termination, and switching.

Model

We develop a basic shifting power model (Fearon 1995, Powell 1999) with the addition of a third player. Including a third country requires assumptions about what alliances do, how bargaining works inside and outside of an alliance, and how war alters the balance of power. The Supporting Information (SI) contains technical details, proofs, and several theoretical extensions.

Players, Resources, and Payoffs

A set of 3 countries, denoted by N, interact at discrete times $t \in \{0, 1, 2, ...\}$. All countries discount the future at a common rate $\delta \in (0, 1)$. Countries have resources for consumption and for military purposes. The total amount of resources available for consumption each period is $X > 0$, and the amount controlled by country i (which may change after a war) is denoted x_i. A nonnegative vector $\mathbf{x} = (x_1, x_2, x_3)$ specifies consumption resources for all countries, where $x_i > 0$ when a country is active, $x_i = 0$ if a country is inactive (defeated in war), and $\sum_{i=1}^{3} x_i = X$. For simplicity, we will assume that $X = 1$ and that countries initially control an even split of consumption resources, $\mathbf{x} = (1/3,\ 1/3,\ 1/3)$. This is not necessary to demonstrate the propositions. In addition to consumption resources, each country i has current military resources or strength, s_i. There is a finite set $\hat{S} = S \cup \{0\}$ of possible states, where an element s of $S = \{1, 2, ..., K\}$, $K \geq 1$ represents an active country's strength in war. A country defeated in war has a strength of 0 and becomes inactive. Let $\mathbf{s} \in \hat{S}^3$ denote a vector of military strengths for all countries.

When a country is at peace, its consumption reflects its resources and transfers arranged via bargaining. Let τ_{ij} denote net transfers from i to j.[4] In the absence of war, consumption in country i for a single period is $c_i = x_i - \sum_{j \in N \setminus \{i\}} \tau_{ij}$. Transfers are restricted by a bargaining protocol described below so that $c_i \geq 0$ for all i. The total payoff to a country that receives consumption stream $\{c_t\}_{t \geq 1}$ is $v_i = (1 - \delta) \sum_{t=1}^{\infty} \delta^{t-1} c_t$. If only a single country remains, the game ends and the survivor receives the entire stream of available consumption $(1 - \delta) \sum_{t=1}^{\infty} \delta^{t-1} X = X$.

Strength Shifts

We focus on one-time strength shifts where a single country's military power increases additively by $z \in \{1, 2, ..., K - 1\}$ where the maximum achieved military strength cannot exceed K. Particular power shifts are denoted (i, z) where i is the country shifting up by z for a single period. A power shift can either be *unanticipated* in the sense that sticky alliances have already formed when the shift takes place or *anticipated*, which countries can take into account when forming alliances.[5] The SI discusses the case of persistent shifts that last longer than a single period.

[4] Transfers are flow payments rather than asset transfers, though the model is robust to asset transfers as discussed in the SI.

[5] If one objects to unanticipated strength shifts and insists that countries assign some probability to the possibility of unanticipated strength shifts, then it is always possible to define a probability $\epsilon > 0$ that is sufficiently small that no part of the analysis changes. The presence of probabilistic strength shifts does not imply incomplete information or the need to specify belief formation.

Alliances

Countries can form alliances which last for one-period and have the following traits: (1) Members make a binding commitment to not attack each other. (2) Members make a binding commitment to go to war with any country at war with an alliance member, regardless of who initiates war. Many de jure defensive alliances often behave in this way. For instance, NATO, a defensive alliance, acted offensively when intervening in the Bosnian War and Kosovo War during the 1990s. We consider purely defensive alliances in the SI. (3) Alliance members can commit to sharing resources according to a known bargaining protocol, ϕ (described below). The credibility of alliance commitments is assumed as is standard in setups with cooperative game elements, but may be attributed to the existence of sufficient audience costs when signing an alliance contract.[6]

In every period, countries choose whether or not to form alliances upon observing the initial game state $(\mathbf{x}, \mathbf{s})$ and any anticipated strength shifts.[7] Once countries form alliances, $\mathbf{a}$ denotes the alliance state. $\mathbf{a}$ can either indicate the no alliance state, denoted 0, or any state in which alliances occur, denoted by specifying the allied countries, for example ij.

We assume that an alliance forms only if the alliance state is *stable*, defined as follows[8]:

Definition 1. Alliance state $\mathbf{a} \neq 0$ is stable if there is not a strictly positive deviation for any allied player and the outside player to another state $\mathbf{a}'$. The no alliance state, $\mathbf{a} = 0$, is stable if no two players have a weakly positive deviation to an alliance state.

Definition 1 implies that any two countries can object to the no alliance state and form an

[6]The commitment technology is the sense in which formal alliances are distinct from non-formalized alignments. This assumption allows alliances to credibly threaten a unified front during bargaining, even when one country may prefer to renege on the alliance in the event of war.

[7]We suppress whether war has occurred previously because the game is trivial after war.

[8]This is not Nash Equilibrium, but a cooperative game notion of stability closely related to the core solution concept in partition function games. The application of cooperative game theory avoids the necessity of exactly specifying the action space for the alliance formation stage. Given the large set of plausible actions, non-cooperative approaches tend to lead to a large multiplicity of equilibria (see Garfinkel, 2004). We mix cooperative and non-cooperative game elements in the tradition of Konishi and Ray (2003) and Kalai and Kalai (2013).

alliance. Furthermore, any alliance member can object to an alliance state and move to the no alliance state or form an alliance with the out country. The possibility of a grand coalition is excluded since any grand coalition would mimic the payoffs of one of these other coalitions, but deny countries the option value of fighting a war.

War

Wars are costly as countries involved receive zero consumption during conflict. Including additional costs beyond forfeiting consumption would not qualitatively impact the analysis. For expositional purposes, we assume that any country is physically capable of attacking any other country. Our results are flexible to dropping this assumption as shown in the SI where we formalize a network structure specifying which countries can attack each other. In a two country war, i wins with probability $p_i = s_i/(s_i + s_j)$. In a three country war without a coordinated alliance, i wins with probability $p_i = s_i/(s_i + s_j + s_z)$. When fighting against a coordinated alliance, i faces a penalty for fighting on two fronts of $\chi \in \{1, ..., \min\{s_1, s_2, s_3\}\}$, so that i's probability of victory becomes $p_i(\chi) = (s_i - \chi)/(s_i - \chi + s_j + s_z)$.[9] If one country is defeated, the victor acquires the defeated country's consumption and military resources.[10] Defeated countries receive a continuation payoff of 0.

Let w_i represent i's war value for continuing to fight until all opponents are defeated. When fighting two uncoordinated opponents at once, $w_i = \delta \frac{s_i}{s_i+s_j+s_z}$. This value is discounted by δ since consumption is lost in the one period of fighting. Similarly, when fighting two coordinated opponents at once, $w_i = \delta \frac{s_i-\chi}{s_i-\chi+s_j+s_z}$. Due to our assumptions about war values, in equilibrium, any war will involve all countries. The SI describes off-the-equilibrium path wars where one country attacks the two other countries in sequence.

[9]These particular contest success forms are not necessary for the results but do ease exposition of the alliance-utility tables below.

[10]If more than one country defeats a single country, they receive an equal share of i's resources x_i. The sharing rule does not qualitatively affect the result.

Bargaining Protocol

In the absence of power shifts, transfers are made according to some specific bargaining protocol where ρ represents the protocol between alliance groups and ϕ represents the protocol within alliances. The proofs go through for any ρ and ϕ that obey a set of assumptions (specified in the SI) that allow for a broad class of reasonable bargaining protocols. Consequently, we give up some degree of sharpness in our predictions so that our results are robust to a wide variety of game specifications. However, for ease of exposition, in all examples we will use the following specification: ρ gives proposer power to the country or alliance group that has the largest war value or splits the bargaining surplus evenly between countries that all have the weakly largest war values; under ϕ alliance members evenly divide any surplus beyond their no-alliance values.

Timing and Equilibrium Concept

We refer to the full game as Γ. Each period players make moves in the stage game, labeled $\Gamma(t)$, before moving on to the next stage game $\Gamma(t+1)$. The only distinction in timing from the standard preventive war model (Powell 2006), is that alliances must form every period.[11] The one complicating factor is whether sticky alliances form before countries know of a power shift or form after countries know of the power shift. We focus on the latter case since our primary interest is how anticipated power shifts alter alliance choices. In each period of this framework, countries observe the power distribution, learn of any looming power shifts, form alliances and determine transfers, and decide whether to initiate war.

We will restrict attention to Markov Perfect Equilibria (MPE). An MPE is a Subgame Perfect Equilibrium (SPE) such that players play Markov strategies. Markov strategies are strategies that depend only on the payoff relevant state. Accordingly, past actions affect strategy only through their effect on the state and players cannot explicitly condition on past actions.[12]

[11]See SI A for a technical description of the stage game.

[12]The SI argues why the restriction MPEs is reasonable.

Analysis: Static Alliance Formation

To show how anticipated power shifts affect alliance dynamics, the analysis proceeds through three conditions. The first, covered in this section, analyzes the model without power shifts to provide a baseline against which to compare subsequent results. The second examines cases with (semi-)fixed alliances that countries cannot change if they learn of a power shift. These serve as counterfactuals that help solve the third condition in which countries flexibly form alliances accounting for anticipated power shifts. Showing the consequences of fixed alliances provides intuition for results with flexible dynamic alliances.

Begin with the model without power shifts. The analytical approach is straightforward: calculate the payoffs for each country in each possible alliance state. Once completed, the resulting alliance-utility table shows which alliance, if any, is optimal. Consider an example where $\mathbf{s} = (10,\ 6,\ 3)$, $\delta = 0.9$, and the penalty of fighting against coordinated opponents is $\chi = 2$. Since countries always have the outside option of war, it is necessary to first calculate each country or alliance group's war value in each possible circumstance. Each country faces two uncoordinated opponents in the no alliance state and less discounting occurs if a country faces both opponents immediately. War values in the no alliance state are given by $w_i = \delta s_i / \left(s_i + s_j + s_z\right)$. Using this, one can find all war values in the no alliance state as $\mathbf{w}^0 \approx (0.474,\ 0.284,\ 0.142)$ where the superscript 0 represents the no alliance state. Since country 1 has the largest war value, it is able to extract the entire bargaining surplus, hence final values for this state are $\mathbf{v}^0 = (0.574,\ 0.284,\ 0.142)$. Transfers are being made with the vector of total net transfers $\tau \approx (0.241,\ -0.049,\ -0.191)$ since initial resources are $\mathbf{x} = (1/3,\ 1/3,\ 1/3)$.

Now consider alliance state $\{23\}$. Country 1's war value is now calculated as

$$w_1^{\{23\}} = \delta \tfrac{s_1 - \chi}{s_1 - \chi + s_2 + s_3} = 0.9 \tfrac{10-2}{10-2+6+3} \approx 0.423.$$

The alliance group's combined war value exceeds 1's war value and thus, according to ρ, the alliance group has proposer power and captures the surplus in bargaining. According to ϕ, alliance members receive their no-alliance values plus an equal share of the surplus. Hence, 2 receives

$$v_2^{\{23\}} = v_2^0 + \frac{1}{2}\left[\left(1 - w_1^{\{23\}}\right) - \left(v_2^0 + v_3^0\right)\right].$$

One can similarly find 3's value and calculate the value vector $\mathbf{v}^{\{23\}} = (0.423,\ 0.360,\ 0.218)$. Repeating this procedure for each alliance, we construct the following alliance-utility table:

Table 1: $\mathbf{s} = (10, 6, 3)$, $\chi = 2$, $\delta = 0.9$

	no alliance	$\{12\}$	$\{13\}$	**{23}**
v_1	0.574	**0.619**	0.611	0.423
v_2	0.284	0.329	0.211	**0.360**
v_3	0.142	0.053	0.179	**0.218**

The bolded numbers represent a country's best outcome. We bold an alliance state if two countries most prefer that state and will therefore form that alliance. We can see that the balancing alliance, $\{23\}$, is the unique stable alliance state in this period. From Lemma 1, this is also the unique alliance that forms in the MPE of the repeated game.[13]

Lemma 1. *In the absence of strength shifts, there exists a stable alliance state,* ***a****, of the stage game* $\Gamma(t)$. *When* ***a*** *is the unique stable alliance state of the stage game, it forms every period in the MPE of the repeated game,* Γ.

Analysis: Dynamic Alliance Formation

This section shows that alliance formation often depends on dynamic concerns. We demonstrate two propositions that characterize the novel implications of military strength shifts on war and consequently on alliance formation. The first subsection, with (semi-)fixed alliances, highlights how the presence of more than two actors can impact the conflict-causing potential of a strength shift. It also provides a necessary step toward understanding alliance dynamics when shifts are anticipated. Namely, it demonstrates how war may occur when alliances are initially immutable and non-anticipatory. The next subsection then focuses on our main result. When alliances are fully flexible, anticipated strength shifts cause alliances to shift today which can allow

[13]Lemma 1 extends the result in Krainin (2014) on static games to a repeated game setting. The result for this simplified setting without strength shifts will be critical for establishing subsequent results.

states to avoid the losses of war. In such cases, the power shifts dominate the distribution of power in determining which alliances countries form.

Fixed Alliances and Shifting Power

In this subsection, states form sticky alliances that they cannot change if they learn a power shift will occur. Alternatively, we can think of power shifts as unanticipated. Laying out the consequences of sticky alliances provides insights into the strategic logic motivating states to dynamically alter alliances when they do anticipate power shifts (our central concern).

Consider the case when countries form alliances that they cannot change if they learn a power shift will occur. Furthermore, assume that countries cannot change the alliance structure even after the power shift occurs—that is, during the next period of play. With these stipulations, the conditions for war are exactly analogous to Powell (2004) while treating any alliance groups as a single country. A sufficient condition for country or alliance group i to go to war is $w_i^{\mathbf{a}}(\mathbf{s}) > (1-\delta)\, c_i + \delta\, [v_i^{\mathbf{a}}(\mathbf{s}')]$. As in typical commitment problem models with shifting power, a country or alliance group i goes to war when its adversary's strength shifts sufficiently upward—i opts to obtain its current war value rather than any bargain today plus the discounted stream of its future bargains. The following alliance utility tables illustrate the case:

Table 2: $\mathbf{s} = (4,3,2)$, $\chi = 1$, $\delta = 0.9$

	no alliance	$\{12\}$	$\{13\}$	**$\{23\}$**
v_1	0.500	**0.544**	0.538	0.338
v_2	0.300	0.344	0.225	**0.381**
v_3	0.200	0.113	0.238	**0.281**

In this situation, countries form the optimal alliance $\{23\}$. Now imagine a shift in power of the form $(i,z) = (1,2)$ which results in the following post-shift alliance-utility table:

Table 3: $\mathbf{s} = (6,3,2)$, $\chi = 1$, $\delta = 0.9$

	no alliance	$\{12\}$	$\{13\}$	**$\{23\}$**
v_1	0.591	**0.628**	0.619	0.500
v_2	0.245	0.282	0.180	**0.291**
v_3	0.164	0.090	0.192	**0.210**

Countries 2 and 3, locked together in an alliance, will initiate war to prevent 1's rise. To see this, plug in the values from Tables 2 and 3[14] and solve the above inequality for c_i. To avoid war, consumption in the initial period for countries 2 and 3 must be

$$\begin{aligned} c_2 &\geq \frac{1}{(1-0.9)}\left[0.331 - 0.9\,(0.291)\right] \approx 0.69 \\ c_3 &\geq \frac{1}{(1-0.9)}\left[0.231 - 0.9\,(0.210)\right] \approx 0.42 \end{aligned}$$

which sum to more than the total consumption available. Even if 1 initially kept none of the resource for itself, 2 and 3 still prefer to fight. Sticky alliances can lead to war.

We now consider semi-fixed alliances in that sense that countries can alter alliance arrangements *after* a power shift occurs, as compared to the prior discussion with no alliance alterations. Optimal alliances may change after a strength shift for two reasons. One, the strength shift may change whether it is a balancing system or a bandwagoning system. Two, the shift may alter the strength order of countries causing a different balancing or bandwagoning alliance to form. A revised sufficient condition for war allows for strength shifts and subsequent alliance shifts:

$$w_i^{\mathbf{a}}(\mathbf{s}) > (1-\delta)\,c_i + \delta\left[v_i^{\mathbf{a}'}(\mathbf{s}')\right]. \tag{1}$$

The distinction between inequality (1), and the earlier condition for war is that (1) allows both the alliance state and the strength state to change. Alliance partners are not stuck together after the first period and may optimally respond to a strength shift by shifting alliances as discussed in prior scholarship (Leeds and Savun, 2007). Alliance shifts in response to a strength shift creates a potential secondary or indirect effect to any strength shift. For instance, the 2007 "surge" of an additional 30,000 US troops in Iraq facilitated the realignment of Sunni tribes against al-Qaida in Iraq (Biddle, Friedman, and Shapiro, 2012).

Alliance shifts following strength shifts can offset or exacerbate those strength shifts. First consider a scenario where alliance shifts mitigate strength shifts. The distribution of power starts off as in Table 2. After a shift of $(i, z) = (2, 3)$, the distribution of power becomes $\mathbf{s} = (4, 6, 2)$

[14]War values are peace values minus the bargaining surplus. Hence, peace values of 0.381 and 0.281 in the Table 2 above becomes 0.331 and 0.231 in the inequalities below.

with the corresponding alliance-utility table depicted in Table 4.

Table 4: After Shift: $\mathbf{s} = (4, 6, 2)$, $\chi = 1$, $\delta = 0.9$

	no alliance	$\{12\}$	**$\{13\}$**	$\{23\}$
v_1	0.3	0.334	**0.371**	0.245
v_2	0.55	**0.584**	0.409	0.578
v_3	0.15	0.082	**0.221**	0.177

As established above, 2 and 3 form an alliance given the initial conditions. After the strength shift, 3 will switch to being allied with 1 in the second period. Intuitively, the $\{13\}$ alliance represents an effort to balance against the rising power. To see that a peaceful bargain exists (unlike the earlier case), calculate the consumption demands in the period before the shift:

$$\begin{aligned} c_1 &\geq \frac{1}{(1-0.9)}\left[0.338 - 0.9\,(0.371)\right] = 0.4 \\ c_2 &\geq \frac{1}{(1-0.9)}\left[0.331 - 0.9\,(0.409)\right] = -0.4 \\ c_3 &\geq \frac{1}{(1-0.9)}\left[0.231 - 0.9\,(0.221)\right] = 0.3. \end{aligned}$$

Consumption must be positive by assumption, so any transfer system $c_1 \geq 0.4$, $c_2 \geq 0$, and $c_3 \geq 0.3$ is peaceful. Moreover it is feasible as total resources exceed total consumption. Thus, the alliance shift offsets the strength shift and restores feasible peaceful bargains.

Now consider a case where alliance shifts exacerbate strength shifts. Let $\mathbf{s} = (100, 99, 98)$, $(i, z) = (2, 2)$, $\chi = 50$, and $\delta = 0.9$. Tables 5 and 6 summarize this scenario.

Table 5: Before Shift: $\mathbf{s} = (100, 99, 98)$, $\chi = 50$, $\delta = 0.9$

	no alliance	$\{12\}$	$\{13\}$	**$\{23\}$**
v_1	0.403	**0.464**	0.4635	0.182
v_2	0.300	0.361	0.179	**0.411**
v_3	0.297	0.175	0.358	**0.408**

Table 6: After Shift: $\mathbf{s} = (100, 101, 98)$, $\chi = 50$, $\delta = 0.9$

	no alliance	$\{12\}$	**$\{13\}$**	$\{23\}$
v_1	0.301	0.362	**0.411**	0.181
v_2	0.404	**0.465**	0.184	0.464
v_3	0.295	0.173	**0.405**	0.355

There would be no war after the power shift if the initial alliance, $\{23\}$, were fixed. A bargain of the following form would avoid war:

$$\begin{aligned}
c_1 &\geq \frac{1}{(1-0.9)}\left[0.182 - 0.9\,(0.182)\right] = 0.18 \\
c_2 &\geq \frac{1}{(1-0.9)}\left[0.361 - 0.9\,(0.464)\right] = -0.57 \\
c_3 &\geq \frac{1}{(1-0.9)}\left[0.358 - 0.9\,(0.355)\right] = 0.38
\end{aligned}$$

which is feasible since the minimum positive consumption values add up to less than 1. However, since an alliance shift does occur, from $\{23\}$ to $\{13\}$, the best bargain 2 can receive is $(1-0.9) + 0.9\,(0.184) \approx 0.266$ which is less than 2's war value before the shift of 0.361. Consequently, the rising power 2 cannot be satisfied via bargaining and initiates war. When peace would prevail with fully fixed alliances, a post-strength shift alteration in alliances leads to war.

Proposition 1 summarizes these results, comparing the effect of strength shifts when alliances are fully fixed to the case where alliances can change after a strength shift occurs.

Proposition 1. *(War with Sticky Alliances) Consider an exogenous, one period, one country,* ***unanticipated****, positive strength shift where alliances can shift after one period compared to the case where alliance groups are permanently treated as a single country.*

1. *(Direct effect of a strength shift) For a given strength shift: (a) If non-allied country i initiates war when alliance shifting is possible, then i also initiates war when alliance shifting is not possible. (b) The converse does not hold.*

2. *(Indirect effect of a strength shift) For a given strength shift: (a) War may occur when alliances can shift, but not occur when alliances are fixed. (b) There exists a nonempty set of parameters where a rising power initiates war when alliance shifts are possible.*

Proposition 1 illustrates one reason why simplifying international systems to a two country setting can mislead. Proposition 1.1 demonstrates that two country models (or three country models where alliance partners are permanently fixed) may predict war when no war would occur when accounting for alliance shifts. Proposition 1.2 demonstrates the opposite. Simpler models may fail to predict war when it would indeed occur in a model where alliance shifts are possible. Finally, the result shows that rising powers may initiate war in this model. The result contradicts the prediction in two-country commitment problem models in which only the declining country opts for preventive war, which is an ahistorical prediction as demonstrated by World War II era Germany and Japan (Debs and Monteiro, 2015).

The results comment on canonical debates about the peacefulness of bipolarity and multipolarity (Waltz, 1979). Reframing actors in this model as "poles," polarity does not consistently affect peacefulness with respect to strength shifts. In some cases the presence of a third pole allows for alliance shifting that mitigates the effect of a strength shift. In other cases conflict may erupt in a multipolar system due to realignments that are not possible under bipolarity. The latter case is highly relevant for our main theoretical result on dynamic alliance formation. Countries have a strong incentive to alter alliances *before* strength shifts when those strength shifts would otherwise later induce a country to shift alliances and thereby increase the risk of preventive war.

Flexible Alliances and Anticipated Power Shifts

We turn to our central concern, examining a case with flexible alliances that can change *before* power shifts. This subsection shows by example that the distribution of power is not a sufficient statistic to determine alliance formation with anticipated power shifts. Dynamic effects can dominate static effects and determine which alliance forms.

Consider the situation analyzed in Tables 5 and 6 which produced war when alliances could only change after the power shift. We now examine behavior when countries anticipate the strength shift and can change alliances *before* the shift to attempt to avoid war. In this case, forming $\{13\}$ before the power shift occurs salvages peace. Country 3's choice is pivotal. In a setting with fixed alliances we know from above that 3 joins alliance $\{23\}$, goes to war, and secures a war value of 0.358. What if 3 opts to initially form $\{13\}$ instead? Doing so produces peace values before the shift of

$$
\begin{aligned}
v_1 &= (1-0.9)\,0.4635 + 0.9\,(0.411) \approx 0.416 \\
v_2 &= (1-0.9)\,0.179 + 0.9\,(0.184) \approx 0.184 \\
v_3 &= (1-0.9)\,0.358 + 0.9\,(0.405) \approx 0.400
\end{aligned}
$$

All countries prefer peace under alliance $\{13\}$ to their war values: $w_1 = 0.414$, $w_2 = 0.179$, and $w_3 = 0.308$. Critically, 3 prefers peace under $\{13\}$ to war under $\{23\}$ $(0.400 > 0.358)$. An anticipated power shift alters optimal alliances. All countries now prefer peace to any feasible war scenario. This example demonstrates the following proposition.

Proposition 2. *(Dynamic Alliances) When countries anticipate strength shifts at the time of alliance formation, there exists a nonempty set of parameters where the optimal static alliance does not form.*

Alliances which were optimal when strength shifts were absent or minimal may not be when strength shifts are looming. It follows that the likelihood of alliance changes increases when moving from a world with fixed power to one with anticipated changes in power.

Strength shifts can cause formerly peaceful alliance arrangements to devolve into conflict. Rather than be dragged into war, countries dynamically alter alliances in anticipation of these strength shifts. Doing so can restore the possibility of peace. Accordingly, it is imperative to account for power dynamics when analyzing alliance choices. Consider the general lack of hard balancing against the US after the Cold War. While it is possible a coalition including China could effectively balance the US and provide short run bargaining gains for those chafing under US hegemony, Proposition 2 suggests that China's rise relative to the US could disincline countries against such balancing. Aligning with the US and dynamically balancing China may improve the chances of peace compared to static balancing against the US. While we believe this logic applies, dynamic balancing is only one force among many related to this phenomenon (Ikenberry, Mastanduno, and Wohlforth, 2009; Lake, 2009; Gowa and Ramsay, 2017).

Dynamic Alliances in Practice

We focus the empirical analysis on one of the model's implications: greater anticipated strength shifts increase the likelihood of alliance changes. This section specifies the testable implication before operationalizing concepts from the theoretical model. We then describe a research design to quantitatively evaluate elements of the theory.

Alliance formation and termination depend upon the distribution of power *and* the dynamics of power. For a given power distribution, states form optimal alliances and maintain those alliances so long as power remains static (Lemma 1). If states anticipate that at least one state's power will change, then what constitutes the optimal alliance also may change (Proposition 2). Intuitively, the size of the anticipated strength shift matters. Minuscule changes in military strength, which are similar to static power environments, are unlikely to sufficiently alter war payoffs and induce alliance change. Larger strength shifts produce more dramatic changes in war payoffs. When states anticipate sizable changes, the probability that optimal alliance arrangements change increases, causing states to terminate existing alliances or form new ones. Put together, a testable implication follows: *An increase in expected strength shifts increases the probability of alliance changes.*

Because it is new to the literature and operationalization is feasible, we emphasize the relationship between forward-looking power dynamics and alliance changes as opposed to other implications that emerge from the model. While preferable to test additional implications, it would be misguided to do so when available measures are insufficient or when it requires diluting attention from new results given space constraints.

Operationalizing Concepts

We hypothesize that greater anticipated changes in the power distribution increase the likelihood of alliance changes. Mapping this theoretical contention to data involves three steps: 1) specify the relevant set of states, 2) measure anticipated power shifts in those states, and 3) capture alliance changes among those states.

First, who are the players? The model considers a three player setting which illustrates alliance dynamics while remaining tractable. We operationalize a set as a geographic region—the Americas, Europe, Sub-Saharan Africa, Middle East and North Africa, and Asia-Pacific. Regions provide an intuitive grouping of states that likely monitor one another's power dynamics and consider one another as potential allies. The appropriateness of a geographically-bounded conception of the relevant actors likely varies with time. Global interconnections may diminish the relevance of a regional framework, which is a point we address in the analysis.

A regional approach offers advantages over a strict three-player approach, which poses several problems. Many three-state configurations are politically irrelevant with no plausible alliance-formation possibilities. More generally, alliances rarely reflect strictly three-player considerations because they are multilateral (26% of alliances) or target more than one state (68% of alliances).[15] Regions, in contrast, often contain the full membership of alliances and their targets.

Despite each region consisting of more than the modeled three players, the hypothesis remains appropriate. While difficult to show analytically, the intuition is straightforward. Alliance-utility tables rapidly grow in complexity as the number of players increases. Finding analytical solutions for optimal alliance configurations after scaling up to a potentially 40 state setting is beyond the scope of this paper. Nonetheless, the basic insight of the hypothesis holds. With no expected power shifts, there is some set of optimal alliances. Provided the power distribution remains stable, this optimal set holds. In contrast, when states anticipate meaningful strength shifts, the optimal alliance set likely changes. Consequently, as expected strength shifts increase, so does the probability of alliance changes.

Region-year is the unit of analysis with each year representing a period from the theory. Regions vary in their temporal spans based on data availability and alliance behavior. For the main analyses the sample starts from the year in which the first regional alliance formed.[16] Across the five regions there are 526 observations with Europe contributing the most (n=183) and Sub-Saharan

[15] Percentages based on alliances with an offensive or defensive component (Leeds et al., 2002).

[16] Robustness tests in the SI include years preceding the first regional alliance and find similar findings. These specifications attenuate results because the outcome variable is definitionally equal to 0 in the added observations.

Africa the least (n=40).

The second step measures the core explanatory variable: anticipated strength shifts. We adopt the approach introduced in Bell and Johnson (2015). Abstractly, the approach models the relationship between observable state-level characteristics from time $t-1$ and that state's military strength at time t. It then uses the coefficients from the models and plugs in the values of those observable characteristics in t to generate a predicted future military strength for time $t+1$. More concretely, the outcome variable (military strength) takes the average of a state's share of global military personnel and expenditures, which are two components of CINC scores (Singer, Bremer and Stuckey, 1972). The predictors include economic potential (represented by the other four components of CINC scores), an indicator for rivalries (Thompson and Dreyer, 2010), the log of battle deaths in that year (Sarkees and Wayman, 2010), regime type as represented by *polity2* scores (Marshall and Jaggers, 2002), and an indicator for whether alliance obligations demanded military contributions in that year (Leeds et al., 2002). These predictors generally accord with observable traits that states use to assess power dynamics (Fordham, 2011; Bas and Schub, 2017). The generative model employs OLS with the country-year as the unit of analysis and country fixed effects.

We take the expected change in each state's military power: country i's estimated capabilities in $t+1$ minus actual capabilities in t, or $\widehat{Mil_{it+1}} - Mil_{it}$. *Expected Power Shift* is the mean absolute value expected change of each state in a region, or $\frac{1}{n}\sum_{i=1}^{n} |\widehat{Mil_{it+1}} - Mil_{it}|$, for a region with n states. Because power dynamics alter war payoffs and thus optimal alliance configurations, we are interested in expected power increases and decreases. Hence it is appropriate to use the absolute value of expected changes. The measure grants more weight to more powerful actors as their strength dynamics produce larger shifts in war payoffs and thus optimal alliances. Using the mean across a region captures the general level of anticipated strength shifts. Robustness tests using the *maximum* anticipated shift among states in the region yields similar results. Across all region-year observations, *Expected Power Shift* has a mean of 0.17 and standard deviation of 0.15. Higher values indicate more extreme anticipated power dynamics.

The third step is constructing a measure for regional alliance changes—the outcome variable.

We employ alliance data from ATOP (Leeds et al., 2002), using only those alliances with offensive and/or defensive provisions because the theory does not offer clear implications for alternative agreements. We identify all strictly intra-regional alliances for a given region. To assure a match between the unit of analysis (region-year) and the outcome variable, we exclude inter-regional alliances such as NATO. Intra-regional alliances constitute 70% of all alliances and thus are not an aberrant subsample to analyze. Next, we calculate the number of intra-regional alliances at the start of year t, formed during t, and terminated during t. We define *Alliance Changes* as the sum of intra-regional alliances formed and terminated in a region-year because both new and terminated alliances reflect alliance dynamics.[17] On average, a region has 0.68 alliance changes in a year with a standard deviation of 1.69. Figure 1 shows regional alliance shifts across time.

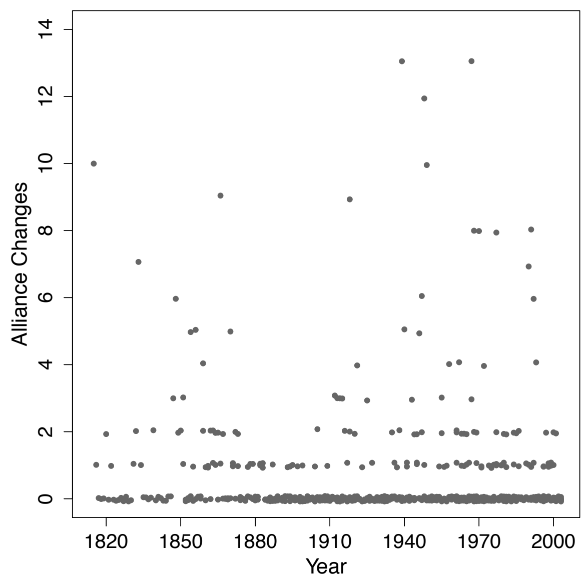

Figure 1: *Alliance Changes* over time by region-year. Vertical jitter added for readability.

The models include a set of control variables that may affect *Alliance Changes* or plausibly be confounding variables for *Expected Power Shift* and *Alliance Changes*. *Alliance Start Count* measures the number of intra-regional alliances at the start of the year. More existing alliances

[17]Formation and termination pertain to the entire alliance's start and end dates as opposed to changes in alliance phases or changes in alliance membership (Leeds et al., 2002).

increases the number of potential alliances to terminate. We calculate the variable as described above. *Dyads* indicates the number of dyads in a given region-year. We anticipate that alliance changes increase with the number of potential pairings. Having more *Major Powers*, defined in accordance with the Correlates of War Project (2017), may increase *Expected Power Shift* as their expected strength changes are larger than those for small states. It may also affect the frequency of alliance changes if multipolar systems are associated with greater alliance jockeying. *Year* accounts for possible time trends. Empirically, alliance changes become increasingly frequent in more recent years when conditioning on the region. All results remain similar when including a quadratic term for time trends. *Regional Uncertainty* offers a summary measure of a region's power distribution (Bas and Schub, 2016). Its value increases with greater power parity and decreases with a more strict hierarchy among states. When lower, indicating a relatively unbalanced power distribution, states may balance powerful actors through internal arms acquisition and external alliance formation, thus increasing *Expected Power Shift* and inducing more *Alliance Changes*. The SI provides summary statistics for all variables.

Results: Strength Shifts Produce Alliance Shifts

Do anticipated shifts in military power induce changes in intra-regional alliances? Figure 2 plots the main explanatory (*Expected Power Shift*) and outcome (*Alliance Changes*) variables with a fitted line and 95% confidence intervals from a bivariate OLS. In accordance with the hypothesis, greater expected strength shifts are associated with more alliance changes. When the mean absolute anticipated strength shift for states within a given region is small, few alliance changes occur. States have already formed the optimal set of alliances and the optimal set does not change. In contrast, when power dynamics become more pronounced, the optimal set of alliances changes. States exit existing alliances or enter new ones.

A series of regression specifications ensure that the relationship holds after accounting for other potential causes of alliance changes or confounders of the link between anticipated strength shifts and alliance alterations. Table 7 presents results from models using OLS with the region-year as the unit of analysis and number of *Alliance Changes* as the outcome variable. Models 2 through

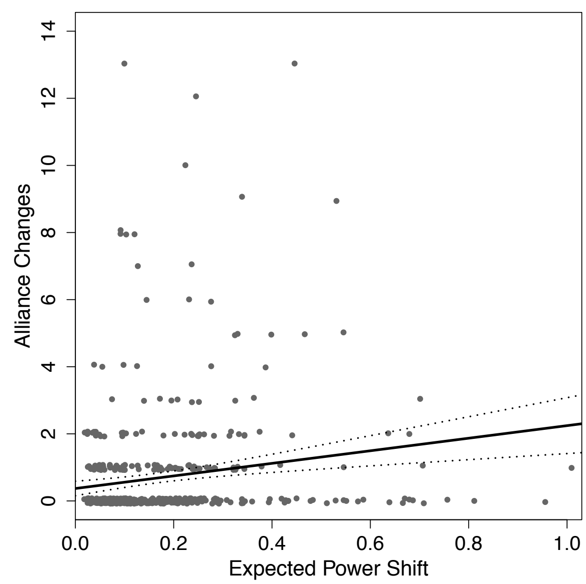

Figure 2: Descriptive plot of *Expected Power Shift* and *Alliance Changes* with fitted line and 95% confidence intervals from bivariate OLS. Vertical jitter added for readability.

5 include region fixed effects to account for unobserved time-invariant factors that may cause the frequency of alliance changes to differ between regions.

Greater anticipated changes in state-level capabilities increase the expected number of alliance changes within a region. This holds with and without control variables and with and without fixed effects. When states expect the regional balance of power to substantially change in the following year, the likelihood of alliance termination and/or formation increases. When they expect the regional balance to remain roughly static, few alliance changes occur. Models 4 and 5 disaggregate the relationship, separately examining alliances formed and terminated. Higher anticipated strength shifts within a region are associated with both a greater number of new alliances and greater number of alliance terminations. Consistent with the theory, power shifts alter the optimal alliance configurations. States exit old alliances and enter new ones.

Returning to the main analysis (Model 3), consider the effect within the European region of increasing the absolute *Expected Power Shift* from its 5th to 95th percentile values (0.03 and 0.45, respectively) when holding other variables at their medians. At the lower value, when states anticipate little change in the power distribution, the model predicts 1.6 alliance changes per year. At

Table 7: Mean Anticipated Strength Shifts and Alliance Dynamics

	Total Changed			Formed	Terminated
	(1)	(2)	(3)	(4)	(5)
Expected Power Shift	1.87***	1.19**	2.62***	1.02**	1.60***
	(0.50)	(0.54)	(0.67)	(0.40)	(0.43)
Alliance Start Count			0.03	−0.03**	0.06***
			(0.02)	(0.01)	(0.01)
Dyads			−0.0001	−0.004*	0.004
			(0.003)	(0.002)	(0.002)
Number Major Powers			−0.22*	−0.26***	0.04
			(0.12)	(0.07)	(0.08)
Regional Uncertainty			−2.51*	−1.84**	−0.67
			(1.39)	(0.84)	(0.89)
Year			0.0003	0.002	−0.002
			(0.002)	(0.001)	(0.002)
Constant	0.37***	1.18***	2.15	−0.78	2.93
	(0.11)	(0.17)	(4.47)	(2.71)	(2.85)
N	526	526	526	526	526
Region FEs	N	Y	Y	Y	Y
Outcome Mean	0.68	0.68	0.68	0.36	0.32

$^{*}p < 0.1$ $^{**}p < 0.05$ $^{***}p < 0.01$

Notes: OLS regression with region-year as the unit of analysis. Standard errors in parentheses. Outcome is total number of intra-regional alliance changes (M1-3), alliances formed (M4), and alliances terminated (M5). Region fixed effects not shown.

the higher value, when states anticipate sizable alterations to the regional power distribution, we expect 2.7 alliance changes per year. The marginal effect of a 1.1 increase in alliance changes ($\pm$ 0.6 at the 95% confidence interval) represents a roughly 70% relative increase in alliance transitions. Expected strength shifts and actual alliance jockeying in 1921 Europe typifiy the empirical pattern. The aggregate anticipated power shift that year was high (93rd percentile) due to large expected changes in Russian strength after the Polish-Soviet War and in France due to rising economic output. Using the observed values from the region-year, Model 3 predicts over two alliance changes, which is a high number within the data set (86th percentile). In reality, states formed four new intra-regional alliances that year. In a less fluid environment with fewer expected strength shifts, we would anticipate fewer alliance changes than the four observed. For instance, holding all other variables constant and decreasing *Expected Power Shift* to its 5th percentile value cuts the predicted number of alliance changes roughly in half.

Robustness: Time, Retrospection, and War

Tests in the SI demonstrate the robustness of the finding across additional specifications. These include models using robust standard errors[18], negative binomial count models, the maximum anticipated strength shift as opposed to the mean, and observations from years before the first regional alliance formed in each region. Results are also similar when evaluating anticipated *persistent* shifts as opposed to single year changes (Krainin, 2017). To show this, we reconstruct the explanatory variable by estimating each state's military capabilities three years out rather than one year out.

Table 8: Robustness Tests: Time, Retrospection, War, and Alliance Dynamics

	(1)	(2)	(3)	(4)
Expected Power Shift	2.77^{***}	2.05^{***}	1.73^{**}	1.85^{***}
	(0.95)	(0.73)	(0.68)	(0.67)
Retrospective Power Shift		0.38^{**}		
		(0.19)		
War			0.16^{***}	
			(0.03)	
War Termination				0.25^{***}
				(0.05)
Constant	2.97	2.41	4.09	3.82
	(12.47)	(4.46)	(4.40)	(4.37)
N	179	526	526	526
Region FEs	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Sample	Pre-1914	All	All	All
Outcome Mean	0.61	0.68	0.68	0.68

$^{*}p < 0.1$ $^{**}p < 0.05$ $^{***}p < 0.01$

Notes: OLS regression with region-year as the unit of analysis. Standard errors in parentheses. Outcome is number of intra-regional alliance changes. Region fixed effects and controls not shown.

Results are similarly robust to several substantive considerations, as shown in Table 8. Limiting

[18]We do not cluster standard errors on the region because there are only five clusters. Rejection rates substantially exceed 0.05 when dealing with a small number of clusters, particularly when clusters are unbalanced (Cameron and Miller, 2015, p. 341).

the sample to the pre-WW1 era (Model 1), when intra-regional concerns were particularly likely to supersede inter-regional concerns, produces similar findings. Accounting for retrospective power shifts, which are related to alliance termination and might also cause states to anticipate future power shifts, does not alter the substantive finding (Model 2). Nor does controlling for the number of regional actors involved in any war as coded in Reiter, Stam and Horowitz (2014). War could confound the relationship of interest as belligerents increase their military strength and may form new alliances or break old ones. Importantly though, even after controlling for war participation, anticipated strength shifts still have a significant effect (Model 3). War attenuates the relationship, but does not eliminate it. The same is true of war termination, which is likely a common cause of anticipated power shifts (defeated parties are disarmed or lose resources) and alliance dynamics (war-winning alliances dissipate) (Bennett, 1997). Results remain similar when including a variable counting the number of states that participated in a war ending in that year (Model 4). A range of quantitative tests consistently suggest that short run anticipated strength shifts alter the optimal set of alliances. States frequently end existing alliances or seek new ones to adapt to the changing landscape of power.

Conclusion

This paper theorizes and finds that states look to the future, not only the past and present, when forming new alliances and exiting old ones. In addition to the well-known role in explaining bargaining failures (Fearon, 1995; Powell, 2006), anticipated military strength shifts also play a vital role in explaining alliance dynamics. This expectation emerges from a theoretical model that jointly incorporates power dynamics, three players, bargaining, and flexible roles for all players. Analyzing a model with this collection of features offers new insights into balancing versus bandwagoning considerations, links between alliance choices and preventive war, and, most importantly for this paper, the effect of anticipated power shifts on current alliance arrangements. We show that future power dynamics can supersede existing power distributions in swaying states' alliance choices. As anticipated military strength shifts increase, the number of alliance changes grows. An array of empirical tests strongly support the contention. When regional power balances are stable, few alliance changes occur. As anticipated strength shifts increase, alliance changes grow more frequent whether in the form of new alliances formed or old ones terminated.

While this paper couches dynamic alliances and short term power shifts in terms of interstate behavior, the logic applies more broadly. Its lessons may travel to other settings with the potential for violence, such as revolutions or civil wars. This paper opens several additional pathways for future research. For theory, the formal model provides a useful framework for addressing other alliance-related topics. Subsequent analyses could further specify conditions amenable balancing versus bandwagoning. Another vein of research might explore the model's implications for war. In some circumstances, alliance switches exacerbate military strength shifts and spark preventive war. In other conditions, alliances changes offset strength shifts enabling states to strike credible bargains. Future work might consider dynamics beyond power. For instance, the model flexibly accommodates different network structures which could represent geographic linkages and force projection capabilities. Rationalist war could emerge solely due to network shifts (formation of a new link) even absent power shifts. Empirically, subsequent work can profitably incorporate factors beyond power that are associated with alliance choices. Policy affinity, regime type, and alliance institutionalization may moderate the relationship between future strength shifts and alliance dynamism.

The findings show the importance of looking beyond dyadic research designs when analyzing multilateral phenomena and accounting for expected *future* dynamics when studying decision-makers' choices. On the first, states frequently consider multiple actors when approaching strategic interactions; scholars can productively follow this lead when applicable for the substantive topic. On the second, states' decisions to accept or discard formal international obligations depend upon not only how matters stand today, but also how matters might stand tomorrow.

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