The Coalition Politics of Shifting Power and War*

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August 28, 2020

Abstract

I analyze a model in which a rising country bargains with an enemy and an erstwhile coalition partner, both of which may be tempted to launch a preventive war. When power will shift only moderately, peace is sustainable when war would otherwise occur with only two players, because neither decliner wishes to face the other alone after defeating the rising country. But when power will shift far enough, peace fails if (a) coalition partners fight over their shared victory, (b) the enemy attacks despite credible deterrent threats, or (c) the enemy attacks because shifting power has undermined collective deterrence, effectively splitting the coalition. The success of one bargain, whether within or across sides, can bolster the other, and the failure one can undermine the other. I also generalize the model and show how the same mechanism that explains multilateral peace also explains collective failures to form balancing coalitions.

11,197 words

*Thanks to Kiran Auerbach, Jeff Carter, Andrew Enterline, Kyle Haynes, Paul Hensel, Richard Jordan, Ashley Leeds, Doug Lemke, Amy Liu, Aila Matanock, Pat McDonald, Cliff Morgan, Glenn Palmer, Julie Phillips, Mike Poznansky, Toby Rider, Emily Ritter, Patrick Shea, William Spaniel, Amy Yuen, Chris Zorn, and audiences at Penn State and Purdue Universities, for helpful comments and suggestions and to Black Star Co-Op, Crown & Anchor Pub, Gabriel's Café, Growler USA, Pinthouse Pizza, Spider House Café, Taco Flats, Untappd at Home, and Workhorse Bar in Austin; Hotel Park and Human Fish Brewing in Ljubljana; BEAST Bar & Grill in Kaohsiung; OrgAsmo Curry and Zhang Men Brewing in Taichung; Whiskers in State College; Harry's Chocolate Shop in West Lafayette; and Southland Beer in Los Angeles for excellent work environments. Previous versions of this paper were presented at the 2019 Texas Triangle IR Conference, 27 January, Fredericksburg TX, and the 2019 International Political Science Association colloquium, June 13, Sarajevo BiH.

The Balkan League of Serbia, Bulgaria, Greece, and Montenegro defeated the Ottoman Empire in the First Balkan War of 1912-1913, overrunning Kosovo, Macedonia, the Sanjak of Novi Pazar, and Western Thrace. The Treaty of London, signed on 30 May 1913 and guaranteed explicitly by Germany, Russia, Italy, and Austria-Hungary, recognized Ottoman losses. Yet by late July, Ottoman armies had poured back into southeastern Europe, notwithstanding domestic upheaval, military defeat, and great power guarantees of its diminished borders. This Second Balkan War saw the Empire recover lands lost to Bulgaria in the First, including the city of Adrianople, and win official minority rights for Turks living in newly-Greek territory. Why, after a bloody, wasteful, and ostensibly decisive First Balkan War did the principals wage a Second less than two months later?

When former enemies return to war, political scientists often look for flaws in the settlement. Did the content of the ceasefire, armistice, or treaty correspond to military realities revealed by fighting (Werner and Yuen 2005)? Did the settlement provide ample means for monitoring and enforcement (Fortna 2003, 2004)?[1] Was it imposed (Quackenbush and Venteicher 2008, Senese and Quackenbush 2003), guaranteed (Goemans 2000), or subsidized (Arena and Pechenkina 2016) by third parties? Were the terms robust to changes—in military capabilities, alignments, national leaders, or domestic coalitions—that might encourage one side to resume fighting (Lo, Hashimoto and Reiter 2008, Werner 1999)?[2] The answers to these questions bode well for a stable peace after the First Balkan War, whose largely uninterrupted tide of battle consistently favored the victors and whose outcome, even if unratified by all parties, was guaranteed by a conference of the great powers.[3]

How, then, should we explain the Ottoman return to war in 1913? The state of the art, with its focus on bilateral relations between former enemies, points us to the wrong

[1]For applications of similar questions to peace after civil conflict, see, *inter alia*, Fortna (2008), Mattes and Savun (2009, 2010) and Hultman, Kathman and Shannon (2015).

[2]On the link between changing domestic circumstances and changes in foreign policy, see Wolford (2012, 2018) and Mattes, Leeds and Matsumura (2016).

[3]The absence of a formal agreement might arise as a possible explanation of the League's post-victory collapse. But the very anticipation of conflict over Macedonia explains (a) why Serbia and Bulgaria agreed only informally to Russian mediation before the war and (b) why Bulgaria wouldn't submit to a formal agreement ratifying Serbia's gains in the summer of 1913.

dimension of the settlement. It wasn't the bargain between victors and vanquished that first proved unsustainable but the bargain among the victors themselves. On 29 June, three weeks before Ottoman forces broke out into Thrace, Bulgarian armies attacked Serbian and Greek forces in Macedonia. After Serbia rebuffed a previously-agreed Russian mediation (Glenny 2012, pp. 243-248), Bulgaria attacked Serbia rather than see its erstwhile partner consolidate its position as the preeminent Balkan power (see Bobroff 2000, 80, Dakin 1962, 354-366, Howard 1931, 26-30). The origins of the Second Balkan War lay not in Turkish revanchism but in a winners' dispute over the fruits of victory. Whatever the flaws of the across-side bargain, they didn't precipitate Ottoman participation in the Second. The agreement among the the victors collapsed first, allowing the Empire to strike back.

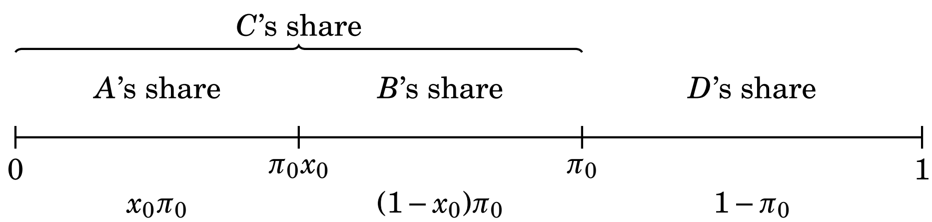
All wars end in some form of settlement, whether harsh or lenient, comprehensive or limited, robust or fragile. Most work focuses only on the distribution of political goods across sides, yet in the process of taking from the vanquished, the victors must also devise a credible within-side bargain lest they fall into war themselves (see Phillips and Wolford n.d., Wolford 2017). A single war can produce bargains on several dimensions, each of which must be self-enforcing if the settlement writ large is to succeed. The First Balkan War's principals weren't simultaneously satisfied with their shares of the postwar pie in 1913, but it took the collapse of the bargain among the victors to cause the collapse of the bargain between victors and vanquished. Thus, examining politics between only former enemies risks mischaracterizing failed settlements as successful or misunderstanding why some settlements fail. Indeed, most data on postwar peace samples on ceasefires (see Fortna 2003, 2004, Lo, Hashimoto and Reiter 2008, Quackenbush and Venteicher 2008, Werner 1999, Werner and Yuen 2005), but this would mis-identify the Ottoman invasion of Thrace, *not* the war among victors that enabled it, as breaking the First Balkan War's settlement.

Nearly half (40%) of all interstate wars fought in the last two centuries have seen military coalitions fight on at least one side (Sarkees and Wayman 2010), and more often than not those coalitions win (Morey 2016). But win or lose, coalitions must share in the distribution and defense of a new status quo if they're to sustain the bargain struck with their enemies. A durable settlement requires that both across- and within-side bargains be simultaneously self-enforcing. I explore settlement success and failure in a game-theoretic model in which countries contend over a flow of benefits divided across and within formerly-warring sides. Settlements survive when no player attacks another over the terms of either bargain, but the rising strength of one coalition member implies relative decline in both a former enemy *and* an erstwhile partner. There are several key results. First, settlements can survive shifts in power because the declining partner and declining enemy deter one another from preventive attack, avoiding wars that would be sure to occur dyadically. Second, shifting power can lead to intra-coalition war, though the imperative of confronting a common enemy can dampen those incentives. Third, even when the coalition has yet to collapse, a former enemy may attack, confident that doing so will split the coalition and undermine collective deterrence. Therefore, solving the commitment problem along one dimension can solve it along the other, and failure along one dimension can cause failure along the other. The stability of bargains *within* formerly-warring sides shapes the stability of bargains *across* formerly-warring sides, and vice versa. I also show in an extension that two decliners can indirectly deter one another from confronting a rising threat, either jointly or in combination, explaining failures to form balancing coalitions with the same mechanism that explains the durability of peace after coalition wars.

Model

Suppose that one rising country (or "riser") bargains over a flow of benefits with two declining countries ("decliners"). Each wishes to increase its share of the pie at other players' expense, but one decliner has the opportunity to defend the riser against the other decliner's attack. This aligned pair represents a coalition that's just defeated the third country in war, and the explicit opportunity for support in the event of attack helps isolate the problem of

Figure 1: Allocations in the Status Quo Settlement



collective deterrence. I show in an extension, however, that the model represents more general features of shifting power and shared threats. The previous war has clarified the initial distribution of power, removing an informational motive for fighting (see Werner and Yuen 2005). One coalition member, however, is set to grow in military strength unless defeated in a preventive war.[4] *De jure* international anarchy ensures that all bargains are up for renegotiation, such that the riser can't credibly promise not to renegotiate at the expense of either partner or enemy. Bilateral incentives for preventive war are well understood (see Powell 2006), but the model shows how the interaction of preventive motives in a multilateral setting can explain non-obvious collective outcomes, such as how shifting power that would cause war in bilateral settings can go unchecked in multilateral settings.

The coalition $C = \{A, B\}$ shares with D a flow unit-sized of benefits, over which players have linear preferences. The *settlement* that ended the previous war defines who gets what at the status quo, and Figure 1 shows its two dimensions: an *across*-side bargain that allocates $\pi_0 \in (0,1)$ to C and $1-\pi_0$ to D and a *within*-side bargain that allocates $x_0\pi_0$ and $(1-x_0)\pi_0$, where $x_0 \in (0,1)$, respectively to A and B. War can break out over either or both dimensions. When the game begins, each country is satisfied; it receives at least as much in the settlement as it could gain by fighting. D hopes to revise the across bargain in its favor, and coalition members face the challenge of cooperating in defense of the across bargain as they contend over the terms of the within bargain. Both sets of priorities are complicated by

[4] I use "preventive war" in a general sense to indicate wars driven by commitment problems, which are rationalized by the desire to lock in a relatively favorable outcome against future loss.

the fact that B will experience an increase in its military capabilities that it can't credibly commit not to exploit if given the opportunity.

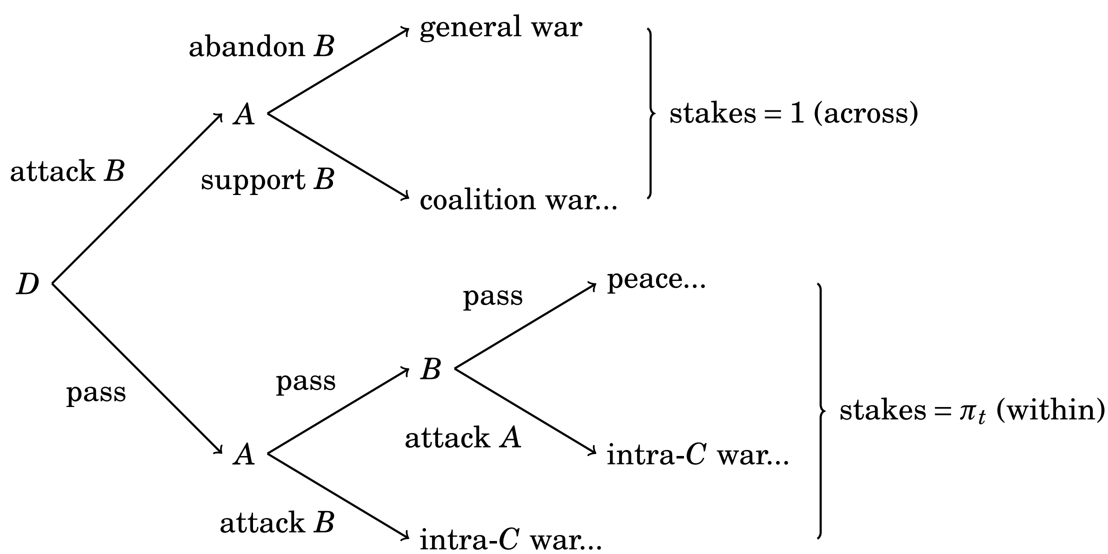
In each of a potentially infinite number of periods, beginning at time $t = 0$, the settlement survives if no player attacks another. Peaceful negotiations, even though they occur in the shadow of war, don't constitute failures of the settlement. With common discount rate $\delta \in (0,1)$, payoffs for a settlement that survives from period t are

$$u_A = \frac{x_t \pi_t}{1-\delta}, \quad u_B = \frac{(1-x_t)\pi_t}{1-\delta}, \quad \text{and} \quad u_D = \frac{1-\pi_t}{1-\delta},$$

where bargains are indexed by t to indicate possible renegotiation. Next, as long as B isn't defeated in a war at time $t = 0$, its military capabilities increase between periods $t = 0$ and $t = 1$. Since states can in principle bargain over both political goods and their own strength, exogenous capability growth is key to explaining preventive war in the absence of information problems (Debs and Monteiro 2014), asymmetric patience (Chadefaux 2011), or multiple enemies (*ibid.*). Thus, B may rise due to the imminent consolidation of the fruits of victory, differential rates of postwar recovery, the need to arm against another opponent, a rearrangement of alliance commitments, or intense domestic demands for military growth. D's chances of winning a renewed war against the coalition are thus poised to fall, as are A's chances of defeating B in an intra-coalition conflict. B is the only possible target of attack, as the decliners have no direct incentive to attack one another.

Figure 2 gives the three-country stage game at which play begins. D first chooses whether to pass or to attack B. If D passes, A chooses whether to attack B or to pass. Attacking initiates an *intra-coalition war* over the terms of the within bargain, but since D has passed the war remains bilateral. If A passes, B chooses between attack, which also entails intra-coalition war, and pass, which ends the period in *peace*. If A and B fight, the winner $i = \{A, B\}$ enters a two-player stage game, like the one represented in Figure 3 where $j = D$, where players compete over the entire prize. If all players pass, then play at $t = 0$

Figure 2: Moves, outcomes, and stakes in three-player stage game, where ellipses indicate transition to the same or a two-player stage game

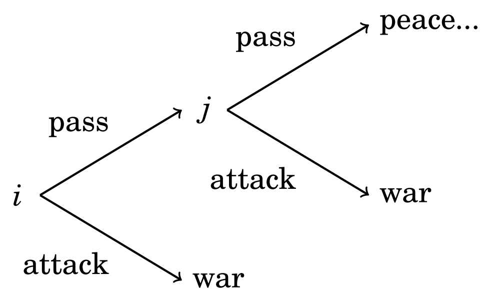


transitions to a three-player stage game in which B's military capabilities have increased. If D attacks B at $t = 0$, A has the opportunity to support B in a *coalition war*, during which D either defeats the coalition, ending the game, or loses to it, transitioning to the two-player stage game in Figure 3 where $i, j = A, B$. A's choice of abandoning B, on the other hand, leads to a *general war* in which one belligerent defeats the others.[5] If a war leaves only one survivor, play ends with that country controlling the flow of benefits.

Payoffs depend on the outcomes of wars and negotiations. First, wars are costly lotteries that allocate the period's stakes, 1 in a war over the across bargain and π_t in a war over the within bargain, to the winning side and eliminate the losing side. Each belligerent i pays an upfront cost for fighting $c_i(w) > 0$, where $w = \{b, k, g\}$ indicates bilateral, coalition, and general wars. Bilateral wars, which can occur inside the coalition or between D and the

[5] I make this assumption for analytical convenience, but it also approximates the ultimate outcome of a war involving belligerents D and B, as well as an interested third party (A), who can still preserve a share of the pie proportional to its relative military power. In other words, it ensures that A's payoffs are a function of its own military power relative to the other two players, as would be the case if it were to engage in subsequent bargaining with the winner of a two-party war between B and D or to join D in a war against B (cf. Powell 1999, Ch. 5). An alternative would allow A a period of neutrality before bargaining with the eventual winner, but it would complicate matters without changing the substance of the results.

Figure 3: Moves and outcomes in two-player (i, j) stage game, where ellipses indicate repetition of the stage game



winner of an intra-coalition war, are less costly than either coalition or general wars. I make no assumption about the relative costs of the latter two, so $c_i(b) < \min\{c_i(k), c_i(g)\}$. Unlike other treatments of shifting power (e.g. Powell 2006), I model the upfront costs of war rather than its destructiveness. The latter would impose the mathematical burden of cumulative destruction on a divided pie for little analytical gain; war's costs matter here only as a source of inefficiency, so I opt for the simpler representation (see also Fearon 1995, 404-408, Wolford, Reiter and Carrubba 2011). Second, the probability with which a side wins a war is the ratio of its military capabilities to the sum of all military capabilities engaged in the war. For example, in a two-belligerent war at $t = 0$, i defeats j with probability

$$p_i(m_i, m_j) = \frac{m_i}{m_i + m_j},$$

where $m_{i,j} > 0$. Next, i wins a general war against two opponents j with probability

$$p_i\left(m_i, \sum m_j\right) = \frac{m_i}{m_i + \sum m_j}.$$

Note that for any $t > 0$, B's capabilities are $m_B + s$, where $s > 0$ is the boost experienced if it either avoids or wins a war at $t = 0$. Therefore, s represents the size of the prospective shift in B's capabilities. Finally, for any three-player stage game, a coalition of A and B defeats

D with probability

$$p_C(m_A, m_B, s\sigma, m_D) = \frac{m_A + m_B + s\sigma}{m_A + m_B + s\sigma + m_D},$$

where $\sigma = \{0, 1\}$ indicates whether the shift has occurred, and D wins with the complementary probability $1 - p_C(m_A, m_B, s\sigma, m_D)$.

Negotiations occur automatically at the end of a period between states that have avoided war, generating efficient divisions of the flow based on countries' relative power and ensuring that the riser can't commit not to leverage newfound strength against its partner or its enemy. If all players pass, then bargains automatically reflect relative power at the end of the period. If A defeats B in an intra-coalition war, however, then it captures only π_t, and the across-side bargain is renegotiated with D only in the following period. At the status quo settlement, for example,

$$\pi_0 = \frac{m_A + m_B}{m_A + m_B + m_D} \quad \text{and} \quad x_0 = \frac{m_A}{m_A + m_B},$$

which defines payoffs for that period if all players pass, before transitioning to $t = 1$, where

$$\pi_1 = \frac{m_A + m_B + s}{m_A + m_B + s + m_D} \quad \text{and} \quad x_1 = \frac{m_A}{m_A + m_B + s},$$

if all players pass, which automatically reflects B's new strength. Power never shifts again once B rises, so I abuse notation and subscript all bargains at $t \geq 1$ as x_1 and π_1. And since all two-player continuations entail negotiations over the entire flow of benefits, through the elimination of either D or a coalition member, I subscript those negotiated outcomes as $\pi_{i,j}$, where they automatically reflect each side's chances of defeating the other in war. For example, if A defeats B in an intra-coalition war at $t = 0$, it secures π_0 for itself in the current period, but if it avoids war with D at $t = 1$, payoffs are

$$u_A = \pi_{A,D} = \frac{m_A}{m_A + m_D} \quad \text{and} \quad u_D = 1 - \pi_{A,D} = \frac{m_D}{m_A + m_D}.$$

Finally, recall that B's capabilities are $m_B + s$ once it survives to $t \geq 1$, which are reflected in across bargains $\pi_{A,B}$ and $\pi_{B,D}$.

B's rising military capabilities shape the distributions of power underlying within and across bargains, creating *two* decliners, in contrast to dyadic models of the commitment problem (e.g. Debs and Monteiro 2014, Fearon 1995, Leventoglu and Slantchev 2007, Powell 2006, 2012, Wolford, Reiter and Carrubba 2011). Several models, however, do consider multiple decliners.[6] Arena and Pechenkina (2016) study a model with shifting power and three players, but the third party wants to secure peace through subsidies, not gain at another party's expense. Chadefaux (2011, 243-244) shows that risers may be unable to compensate multiple decliners in a model with endogenously shifting power, though he abstracts away from alignments. And in a model with a similarly two-dimensional settlement, Phillips and Wolford (n.d.) show that revisionist threats from defeated countries can discourage intra-coalition war. Their model, however, abstracts away from the outbreak of general and coalition war, limiting what it can say about the simultaneous success and failure of multiple bargains. This model, in contrast, is useful for exploring how shifting power shapes bargaining between a riser and two decliners that disagree over whether and how that riser ought to compensate them for their impending loss of power.

[6] Gallop's (2017) model, which abstracts away from information and commitment problems, introduces a third player but also gives players ideal points over outcomes rather than treating the stakes of bargaining as a private good, a distinction without a difference in most two-player models (cf. Fearon 1995, but see Bils and Spaniel 2017). Three players with linear preferences over maximizing their shares of the pie would still reach settlement under complete information and static power.

Analysis

I solve for stationary Markov Perfect Equilibria (MPE), a refinement of Subgame Perfect Equilibrium in which strategies depend only on payoff-relevant information (Maskin and Tirole 2001). MPE rules out strategies in which players threaten to punish deviations from the path of play, which is useful for isolating the effects of commitment problems on settlement failure. Markov strategies depend on the current state of the world and a transition rule defining how play moves between states. The game has five states, $\theta = \{1, \dots, 5\}$, defined by the number of players, their capabilities, and the stakes under contention:

- At $\theta = 1$, the initial state, all three players are present, and B's capabilities are m_B.
- At $\theta = 2$, all three players are present, but B's capabilities are $m_B + s$. Only all players passing at $\theta = 1$ leads to $\theta = 2$.
- At $\theta = 3$, A and D bargain over the entire prize after A defeats B in an intra-coalition war at $\theta = 1$ or $\theta = 2$.
- At $\theta = 4$, B's capabilities have increased, and it bargains with D over the entire prize after B defeats A in an intra-coalition war at $\theta = 1$ or $\theta = 2$.
- At $\theta = 5$, B's capabilities have increased, and it bargains with A over the entire prize after defeating D in a coalition war at $\theta = 1$ or $\theta = 2$.

The game begins at $\theta = 1$, and it transitions to state 2 only if all players pass. War in any three-player state, $\theta \in [1,2]$, leads to one of the two-player states, $\theta \in [3,5]$, where play remains unless or until war leaves only one survivor. There are no absorbing states, because players can always end play in any two-player continuation by resorting to war. Calculating an MPE entails identifying best responses for each player at each state, given implications for time-t payoffs and transitions to other states.

Before analyzing the full game, I establish two lemmas. Lemma 1 establishes that all MPE in states after which B rises ($\theta \geq 2$) are peaceful, ensuring that (a) shifting power is the cause of war at $\theta = 1$ and (b) introducing a third party doesn't introduce additional motives for war unrelated to the commitment problem. Then, Lemma 2 characterizes the conditions under which MPE are violent or peaceful in a two-player version of the model. Moving to the full model, Proposition 1 characterizes a *successful deterrence* MPE at which all states pass and A's promise to support B is credible. Lemmas 3 and 4 establish that the imperatives of collective deterrence, which prevent D from launching a preventive war in the successful deterrence MPE, also prevent wars between A and B that would occur in a two-player model. The threat of facing D alone encourages A to tolerate B's rise, which manifests in a willingness to support B that deters D from trying to prevent B's rise. I then identify multiple paths along which successful deterrence unravels. Proposition 2 describes an *intra-coalition war* MPE in which A attacks B despite knowing that it'll face D alone if it wins. Proposition 3 describes a *failed deterrence* MPE at which D attacks despite A's willingness to support B in a coalition war. Finally, Proposition 4 characterizes a *compromised deterrence* MPE at which D attacks because doing so prompts A to abandon B. The stability of across and within bargains are endogenously linked: the failure of one can presage the failure of the other, and the success of one can support the success of the other.

Lemma 1 (No shift, no war)**.** *All players pass in any state following a shift in power.*

Lemma 1 establishes that no player attacks in a state that occurs after B successfully rises in power—that is, after all players pass or after D wins an intra-coalition war at $t = 0$. The bargaining mechanism ensures that players receive shares of the pie commensurate with their relative power, which saves the costs of war, and since those values don't change at a static distribution of power, peace is assured. If war is to occur in equilibrium, it must occur before (and because) B rises in power.

Lemma 2 (Two players)**.** *Let $\pi = 1$ and $m_D = 0$. There exists an MPE at which A attacks B*

at $t = 0$ when

$$c_A(b) < \frac{m_A s \delta}{(m_A + m_B)(m_A + m_B + s)(1-\delta)} = c_A^{\dagger}(b). \tag{1}$$

Otherwise, all MPE are peaceful.

Lemma 2 considers a two-player model in which D's capabilities are set to zero and $\pi = 1$, such that A and D bargain over a fixed flow. Line (1) states that A attacks B preventively when the costs of war aren't too high, but this inequality can't be satisfied unless power is shifting—that is, unless $s > 0$. Otherwise, $c_A^{\dagger}(b) = 0$ when $s = 0$ because A gains nothing from attack. Therefore, war occurs when power is shifting and the costs of war aren't too high relative to the shift in power. This is a different expression than Powell's (2006) inefficiency condition, which places a minimum value on the shift because war entails destruction rather than upfront costs, but the substantive interpretation—that A attacks when power is shifting sufficiently relative to the costs of war—is the same. The more power will shift in B's favor, the more eager A is to launch a costly war from today's position of relative strength to lock in a favorable share of the flow.

Successful Settlements

In each period of Proposition 1's *successful deterrence* MPE, D passes in the face of A's credible commitment to help B meet an attack, and A passes on its own chance to attack, allowing B to rise peacefully. Play then remains permanently at $\theta = 2$ (recall Lemma 1), allowing B to renegotiate within- and across-side bargains in its favor. A expects to receive a less favorable share of the within bargain, but passing ensures that it won't face D alone as it would after winning an intra-coalition war. D, for its part, passes rather than wage a costly war against an intact coalition. Countries avert two wars at this equilibrium, one launched from within and one from without the riser's coalition.

Proposition 1 (Successful deterrence)**.** *There exists an MPE for which strategies at $t = 0$*

entail all players passing and A supporting B when $c_D(k) \geq \hat{c}_D(k)$*, where*

$$\hat{c}_D(k) = \frac{m_D s \delta}{(m_A + m_B + m_D)(m_A + m_B + s + m_D)(1-\delta)}; \tag{2}$$

$c_A(k) \leq \hat{c}_A(k)$*, where*

$$\hat{c}_A(k) = c_A(g) - \frac{m_A s \delta}{(m_A + m_B + m_D)(m_A + m_B + s)(1-\delta)}; \tag{3}$$

and either (a) $s \leq (m_B m_D)/m_A = \hat{s}$ *or (b)* $s > \hat{s}$ *and* $c_A(b) \geq \hat{c}_A(1)$*, where*

$$\hat{c}_A(b) = \frac{m_A \delta (m_A s - m_B m_D)}{(m_A + m_B)(m_A + m_D)(m_A + m_B + s + m_D)(1-\delta)}.$$

The successful deterrence MPE exists when D's costs for war against an intact coalition are sufficiently high, A's costs for supporting B in a coalition war are sufficiently lower than its costs for waging a general war, and either (a) B's growth in power is small or, failing that, (b) A's costs for an intra-coalition war are sufficiently high. Note that Proposition 1 places no constraints on B, because passing is a dominant strategy for the rising player. Further, each inequality holds unconditionally when $s = 0$, such that peace obtains for all values of the parameters when power isn't shifting. Peace at a relatively stable distribution of power isn't surprising; B's rise is small enough for A to tolerate, and D's relative power won't decline so far that it's impelled to attack. But in this three-player game, the rationales supporting the decliners' decisions are interdependent. A tolerates the concessions it'll make in the wake of B's rise because it prefers sharing with B to facing D alone, and D passes on attacking B because A will come to the latter's defense. Each decliner thus deters the other, despite the fact that passing guarantees an adverse shift in the distribution of benefits.

Lemma 3 states that D's willingness to pass and A's willingness to pass and to support B increase in the other's capabilities.

Lemma 3 (Reinforcing commitments)**.** *At the successful deterrence MPE, D's pass constraint becomes easier to satisfy as* m_A *increases, and A's support and pass constraints become easier to satisfy as* m_D *increases.*

From D's perspective, A's willingness to support B reduces the effective size of the shift in power; a given value of s has a smaller effect on D's probability of victory, making attack less attractive as m_A increases. We can see this by returning to D's pass constraint in Line (2): if $m_A = 0$, then D attacks at some shifts in power at which it's deterred when $m_A > 0$. Further, A becomes more willing to support and less willing to attack B as m_D increases; the prospect of either fighting a general war or facing D alone after defeating B is less attractive when D is more powerful. Fighting alongside B blunts the effects of D's capabilities, buying A a greater chance of surviving into the next period than it would enjoy in a general war and allowing it to share the entire prize with B after victory. One decliner's willingness to tolerate B's rise reinforces the other's, keeping the settlement stable through shifts in power over which it would otherwise fall apart.

Finally, Lemma 4 compares the conditions under which A and B remain at peace in the three-player game to the two-player case described in Lemma 2.

Lemma 4 (Comparison to two players)**.** *When*

$$\max\left\{0, \hat{c}_A(b)\right\} \leq c_A(b) < c_A^{\dagger}(b),$$

A and B avoid war in the three-player game but fight in the two-player game, and the difference $c_A^{\dagger}(b) - \hat{c}_A(b)$ *increases in s.*

Peace between A and B is more sustainable in the three-player model than it is in the two-player model, because in the latter victory means that A can enjoy the flow alone after defeating B. In the three-player model, however, a victorious A must still contend with D, whose strategic position improves after B's elimination. Defeating B solves one commitment problem, but it creates another. Lemma 4 also shows that the range of parameter values at which A attacks in the two-player model but not in the three-player model increases in the size of the prospective shift in power (s). Formally, this occurs because $c_A^{\dagger}(b)$ increases more quickly than $\hat{c}_A(b)$ in s. Substantively, shifting power is more threatening to A in the two-player case than in the three-player case, provided that power isn't shifting so far that the successful deterrence equilibrium doesn't exist (on that, see the next section).

The successful deterrence equilibrium is always less likely to exist as s increases, so Lemma 4 implicates not the effect of shifting power on settlement failure but the consequences of omitting multiple decliners from empirical analyses. The extent to which we misestimate the probability of war between two states as a function of shifting power depends on both (a) which other parties we omit and (b) the extent to which power is shifting—the explanatory variable itself (see, e.g. Bell and Johnson 2015). Therefore, Lemma 4 counsels caution in choosing units of observation (see, *inter alia* Cranmer and Desmarais 2016, Croco and Teo 2005, Poast 2010). If we think of D's relationships with A and B as omitted variables in a model of war between A and B, then measures of shifting power in the observed dyad would be associated with greater error in predicting the relationship between shifting power and war; the greater the shift in power, the greater the difference in rates of war between dyadic and multilateral observations. And to the extent that peace settlements are multilateral (see Phillips and Wolford n.d., Wolford 2017), dyadic units of observation may struggle to identify credible patterns linking shifting power to war. Suppose, for example, that shifting power between A and B would cause war in a dyadic context but not in a multilateral context. Omitting D's relationship to the A-B dyad would lead us to infer that war didn't occur when it "should've," but the (proper) inclusion of D would indicate that we shouldn't expect war. Omitting other decliners need not bias inferences only in this direction, though. It can also lead us to expect peace when we ought to expect war.

Failed Settlements

I show in this section that A, D, or both may fight rather than allow power to shift in B's favor. In the obverse of Proposition 1's reinforcing commitments, failed settlements exhibit reinforcing failures: the collapse of one bargain encourages another's collapse. At the *intra-coalition war* MPE, A attacks B and the war stays localized, though the winner goes on to negotiate with a D relatively strengthened by one coalition member's defeat. Next, at the *failed deterrence* MPE, D attacks despite A's willingness to support B, touching off a renewed coalition war. Finally, in two *compromised deterrence* MPE, D's attack prompts A to abandon B in favor of a general war. I close the section by showing that shifting power undermines both dimensions of the settlement; D's willingness to attack at $t = 0$, as well as A's willingness to abandon and attack B, increases in the size of the shift in power (s).

Proposition 2 describes an MPE at which A attacks B at $t = 0$, hoping to lock in a favorable distribution of benefits before B can rise, safe in the knowledge that D will wait to bargain with the lone victor of the intra-coalition war over the entire flow.[7]

Proposition 2 (Intra-coalition war)**.** *There exists an MPE for which strategies at* $t = 0$ *entail D passing, A supporting but attacking, and B passing when* $c_D(k) \geq c_D^\dagger(k)$*, where*

$$c_D^\dagger(k) = \frac{m_B m_D \delta (m_D s - m_A(m_A + m_B + 2m_D))}{(m_A + m_B)(m_A + m_D)(m_A + m_B + m_D)(m_B + m_D + s)(1-\delta)},$$

$c_A(b) < \hat{c}_A(b)$*,* $c_A(k) \leq \hat{c}_A(k)$*, and* $s > \max\{\hat{s}, s^\dagger\}$*, where*

$$s^\dagger = \frac{m_A(m_A + m_B + 2m_D)}{m_D}.$$

At this equilibrium, A's commitment to support B is credible, but the threat is never called in. Rather, D's unwillingness to attack allows A to wage a localized war against B

[7] There exists another intra-coalition war MPE in which A would abandon B if D were to attack, but it's less interesting and has the same observable implications.

over the within bargain. Proposition 2 shows that this equilibrium exists when (a) power will shift enough to make intra-coalition war attractive and (b) D's costs of fighting an intact coalition are prohibitive. These conditions are more stringent when D is more powerful, because A is less likely to attack B when it'll face a powerful D alone after victory; D's commitment problem encourages A's restraint. We can check this by noting that both of A's attack constraints, $s > \hat{s}$ and $c_A(k) < \hat{c}_k$, become harder to satisfy as m_D increases.[8] This generalizes Phillips and Wolford's (n.d.) result linking a reduced risk of preventive war between a rising-declining dyad to increases in a shared enemy's capabilities; in their model, D moves only after A and B renegotiate. Propositions 1 and 2 show that a similar story can account for intra-coalition war when D can also move against the across bargain before intra-coalition negotiations.

The intra-coalition war equilibrium offers a useful account of the Second Balkan War, in that a declining coalition partner (Bulgaria) attacked a rising partner (Serbia) over the within bargain, despite the risk that a former enemy (the Ottoman Empire) might take advantage to recoup losses. Bulgaria recognized the risk of exposing its Thracian rear if it attacked Serbia and Greece, asking Austria-Hungary to press for Ottoman demobilization (Faissler 1939-1940, 153) and retaining a misplaced belief that Russia would keep the Ottomans in check (Hall 2000, 108). Bulgaria was, however, undeterred thanks to a mistaken confidence in Turkish weakness (Williamson Jr 1991, 145). In the model, D waits until the conclusion of intra-coalition war before renegotiating, which is at variance with the Ottoman decision to push back into Trace while Bulgaria was still engaged with Serbia. But it's not too different from A's reasoning in equilibrium, because the knowledge that it'll face D after victory doesn't deter A from deciding for war against its rising partner. The shadow of Ottoman intervention looms over the gains from fighting whether it comes during or after intra-coalition war. Further, as established by Lemma 1, D won't attack if the coalition remains intact, consistent with Empire's opportunism with respect to its former enemies'

[8]The proof is straightforward. The numerator of $\hat{s}$ increases in m_D, while the numerator and denominator of $\hat{c}_A(k)$ decrease and increase, respectively, in m_D.

inability to share the fruits of victory.

Next, the failed deterrence MPE entails D attacking B at $t = 0$ despite A's credible commitment to support B. A passes on intra-coalition war if given a chance, but it's denied that chance as a D attacks the coalition in hopes of staving off future losses.[9]

Proposition 3 (Failed deterrence)**.** *There exists an MPE for which strategies at* $t = 0$ *entail D attacking, A supporting and passing, and B passing when* $c_D(k) < \hat{c}_D(k)$, $c_A(k) \leq \hat{c}_A(k)$,*and either (a)* $s \leq \hat{s}$ *or (b)* $s > hats$ *and* $c_A(b) > \hat{c}_A(b)$*.*

Deterrence fails at this equilibrium because A's credible promise to support B isn't sufficient to deter D's attack. The consequences of shifting power are too great relative to the costs of a renewed coalition war . Whether deterrence fails, however, has less to do with D's absolute capabilities than with the long-run consequences of shifting power. Examining D's attack constraint, $c_D(k) < \hat{c}_D(k)$ as defined in Line (2), shows that its willingness to wage war against the coalition decreases in $m_{A,B}$ and increases in s. The effect of D's own capabilities, however, is non-monotonic; $\hat{c}_D(k)$ increases through low values of m_D, making the attack constraint easier to satisfy, peaks at a middling value of m_D, then declines and becomes harder to satisfy as m_D rises through higher values.[10] When D is weak, shifting power can't move the terms of settlement too much farther; likewise, when D is sufficiently powerful, it's less threatened by any given shift. Therefore, those defeated countries most likely to attack coalitions with rising members are neither too strong nor too weak.

Finally, two compromised deterrence MPE entail D attacking and A abandoning B in favor of a general war. At the first equilibrium, A passes if D passes; D's attack splits a coalition that would otherwise remain intact (cf. Crawford 2011). In the second, A attacks if D passes. In each case, B's rise undermines both dimensions of the settlement, because D has no incentive to attack B unless doing so unravels the within bargain.

[9]There's another, less interesting, failed deterrence MPE at which A would attack if given the chance despite being willing to support B.

[10]To see how, note that $\partial_{m_D}(\hat{c}_D(k)) \leq 0$ when $m_D \leq \sqrt{(m_A + m_B)(m_A + m_B + s)}$ and positive otherwise.

Proposition 4 (Compromised deterrence)**.** *There are two interesting compromised deterrence MPE.*

1. *Strategies at $t = 0$ entail D attacking, A abandoning and passing, and B passing when $c_D(g) < \hat{c}_D(g)$, where*

$$\hat{c}_D(g) = \frac{m_D s \delta}{(m_A + m_B + m_D)(m_A + m_B + m_D + s)(1-\delta)};$$

   $c_A(k) > \hat{c}_A(k)$, and either (a) $s \leq \hat{s}$ or (b) $s < \hat{s}$ and $c_A(b) > \hat{c}_A(b)$.

2. *Strategies at $t = 0$ entail D attacking, A abandoning and attacking, and B passing when $c_D(g) < c_D^{\dagger}(g)$, where*

$$c_D^{\dagger}(g) = \frac{m_B m_D \delta (m_D s - m_A(m_A + m_B + 2m_D))}{(m_A + m_B)(m_A + m_D)(m_A + m_B + m_D)(m + B + m_D + s)(1-\delta)},$$

   $c_A < \hat{c}_A(b)$, $c_A(k) > \hat{c}_A(k)$, and $s > \max\{\hat{s}, s^{\dagger}\}$.

Deterrence doesn't fail *per se*, because the coalition's commitment to fight together is incredible. It's more useful to say that shifting power compromises collective deterrence, giving D an opportunity to exploit intra-coalition friction, splitting the coalition when it attacks. Increases in s make D's attack constraint and A's abandonment constraint easier to satisfy at each MPE in Proposition 4, but they also render players more likely to find themselves in the second MPE at which A attacks B even if D passes. Therefore, when power is shifting most substantially in B's favor, the risk of both intra-coalition war *and* general war increases, though the former remains off the path of play. This leads to a clear empirical implication: the risk of war between former enemies increases in the unrealized risk of war between members of the war-winning coalition.

The game's violent equilibria show that a common causal variable (s) accounts for several different paths to war, only one of which—Proposition 3's failed deterrence—resembles the broken ceasefires that dominate in the study of postwar peace. Shifting intra-coalition power may also tempt D to recoup losses after the coalition implodes or to split the coalition before a completed shift in power can make its deterrent threat credible, yet purely bilateral models can't account for these paths to failure. The stability of within and across bargains are linked; the success of one can ensure the success of the other, as shown in Proposition 1, and the failure of one can cause the failure of the other, as shown in Proposition 4. Individual incentives for preventive war can be offset in equilibrium with additional declining players, discouraging rather than encouraging the outbreak of preventive war. Thus, whether shifting power encourages war or peace depends on the riser's relationships with decliners. When partners will come to its aid, peace lasts longer than it otherwise would as long as power won't shifting too far; but when D's rise threatens both enemies *and* friends, peace is more fragile.

Extension: Balancing Coalitions

The main model assumes a specific pattern of alignments to isolate the challenges of collective deterrence, but its core logic applies to more general settings. Alignment between A and B in Figure 2 manifests in the opportunity to fight as a coalition if D attacks B, but what if A and D can form a balancing coalition to stem B's rise (Waltz 1979, cf. Snyder 1991, 124, Powell 1999, Ch. 5, Wagner 2004)? In the appendix, I analyze a model in which A and D first choose simultaneously whether to attack B or to pass, allowing for both coalition and bilateral wars. If the decliners pass, B can pass or attack A, D, or both. Two-player stage games are structurally identical to those found in the baseline model. Equilibria are also largely similar, in that (a) war never occurs after power shifts, (b) B's dominant strategy is passing, and (c) war may break out at time $t = 0$ due to B's inability to commit not to renegotiate once it rises. The most interesting MPE entails no player attacking, though there are also three violent equilibria: one in which A and D attack B together as a balancing coalition, and two in which one decliner attacks while the other successfully passes the buck (see

Waltz 1979, 165-169).

I focus here on an MPE in which both decliners pass, allowing B to rise despite the fact that it will extract concessions from both A and D once it grows stronger. First, mirroring Lemma 4, peace is sustainable between A and B under the broadest conditions in the three-player game. And just like the baseline model, this range widens as D grows more powerful. Second, Lemma 3's reinforcing commitments are *not* an artifact of alignments cutting across the rising-declining distinction. They appear to be a more general feature of the politics of shifting power, applicable to any pair of countries that may form a balancing coalition. If B had only one enemy, it would suffer preventive attack, but since it has two, one decliner's fear of waging war today only to face the other decliner tomorrow can discourage balancing. Deviating from the equilibrium means attacking B alone, which solves one commitment problem only to create another; eliminating B's capabilities makes D a relatively greater threat. In equilibrium, the decliners' solution is to avoid solving the first problem as they watch a shared threat's uninterrupted rise. This explanation for collective balancing failure, which shares some features with Wagner's (2004) conjecture, is distinct from disagreements over cost- or burden-sharing (Wolford 2015, Ch. 3, Henke 2019), which create incentives for buck-passing in a classic collective-action framework (Waltz 1979, 165, Snyder 1991, 124). Thus, a common mechanism can explain both the durability of multilateral settlements *and* failures to balance against shared threats.

Conclusion

Peace settlements are often multidimensional, their success predicated on the simultaneous viability of bargains negotiated across and within formerly warring sides. When one member of a war-winning coalition rises in power, former enemies and erstwhile partners may consider preventive war. These incentives can offset one another when a riser's partner prefers to leverage that strength to deter a shared enemy's preventive attack. Two decliners deter each other, ensuring the survival of settlements that would fail if there were only one decliner. Settlements can break down, however, when (a) former enemies are sufficiently weak that intra-coalition war breaks out in isolation, (b) former enemies can't be deterred despite the coalition's willingness to fight together, and (c) intra-coalition frictions are so great that attacking the coalition can precipitate its collapse. One bargain's success can bolster the other, and one bargain's failure can compromise the other. Finally, the same mechanism that supports peace after coalition wars—the fear of creating a second commitment problem by solving the first one—can also account for collective balancing failures.

Few studies of postwar peace consider the problem of shared victory, though Werner (1999, p. 925) finds no relationship between the number of parties in a war and failures of the across bargain. My model makes sense of this pattern; multilateral victories may produce settlements either more or less fragile than unilateral victories, depending on how members of the winning coalition share in their victory. Shifting power between D and B, for example, may not lead to war when B's present capabilities are already bolstered by a partner willing to come to the riser's aid. Observed shifts in power also appear to have an inconsistent relationship with recurrent war in dyadic studies of postwar peace (see Lo, Hashimoto and Reiter 2008, Werner and Yuen 2005), but that inconsistency may be a function of empirical models that treat settlement-dyads as independent. The standard approach is to calculate robust standard errors clustered on former-enemy dyads produced by the same war, yet the problem isn't heteroskedasticity but an inappropriate unit of observation. Dyadic empirical models are appropriate for many questions, but not those that implicate shared victory and collective deterrence.

The model isolates war-winning coalitions, but multidimensional settlements aren't limited to coalition victories. The Korean War ended in stalemate, creating one across bargain and a within bargain for each belligerent coalition. The war left the Korean Peninsula divided, with North Korea, China, and the Soviet Union on one side, and South Korea, the United States, and their partners on the other, each coalition dividing political influence over their respective shares of the settlement and the burdens of deterring the other side from trying to overturn the settlement (see Reiter 2009). Should cracks in either coalition begin to show, should one side anticipate that collective deterrence will fail due to disagreements within the other coalition, the overall settlement may be in jeopardy. Collective deterrence, as well as intra-coalition restraint of two dissatisfied Korean governments (Benson 2012, Fang, Johnson and Leeds 2014), was key to ending the fighting and remains central to its survival. The war produced a "strong" ceasefire (Fortna 2003, pp. 343, 346, 350), tying great powers to its enforcement and creating a Demilitarized Zone (DMZ). But mutual deterrence may still collapse, the DMZ notwithstanding, if the coalitions guaranteeing the settlement appear fragile. Richer models may yield insights into a wider range of settlements, but the basic tension of sharing in the division and defense of the status quo is important for any coalition after the war, however it ends.

The politics of multilateral settlements also figure prominently in questions of global order. To the extent that the balance of power is supported by a status quo coalition expected to defend it in a crisis, that balance should be more fragile when potential challengers anticipate that the winners' intra-coalition bargain is fragile. If we take the theoretical model as representing collective deterrence in general, then it offers some insights into the United States-dominated postwar order. First, a strong opponent helps smooth out shifting power inside the status quo coalition. Against a formidable Soviet Union, cooperation in the Western bloc was relatively easy, compared to the fissures that emerged when Russian military and economic power bottomed out, allowing a relatively weak Russia to seize parts of Georgia in 2008 and Ukraine in 2014, safe in the knowledge that a coordinated Western response wasn't forthcoming. Second, collective deterrence also rests on a stable distribution of power—at a minimum, one to which states can peacefully adjust the distribution of benefits—inside the status quo coalition. From Korea to maritime Southeast Asia to Eastern Europe, the durability of the international status quo, forged in 1945 and adjusted after the Korean War and the collapse of the Soviet Union, depends as much on Chinese and Russian revisionism as it does the survival of the status quo coalition. Substantial changes in relative power inside the status quo coalition, to the extent that they compromise collective deterrence, may presage future challenges and, at the extreme, great power war.

References

Arena, Philip and Anna Pechenkina. 2016. "External Subsidies and Lasting Peace." *Journal of Conflict Resolution* 60(7):1278–1311.

Bell, Sam R. and Jesse C. Johnson. 2015. "Shifting Power, Commitment Problems, and Preventive War." *International Studies Quarterly* 59(1):124–132.

Benson, Brett V. 2012. *Constructing International Security: Alliances, Deterrence, and Moral Hazard*. Cambridge: Cambridge University Press.

Bils, Peter and William Spaniel. 2017. "Policy Bargaining and Militarized Conflict." *Journal of Theoretical Politics* 29(4):647–768.

Bobroff, Ronald. 2000. "Behind the Balkan Wars: Russian Policy toward Bulgaria and the Turkish Straits, 1912-1913." *Russian Review* 59(1):76–95.

Chadefaux, Thomas. 2011. "Bargaining Over Power: When Do Shifts in Power Lead to War?" *International Theory* 3(2):228–253.

Cranmer, Skyler J. and Bruce A. Desmarais. 2016. "A Critique of Dyadic Design." *International Studies Quarterly* 60(2):355–362.

Crawford, Timothy W. 2011. "Preventing Enemy Coalitions: How Wedge Strategies Shape Power Politics." *International Security* 35(4):155–189.

Croco, Sarah E. and Tze Kwang Teo. 2005. "Assessing the Dyadic Approach to Interstate Conflict Processes: A.K.A. "Dangerous" Dyad-Years." *Conflict Management and Peace Science* 22(1):5–18.

Dakin, Douglas. 1962. "The Diplomacy of the Great Powers and the Balkan States, 1908-1914." *Balkan Studies* 3(2):327–374.

Debs, Alexandre and Nuno P. Monteiro. 2014. "Known Unknowns: Power Shifts, Uncertainty, and War." *International Organization* 68(1):1–31.

Faissler, Margareta A. 1939-1940. "Austria-Hungary and the Disruption of the Balkan League." *The Slavonic and East European Review* 19(53/54):141–157.

Fang, Songying, Jesse C. Johnson and Brett Ashley Leeds. 2014. "To Concede or Resist? The Restraining Effect of Military Alliances." *International Organization* 68(4):775–809.

Fearon, James D. 1995. "Rationalist Explanations for War." *International Organization* 49(3):379–414.

Fortna, Virginia Page. 2003. "Scraps of Paper? Agreements and the Durability of Peace." *International Organization* 57(2):337–372.

Fortna, Virginia Page. 2004. "Interstate Peacekeeping: Causal Mechanisms and Empirical Effects." *World Politics* 56(4):481–519.

Fortna, Virginia Page. 2008. *Does Peacekeeping Work: Shaping Belligerents' Choices After Civil War*. Princeton: Princeton University Press.

Gallop, Max. 2017. "More Dangerous Than Dyads: How a Third Party Enables Rationalist Explanations for War." *Journal of Theoretical Politics* 29(3):353–381.

Glenny, Misha. 2012. *The Balkans: Nationalism, War, and the Great Powers 1804-2011*. New York: Penguin.

Goemans, H.E. 2000. *War and Punishment: The Causes of War Termination and the First World War*. Princeton University Press.

Hall, Richard C. 2000. *The Balkan Wars, 1912-1913: Preude to the First World War*. Routledge.

Henke, Marina E. 2019. *Constructing Allied Cooperation: Diplomacy, Payments and Power in Multilateral Military Coalitions*. Cornell University Press.

Howard, Harry N. 1931. *The Partition of Turkey: A Diplomatic History, 1913-1923*. University of Oklahoma Press.

Hultman, Lisa, Jacob D. Kathman and Megan Shannon. 2015. "United Nations Peacekeeping Dynamics and the Duration of Post-Civil Conflict Peace." *Conflict Management and Peace Science* 33(3):231–249.

Leventoglu, Bahar and Branislav Slantchev. 2007. "The Armed Peace: A Punctuated Equilibrium Theory of War." *American Journal of Political Science* 51(4):755–771.

Lo, Nigel, Barry Hashimoto and Dan Reiter. 2008. "Ensuring Peace: Foreign-Imposed Regime Change and Postwar Peace Duration, 1914-2001." *International Organization* 62(4):717–736.

Maskin, Eric and Jean Tirole. 2001. "Markov Perfect Equilibrium: I. Observable Actions." *Journal of Economic Theory* 100(2):191–219.

Mattes, Michaela, Brett Ashley Leeds and Naoko Matsumura. 2016. "Measuring Change in Source of Leader Support: The CHISOLS Dataset." *Journal of Peace Research* 53(2):259–267.

Mattes, Michaela and Burcu Savun. 2009. "Fostering Peace After Civil War: Commitment Problems and Agreement Design." *International Studies Quarterly* 53(3):737–759.

Mattes, Michaela and Burcu Savun. 2010. "Information, Agreement Design, and the Durability of Civil War Settlements." *American Journal of Political Science* 54(2):511–524.

Morey, Daniel S. 2016. "Military Coalitions and the Outcome of Interstate Wars." *Foreign Policy Analysis* 12(4):533–551.

Phillips, Julianne and Scott Wolford. n.d. "Collective Deterrence in the Shadow of Shifting Power." University of Texas at Austin.

Poast, Paul. 2010. "(Mis)Using Dyadic Data to Analyze Multilateral Events." *Political Analysis* 18(4):403–425.

Powell, Robert. 1999. *In the Shadow of Power*. Princeton University Press.

Powell, Robert. 2006. "War as a Commitment Problem." *International Organization* 60(1):169–203.

Powell, Robert. 2012. "Persistent Fighting and Shifting Power." *American Journal of Political Science* 56(3):620–637.

Quackenbush, Stephen L. and Jerome F. Venteicher. 2008. "Settlements, Outcomes, and the Recurrence of Conflict." *Journal of Peace Research* 45(6):723–742.

Reiter, Dan. 2009. *How Wars End*. Princeton: Princeton University Press.

Sarkees, Meredith Reid and Frank Wayman. 2010. *Resort to War: 1816-2007*. CQ Press.

Senese, Paul D. and Stephen L. Quackenbush. 2003. "Sowing the Seeds of Conflict: The Effect of Dispute Settlements on Durations of Peace." *Journal of Politics* 65(3):696–717.

Snyder, Glenn H. 1991. "Alliances, balance, and stability." *International Organization* 45(1):121–142.

Wagner, R. Harrison. 2004. "Bargaining, War, and Alliances." *Conflict Management and Peace Science* 21(3):215–231.

Waltz, Kenneth. 1979. *Theory of International Politics*. Addison-Wesley.

Werner, Suzanne. 1999. "The Precarious Nature of Peace: Resolving the Issues, Enforcing the Settlement, and Renegotiating the Terms." *American Journal of Political Science* 43(3):912–934.

Werner, Suzanne and Amy Yuen. 2005. "Making and Keeping Peace." *International Organization* 59(2):261–292.

Williamson Jr, Samuel R. 1991. *Austria-Hungary and the Origins of the First World War*. St. Martin's press.

Wolford, Scott. 2012. "Incumbents, Successors, and Crisis Bargaining." *Journal of Peace Research* 49(4):517–530.

Wolford, Scott. 2015. *The Politics of Military Coalitions*. New York: Cambridge University Press.

Wolford, Scott. 2017. "The Problem of Shared Victory: War-Winning Coalitions and Postwar Peace." *Journal of Politics* 79(2):702–716.

Wolford, Scott. 2018. "Wars of Succession." *International Interactions* 44(1):173–187.

Wolford, Scott, Dan Reiter and Clifford J. Carrubba. 2011. "Information, Commitment, and War." *Journal of Conflict Resolution* 55(4):556–579.

Appendix

Proofs

Proof of Lemma 1. Begin with two player states, $\theta_t \geq 3$, and let $i, -i$ represent the two players. Power is static if players have reached any two-player state, so the unique stationary MPE entails both players passing in every period and remaining at the initial state. Given that $-i$ passes, i also passes when

$$\frac{m_j}{m_i + m_j} \cdot \frac{1}{1-\delta} \geq \frac{m_j}{m_i + m_j} \cdot \frac{1}{1-\delta} - c_j(b),$$

which is sure to be true since $c_j(b) \geq 0$. Therefore, the stationary MPE of any two-player continuation with static power is peaceful.

Now consider $\theta = 2$, in which all players pass, ensuring that play never transitions to another state. Beginning at the last move, B passes when

$$\frac{(1-x_1)\pi_1}{1-\delta} \geq -c_B(b) + \frac{m_B + s}{m_A + m_B + s}\left(\pi_1 + \delta \cdot \frac{\pi_{B,D}}{1-\delta}\right),$$

and A passes when

$$\frac{x_1 \pi_1}{1-\delta} \geq -c_A(b) + \frac{m_A}{m_A + m_B + s}\left(\pi_1 + \delta \cdot \frac{\pi_{A,D}}{1-\delta}\right).$$

Both are sure to be true, since $c_i(b) > 0$. D's payoff for attacking depends on whether or not A supports B. Finally, D passes regardless of A's strategy when

$$\frac{1-\pi_1}{1-\delta} \geq \begin{cases} \frac{m_D}{m_A+m_B+s+m_D} \cdot \frac{1}{1-\delta} - c_D(k) & \text{if } A \text{ supports } B \\ \frac{m_D}{m_A+m_B+s+m_D} \cdot \frac{1}{1-\delta} - c_D(g) & \text{if } A \text{ abandons } B, \end{cases}$$

which is sure to be true since $c_D(w) > 0$. Therefore, all players pass in all states $\theta \geq 2$. □

Proof of Lemma 2. Lemma 1 establishes that both players pass at $\theta = 2$, i.e. once power has shifted. It remains to establish when A attacks and when it passes at $\theta = 1$. B passes at $\theta = 1$ when

$$1 - x_0 + \delta \cdot \frac{1-x_1}{1-\delta} \geq \frac{m_B}{m_A + m_B} \cdot \frac{1}{1-\delta} - c_B(b),$$

which is sure to be true since $c_B(b) > 0$ and $s > 0$. A, however, passes when

$$x_0 + \delta \cdot \frac{x_1}{1-\delta} \geq \frac{m_A}{m_A + m_B} \cdot \frac{1}{1-\delta} - c_A(b),$$

or when

$$c_A(b) \geq \frac{m_A s \delta}{(m_A + m_B)(m_A + m_B + s)(1-\delta)} = c_A^{\dagger}(b). \tag{4}$$

Therefore, the MPE is peaceful when $c_A(b) \geq c_A^{\dagger}(b)$ and violent when $c_A(b) < c_A^{\dagger}(b)$. □

Proof of Proposition 1. Lemma 1 establishes that all players pass in all states $\theta \geq 2$, so it remains to prove that all players pass and A supports in state $\theta = 1$. Begin with the last move of the stage game, B passes when

$$(1 - x_0)\pi_0 + \delta \cdot \frac{x_2 \pi_2}{1-\delta} \geq \frac{m_B}{m_A + m_B}\left(pi_0 + \delta \cdot \frac{\pi_{B,D}}{1-\delta}\right) - c_B(b),$$

which is sure to be true given $c_B(b) > 0$ and $s > 0$. A passes when

$$x_0 \pi_0 + \delta \cdot \frac{x_1 \pi_1}{1-\delta} \geq \frac{m_A}{m_A + m_B}\left(\pi_0 + \delta \cdot \frac{\pi_{A,D}}{1-\delta}\right) - c_A(b),$$

or when either (a) $s \leq \hat{s}$, where

$$\hat{s} = \frac{m_B m_D}{m_A}, \tag{5}$$

or (b) $s > \hat{s}$ and $c_A(b) \geq \hat{c}_A(b)$, where

$$\hat{c}_A(b) = \frac{m_A \delta (m_A s - m_B m_D)}{(m_A + m_B)(m_A + m_D)(m_A + m_B + s + m_D)(1-\delta)}. \tag{6}$$

Next, A supports when

$$\frac{m_A + m_B}{m_A + m_B + m_D}\left(x_0 \cdot 1 + \delta \cdot \frac{\pi_{A,B}}{1-\delta}\right) - c_A(k) \geq \frac{m_A}{m_A + m_B + m_D} \cdot \frac{1}{1-\delta} - c_A(g),$$

or when $c_A(k) \leq \hat{c}_A(k)$, where

$$\hat{c}_A(k) = c_A(g) - \frac{m_A s \delta}{(m_A + m_B + m_D)(m_A + m_B + s)(1-\delta)}. \tag{7}$$

Finally, D passes given that A will support B when

$$1 - \pi_0 + \delta \cdot \frac{1 - \pi_1}{1-\delta} \geq \frac{m_D}{m_A + m_B + m_D} \cdot \frac{1}{1-\delta} - c_D(k),$$

or when $c_D(k) \geq \hat{c}_D(k)$, where

$$\hat{c}_D(k) = \frac{m_D s \delta}{(m_A + m_B + m_D)(m_A + m_B + s + m_D)(1-\delta)}. \tag{8}$$

All proposed strategies are best responses under the stipulated conditions, ensuring that the proposed equilibrium exists. □

Proof of Lemma 3. First,

$$\frac{\partial \hat{c}_D(k)}{\partial m_A} = -\frac{m_D s\delta(2(m_A+m_B+m_D)+s)}{(m_A+m_B+m_D)^2(m_A+m_B+m_D+s)^2(1-\delta)} < 0,$$

such that D's pass constraint is easier to satisfy as m_A increases. Second,

$$\frac{\partial \hat{c}_A(k)}{\partial m_D} = \frac{m_A s\delta}{(m_A+m_B+m_D)^2(m_A+m_B+s)(1-\delta)} > 0,$$

such that A's support constraint becomes easier to satisfy as m_D increases. Finally, $\partial\hat{s}/\partial m_D = m_B/m_A > 0$ and

$$\frac{\partial \hat{c}_A(b)}{\partial m_D} = -\frac{m_A\delta\left(m_A m_B(m_A+m_B) - m_B m_D^2 + 2m_A s(m_A+m_B+m_D) + m_A s^2\right)}{(m_A+m_B)(m_A+m_D)^2(m+A+m_B+m_D+s)^2(1-\delta)},$$

which is negative when $s > \hat{s}$, i.e. the condition required for $c_A(b) < \hat{c}_A(b)$ to bind. □

Proof of Lemma 4. First, substitution from definitions in Lines (4) and (6) shows that $c_A^\dagger(b) > \hat{c}_A(b)$ for all parameter values. Second,

$$\frac{\partial\left(c_A^\dagger(b) - \hat{c}_A(b)\right)}{\partial s} = \frac{m_A m_D\delta(2(m_A+m_B+s)+m_D)}{(m_A+m_B+s)^2(m_A+m_B+m_D+s)^2(1-\delta)} > 0$$

such that the difference between the two constraints increases in s. □

Proof of Proposition 2. Lemma 1 establishes that all players pass in all states $\theta \geq 2$, so it remains to prove that proposed $\theta = 1$ strategies in the two intra-coalition war MPE are best responses. Proposition 1 establishes that B passes at all parameter values if given the chance. A attacks when

$$\frac{m_A}{m_A+m_B}\left(\pi_0 + \delta\cdot\frac{\pi_{A,D}}{1-\delta}\right) - c_A(b) > x_0\pi_0 + \delta\cdot\frac{x_1\pi_1}{1-\delta},$$

or when $s > \hat{s}$ and $c_A(b) < \hat{c}_A(b)$ as defined in Lines (5) and (6), and it supports B when

$$\frac{m_A+m_B}{m_A+m_B+m_D}\left(x_0\cdot 1 + \delta\frac{x_1}{1-\delta}\right) - c_A(k) \geq \frac{m_A}{m_A+m_B+m_D}\cdot\frac{1}{1-\delta} - c_A(g),$$

or when $c_A(k) \leq \hat{c}_A(k)$, as defined in Line (7). Finally, D passes when

$$1-\pi_0+\delta\left(\frac{m_A}{m_A+m_B}\cdot\frac{1-\pi_{A,D}}{1-\delta} + \frac{m_B}{m_A+m_B}\cdot\frac{1-\pi_{B,D}}{1-\delta}\right) > -c_D(k) + \frac{m_D}{m_A+m_B+m_D}\cdot\frac{1}{1-\delta},$$

or when $s > s^\dagger$, where

$$s^\dagger = \frac{m_A(m_A+m_B+2m_D)}{m_D}, \tag{9}$$

and $c_D(k) > c_D^\dagger(k)$, where

$$c_D^\dagger(k) = \frac{m_B m_D\delta(m_D s - m_A(m_A+m_B+2m_D))}{(m_A+m_B)(m_A+m_D)(m_A+m_B+m_D)(m+B+s+m_D)(1-\delta)}.$$

All proposed strategies are best responses under the stipulated conditions, ensuring that the proposed equilibrium exists. □

Proof of Proposition 3. Lemma 1 establishes that all players pass in all states $\theta \geq 2$, so it remains to prove that proposed $\theta = 1$ strategies in the two failed deterrence MPE are best responses. Proposition 1 establishes that B passes at all parameter values if given the chance, that A supports B when $c_A(k) \leq \hat{c}_A(k)$, and that A passes when either (a) $s \leq \hat{s}$ or (b) $s > \hat{s}$ and $c_A(b) \geq \hat{c}_A(b)$. Finally, D attacks when

$$\frac{m_D}{m_A + m_B + m_D} \cdot \frac{1}{1-\delta} - c_D(k) > 1 - \pi_0 + \delta \cdot \frac{1-\pi_1}{1-\delta}$$

or when $c_D(k) < \hat{c}_D(k)$, as defined in Line (8). All proposed strategies are best responses under the stipulated conditions, ensuring that the proposed equilibrium exists. □

Proof of Proposition 4. Lemma 1 establishes that all players pass in all states $\theta \geq 2$, so it remains to prove that proposed $\theta = 1$ strategies in the two compromised deterrence MPE are best responses.

At the first compromised deterrence MPE, D attacks, A abandons and passes, and B passes. Proposition 1 establishes that B passes at all parameter values if given the chance and that A passes when either (a) $s \leq \hat{s}$ or (b) $s > \hat{s}$ and $c_A(b) \geq \hat{c}_A(b)$. A abandons B when

$$\frac{m_A}{m_A + m_B + m_D} \cdot \frac{1}{1-\delta} - c_A(g) > \frac{m_A + m_B}{m_A + m_B + m_D}\left(x_0 \cdot 1 + \delta \cdot \frac{x_1}{1-\delta}\right),$$

or when $c_A(k) > \hat{c}_A(k)$, as defined in Line (7). Finally, D attacks when

$$\frac{m_D}{m_A + m_B + m_D} \cdot \frac{1}{1-\delta} - c_D(g) > 1 - \pi_0 + \delta \cdot \frac{1-pi_1}{1-\delta},$$

or when $c_D(k) < \hat{c}_D(k)$ as defined in Line (8).

At the second compromised deterrence MPE, D attacks, A abandons and attacks, and B passes. Proposition 1 establishes that B passes at all parameter values if given a chance, and Proposition 2 establishes that A attacks when $s > \hat{s}$ and $c_A(b) < \hat{c}_A(b)$. That A abandons B when $c_A(k) > \hat{c}_A(k)$ is defined in the first compromised deterrence MPE, and D attacks when $c_D(g) < c_D^{\dagger}(g)$, where

$$c_D^{\dagger}(g) = \frac{m_B m_D \delta (m_D s - m_A(m_A + m_B + 2m_D))}{(m_A + m_B)(m_A + m_D)(m_A + m_B + m_D)(m + B + m_D + s)(1-\delta)}.$$

The relevant constraint on s is thus $s > \max\{\hat{s}, s^{\dagger}\}$.

All proposed strategies are best responses under the stipulated conditions, ensuring that the proposed equilibria exist. □

Extension

If focus the analysis on a single MPE in which all players pass in all states, which ensures peace. Two other insights from the baseline model apply as well, in that all post-shift states are peaceful and B has a dominant strategy of passing. Further, I abandon the two-dimensional notation used for allocations of the flow in the main text and instead explicitly writing down shares of the prize.

My goal is to compare the conditions supporting peace between A and B in the two-player model analyzed in Lemma 2, so it's sufficient to find the conditions under which A and B choose simultaneously to pass. First, A passes rather than attack unilaterally when

$$\frac{m_A}{m_A+m_B+m_D}+\frac{\delta}{1-\delta}\cdot\frac{m_A}{m_A+m_B+m_D+s}\geq \frac{m_A}{m_A+m_B}\left(\frac{m_A+m_B}{m_A+m_B+m_D}+\frac{\delta}{1-\delta}\cdot\frac{m_A}{m_A+m_D}\right)-c_A(b),$$

or when either (a) $s \leq \hat{s}$ or (b) $s > \hat{s}$ and $c_A(b) \geq \hat{c}_A(b)$, as defined in Proposition 1. Next, D passes when

$$\frac{m_D}{m_A+m_B+m_D}+\frac{\delta}{1-\delta}\cdot\frac{m_D}{m_A+m_B+m_D+s}\geq \frac{m_D}{m_A+m_B}\left(\frac{m_D+m_B}{m_A+m_B+m_D}+\frac{\delta}{1-\delta}\cdot\frac{m_D}{m_A+m_D}\right)-c_D(b),$$

or when either (a) $s \leq (m_A m_B)/m_D$ or (b) $s > (m_A m_B)/m_D$ and

$$c_D(b) \geq \frac{m_D\delta(m_D s - m_A m_B)}{(m_A+m_D)(m_B+m_D)(m_A+m_B+s+m_D)(1-\delta)} = \hat{c}_D(b).$$

Therefore, when these constraints are satisfied, peace is assured in this no-alignment version of the model. Finally, with equilibrium constraints established, the results from Lemma 4 still hold: $c_A^{\dagger}(b) > \hat{c}_A(b)$, and the difference between the two increases in s.