

# Coalition Politics and War Termination: On the “Early” End of the First World War\*

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## Abstract

The Allies framed the First World War as a fight to the finish, yet they granted Germany an armistice instead. Why? I analyze a game-theoretic model of multilateral bargaining and war termination in which one side can request an armistice that solves its commitment problem imperfectly, while on the other side one coalition partner secures a larger share of the pie if the war continues to military victory than if it ends in armistice. Under most conditions, the rising partner’s desire to increase its share of the pie ensures a continuation of the war. But when (a) the declining partner has more at stake than its rising partner and (b) intra-coalition power isn’t shifting too rapidly, both rising and declining partners—like the Entente and the U.S. in 1918—grant a fragile armistice. The analysis explains (a) the lack of a consistent bivariate relationship between coalition participation and war duration, identifying shifting intra-coalition power, the chances of military victory, and the costs of intramural disagreement as key explanatory factors, and (b) why bargains struck across and within warring sides shape the duration of wars and the terms on which they end.

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When the First World War ended on the Western Front in 1918, German territory remained unconquered and its army, garrisoning a new Eastern European empire, was mostly intact. This outcome was at clear variance with both Allied rhetoric and war planning in the years and months before the armistice.<sup>1</sup> Britain's Prime Minister David Lloyd George had declared that the "The fight must be to the finish—to a knockout" (Meyer 1916, 153). American President Woodrow Wilson, in his 1917 address requesting of Congress a declaration of war against Germany, articulated beliefs about the causes of the war that required toppling the Hohenzollern regime: autocratic governments like the one that ruled the *Kaiserreich* decided for war without consulting the people that paid its costs, so they couldn't be trusted to uphold any negotiated peace.<sup>2</sup> French premier Georges Clemenceau declared as late as September 1918 that "[a] military decision is what Germany desired and has condemned us to pursue" (quoted in Stevenson 1982, 114). And as British Foreign Minister Sir Edward Grey conveyed to Edward House, Wilson's personal envoy, British war aims required an "end to militarism," a pithy euphemism for an end to the Houses of Hohenzollern and Hapsburg (Meyer 1916, 69). Germany's collected enemies believed that the Kaiser and his generals were bent on unhinging the balance of power not just in Europe but globally (see Hull 2014, 271), and the best solution seemed to be a fight to the finish, to the proverbial "knockout" that would disarm Germany and disempower the generals that talked openly of a "Second Punic War" to avenge their impending loss (Strachan 2013, Ch. 8-10). Why, then, did the First World War end not with a bang but with a whimper? Why, even as France's Marshal Ferdinand Foch mocked the Treaty of Versailles as "an armistice for twenty years," as Allied war plans accounted for fighting well into 1919 (McCrae 2019), and as American dollars and doughboys poured into Europe to tip the scales against the Central Powers, did the Allies settle for a potentially fragile armistice?

The First World War emerged from a network of commitment problems in Southeastern

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<sup>1</sup>A note on terminology: I refer to Britain and France as the Entente, but when combined with the United States, which joined the war as an "Associated" power, I follow convention and call this grouping the "Allies."

<sup>2</sup>See <https://www.firstworldwar.com/source/usawardeclaration.htm>.

Europe triggered by rising Serbian and Russian power (Levy 1990/91). Yet French, British, and ultimately American decisions to fight were predicated on Germany's own inability to commit not to dominate Europe if given the chance (Wolford 2019a), which in the early 20th century also meant dominating the imperial world system (Fischer 1967).<sup>3</sup> Wars driven by commitment problems end when fighting slows, arrests, or reverses an unfavorable shift in power (Wolford 2019b, Ch. 2) or when fighting wipes out the benefits of exploiting newfound strength (Leventoglu and Slantchev 2007). In many cases, that imperative drives the aims of war to totality—to military victory, to disarmament of the loser and the replacement of its government or wholesale elimination of the state (Lo, Hashimoto and Reiter 2008, Reiter 2009, Walter 2002). And solving Germany's commitment problem, made manifest with the promulgation of 1914's *Septemberprogramm* that described the "enfeeblement" of enemies and the establishment of an economic union that could cut Britain off from Europe, required (according to its foes) conquering, disarming, and dismembering or reordering Germany. Nods to democratization, like the one that put Prince Max von Baden at the head of the new civilian government that would sign the armistice, might've placated Wilson, but they were hardly credible in the long run as long as the old political class remained intact. By this line of reasoning, Foch was rightly skeptical; only foreign-imposed regime change might've done the job (Lo, Hashimoto and Reiter 2008). Prevailing IR theory thus leads us to expect that the First World War should've ended not with the armistice we saw in 1918 but with the march on Berlin that we didn't see until 1945.

Explaining this ostensibly "early" end of the First World War requires an understanding of intra-Allied politics, as the Entente war effort came increasingly to rely on the United States over the course of 1918 and into the hypothetical war effort of 1919. To make this case, I introduce a game-theoretic model of intra-war and intra-coalition bargaining, where two states prosecuting a war against a third must agree whether or not to grant an armistice if the latter requests it. Coalition partners mind both the costs and potential gains of contin-

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<sup>3</sup>Not for nothing is the German title of Fritz Fischer's famous book *Griff nach der Weltmacht*, or "Bid for World Power." On this, see <https://adamtooze.com/2019/01/06/framing-crashed-8-provincializing-europe/>.

ued fighting, as is common in dyadic models of war termination (e.g. Filson and Werner 2002, Leventoglu and Slantchev 2007), but they also weigh the consequences of continued fighting for their respective shares of the postwar pie (Phillips and Wolford n.d., Wolford 2017): the longer the war lasts, the greater the share of the postwar pie a rising partner can secure at its declining partner's expense. Such shifting intra-coalition power shapes the relative attractiveness of granting an armistice and continuing the war, with rising partners more inclined to continue the fight and declining partners more inclined to grant an armistice, the risks of failing to solve the enemy state's commitment problem notwithstanding. In equilibrium, shifting intra-coalition power most often undermines early settlement, lengthening wars as rising partners push to maximize their share of the postwar pie, driving wars that would otherwise end in armistice towards total victory. But when (a) declining states have a greater stake in the war's outcome and (b) the rising state isn't rising *too* quickly, then both can agree on an "early" end to the war—even when armistice fails to solve the war's fundamental bargaining problem, leaving open a possibility of renewed conflict with which a total victory would dispense. I also show in an extension that there should be no consistent bivariate relationship between coalition participation and the duration of war. Therefore, war duration and termination depend on the working out of bargaining problems both across *and* within warring sides.

## **Coalitions and War Termination**

Nearly 40% of interstate wars identified by the Correlates of War (COW) project since 1816 have involved multiple states on at least one side (Sarkees and Wayman 2010), whether they fight in parallel or as a coalition (Morey 2016). Yet most theories of endogenous war termination are dyadic, and empirical models of war duration typically treat the number of parties involved—to say nothing of whether any such parties fight as a coalition—as a statistical nuisance (e.g. Bennett and Stam 1996, Slantchev 2004) or an unconditional

source of inefficiency (Cunningham 2006). Yet military coalitions aren't mere aggregations of power (see Wolford 2015, 41-45). Intra-coalition politics determines how partners share the costs and benefits of fighting, which shapes the escalation of disputes to war (*ibid.*, Ch. 4), their expansion to include other states (*ibid.*, Ch. 5), and their duration (Chiba and Johnson 2019). Intra-coalition politics also influences the outcomes of interstate wars (Gartner and Siverson 1996, Graham, Gartzke and Fariss 2017, Morey 2016), who gets (and gives) what in peace settlements (Starr 1972), and the durability of subsequent settlements (Phillips and Wolford n.d., Wolford 2017). The ostensibly "early" end of the Great War on the Western Front suggests that intra-coalition politics can also shape the duration of war, and not always by frustrating settlement attempts and encouraging delay.

Theories of endogenous war termination tend to be dyadic (see Filson and Werner 2002, 2004, Leventoglu and Slantchev 2007, Powell 2004, Slantchev 2003, Wittman 1979, Wolford, Reiter and Carrubba 2011). They focus on bargaining frictions, like information and commitment problems (Fearon 1995), that fighting can solve, and there's no need to include other players, like coalition partners, to make the point. Once fighting (a) creates agreement on the likely outcome of a fight to the finish or (b) makes commitments credible that weren't before, belligerents can save the further costs of fighting by negotiating a war-ending bargain. These theories help explain why negotiated settlements that end short of total victory are the norm (Blainey 1988, Wagner 2007), as well as why commitment problems can sometimes produce fights to the finish; disarming an opponent or toppling its government is sometimes the best available means of making commitments to peace credible (Reiter 2009). Other theories relate leader's private stakes, rather than public costs and benefits, to war duration and outcome (Croco 2005, Goemans 2000b, Stanley and Sawyer 2009), but they also (understandably) abstract away from intra-coalition politics. Morey (2016) and Graham, Gartzke and Fariss (2017) link coalitions to war outcomes, but how intra-coalition politics shapes the duration of war remains an open question, even as powerful countries like the post-Cold War United States wage coalition wars "by default" (Kreps 2011).

Theorizing about coalitions and war duration is sparse, focused mainly on the number of actors involved in the war. The exception is [Bennett and Stam \(1996, 423–244\)](#), who contend that collective action problems inside war coalitions should undermine the ability to wage war to a victorious conclusion, thereby shortening multiparty conflicts on average. That does not, however, appear to be the case for the Allies in 1918, as each of the main parties had clear private incentives—i.e., a spot at the negotiating table—to contribute to the collective military effort (see [Wolford 2019b](#), Ch. 7). More representative are [Blainey \(1988, 197\)](#) and [Vasquez \(1993, 258–260\)](#), who contend that more participants, whether or not they fight in coalitions, imply longer wars. [Cunningham \(2006\)](#) argues the same to support a finding that civil wars with more parties last longer than civil wars with fewer parties. [Bennett and Stam \(1996\)](#) excepted, arguments about the effects of multiple parties, whether organized as coalitions or not, follow a common line of reasoning that more parties mean more inefficiency (e.g. [Bas and Schub 2016](#), [Huth, Bennett and Gelpi 1992](#), [Lake 2010/11](#)). Yet in many cases, like deterrent alliances or collective military threats, the strategic involvement of more actors can *reduce* inefficiency by solving information problems or smoothing out otherwise dangerous shifts in relative power ([Favretto 2009](#), [Leeds 2003](#), [Morrow 2000](#), [Wolford 2014, 2017](#)). And as indicated by the armistice of 1918, a useful theory of coalition war termination must be able to account for both “late” and “early” war termination—and so much the better if it doesn’t rely on collective action problems.

Empirical work is largely silent on the question, focusing not on the presence of coalitions *per se* but the number of states involved in the war. Several studies uncover a negative relationship between the number of belligerent states and interstate war duration ([Bennett and Stam 1996](#), [Goemans 2000a](#), [Quiroz Flores 2012](#), [Stanley and Sawyer 2009](#)). [Weisiger \(2013, 2016\)](#) finds no relationship, and in a sample of war initiators [Slantchev \(2004\)](#) finds that duration increases in the number of parties.<sup>4</sup> Data is, however, available on coalition participation in interstate wars. [Morey’s \(2016\)](#) analysis of war outcomes distinguishes

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<sup>4</sup>Likewise, [Cunningham \(2006\)](#) finds that civil wars last longer when they have more parties.

**Table 1:** Cox PH models of interstate war duration, with data from Morey (2016)

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
Coalition	–	-0.41* (0.23)	-0.35 (0.24)	-0.21 (0.34)	0.06 (0.35)
Wars in Parallel	–	–	0.67* (0.37)	–	0.91** (0.40)
Log Participants	-0.31* (0.18)	–	–	-0.19 (0.25)	-0.40 (0.28)
Model Statistics					
Subjects	95	95	95	95	95
Log Likelihood	-339.20	-339.32	-337.88	-339.00	-336.78
Significance levels : * : 10% ** : 5% *** : 1%					

between war coalitions (i.e., states on the same side that coordinate their activities) and wars fought in “parallel” without such coordination.<sup>5</sup> To get a rough sense of the relationship, I use these data to estimate Cox Proportional-Hazard models of the duration of the 95 interstate wars identified by COW (Sarkees and Wayman 2010). Table 1 presents hazard coefficients, such that positive values indicate an increased risk of war termination (a shorter war) and negative values a decreased risk (a longer war). The results indicate no consistent relationship between the duration of war and either the total number of participants (logged to account for a few very large wars), the presence of a coalition on at least one side, or whether partners fought a war in parallel. On their own, both the number of participants and the presence of a coalition are associated with longer wars, but when modeled together, only wars in parallel show a relationship with war duration, shortening conflicts below the average duration. Grambsch and Therneau’s (1994) test for non-proportionality indicates a violation by *Wars in Parallel*, though interacting the offending variable with analysis time (see Box-Steffensmeier, Reiter and Zorn 2003) eliminates the significance of the offending variable; the interaction coefficient itself is also not discernible from zero.

<sup>5</sup>Graham, Gartzke and Fariss (2017) model war outcomes as a function of the number of states on a single side, but they don’t draw Morey’s (2016) coalitions versus wars-in-parallel distinction.

The lack of an independent bivariate relationship is instructive, because it's consistent with the idea that at least one missing conditioning variable—say, intra-coalition politics—determines whether coalitions lengthen or shorten interstate wars. Further, the armistice of 1918 and intra-Allied debates over the desirability of ending the war are clearly indicative of such a conditional relationship. The United States could've benefited in principle from a continuation of the war into 1919, when its economic dominance would be matched with military dominance on the Continent, making it easier still for President Wilson to remake the global order. Indeed, a state bent on increasing its share of the postwar pie has incentives to push the war to total victory even when an armistice might solve the war's bargaining problem with certainty. And the British and French, for their part, saw the attractiveness of an early end to forestall such an outcome. A useful theory of coalitions and war duration should help explain when these divergent interests in war termination arise and when one priority wins out over the other; it needs to explain why coalition partners develop these priorities and then how they're aggregated to generate either long or short wars. Intra-coalition politics in the waning months of the Great War on the Western Front point to three factors relevant for such a theory: (a) divergent preferences over the division of the postwar pie, (b) how coalitions aggregate those preferences, and (c) shifting relative power, which affects divisions of the postwar pie, inside the coalition.

## **Model**

Recent models of endogenous war termination follow [Wagner's \(2000\)](#) advice to allow also for endogenous initiation ([Filson and Werner 2002](#), [Leventoglu and Slantchev 2007](#), [Powell 2004](#), [Spaniel and Bils 2018](#), [Wolford, Reiter and Carrubba 2011](#)), which is especially useful for explaining the evolution of war aims over time and the means by which fighting can resolve the bargaining problems that give rise to it. Models with three or more actors can easily become intractable, however, and it's not clear that war initiation is necessary to re-

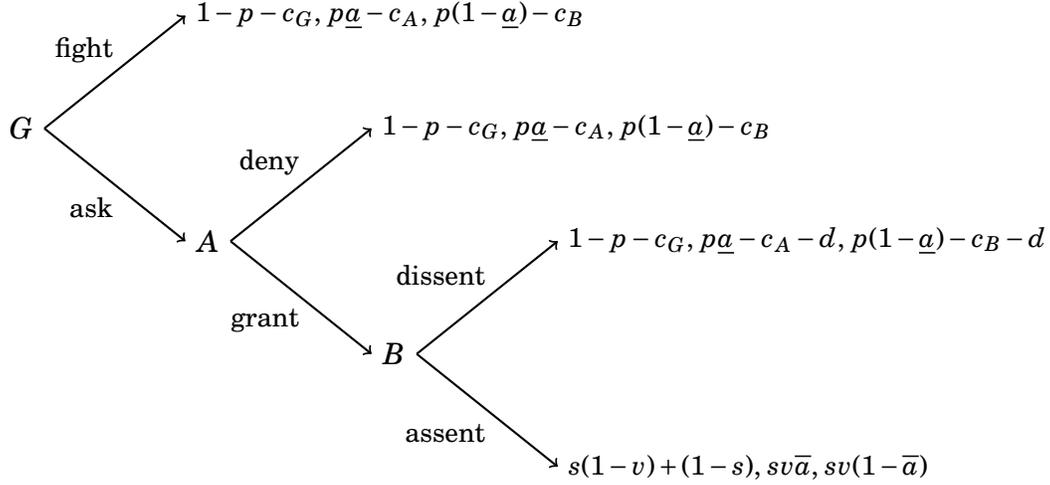
solve the puzzle of an unexpected armistice in the First World War. It's more useful to focus here on a spare representation of the war termination process, assuming that belligerents choose between an armistice of questionable durability and the pursuit of a total victory that solves the bargaining problem by disarming the losing side. The most plausible reason to focus on initiation is that, if states can anticipate undesirable war termination processes, they might avoid the fight in the first place. However, (a) one partner's disadvantage at the intra-war bargaining table might be the other partner's boon, making any such strategic censoring difficult to achieve (much less observe) and (b) wartime events are often unpredictable, leading to an accumulation of additional actors, bargaining problems, and political issues whose emergence was discounted or simply ignored at the beginning of the conflict. Neither the Entente nor Germany, for example, anticipated a long war on the Western Front (Debs 2019), much less one that would involve the United States in the final settlement as an emergent financial-military hegemon (Tooze 2014).<sup>6</sup> This section's model, then, looks in on the across- and within-side politics of ending an ongoing war.

Suppose that a belligerent state  $G$  must choose whether to request an armistice, which accepts the prevailing military situation as a basis for negotiations that may or may not succeed, or continue an ongoing war against a coalition of two states,  $C = \{A, B\}$ . Figure 1 shows that if  $G$  fights, the game ends in a total war with the probabilistic elimination of the losing side. If  $G$  asks for an armistice, each coalition member can force a fight to the finish if it wishes. Both must accept if the war is to end in an armistice. I assume that a lead state ( $A$ ) exercises agenda-setting power inside the coalition. State  $A$ 's denial leads to a continuation of the war, but if  $A$  proposes to grant the armistice,  $B$  gives assent or dissent. Assent implements the armistice, fixing the battlefield situation as the basis for negotiations to end the war, but  $B$ 's dissent forces a fight to the finish. Dissenting imposes a shared cost for intra-coalition discord, but continuing the war allows  $A$ 's military-political influence inside the condition to grow—say, as its blood and treasure account for an increasing share of the

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<sup>6</sup>For more on the unpredictability of war and models that rely on it, see Wolford (2017).

**Figure 1: Intra-Coalition Politics and War Termination**



collective war effort—relative to its declining partner ( $B$ ). If the war ends in armistice,  $B$  secures a smaller share of the coalition’s postwar pie than it does if the war continues, because the rising partner ( $A$ ) can demand a commensurately larger share for itself.

The game ends in either continued war or an armistice, and payoffs depend on both whose decision continues the war and whether the coalition disagrees in the process. If  $G$  requests and the coalition grants an armistice, payoffs depend on the current military situation, the probability with which the armistice produces a settlement, and on the distribution of the postwar pie. The prevailing military situation at armistice leaves  $v$  for the coalition and  $1-v$  for  $G$ . For its part,  $G$  consumes  $1-v$ , but the coalition must share  $v$ , where shares at this within-side bargain are determined by relative military-political power—i.e., the number of boots a partner has on the ground, the extent of its partner’s dependence on its own financial resources, the costs it’s paid in blood and treasure, or its ability to continue the war beyond a putative armistice. Thus,  $A$  receives a share  $\underline{a} \in (0, 1)$ , and  $B$  gets  $1 - \underline{a}$ . But this successful outcome, a settlement based on the present military situation, is only realized with probability  $s \in (0, 1)$ . With probability  $1 - s$ ,  $G$  breaks out of the armistice and overturns the settlement, yielding 1 for  $G$  and 0 for each member of  $C$ . The extremity of

this outcome stacks the deck against the coalition granting an armistice, making the consequences of foregoing a knockout blows as severe as possible for the coalition.<sup>7</sup> Payoffs for an armistice are

$$u_i(\text{armistice}) = \begin{cases} s(1-v) + (1-s) \times 1 & \text{if } i = G \\ s\underline{a} & \text{if } i = A \\ s v(1-\underline{a}) & \text{if } i = B. \end{cases}$$

If the war continues, the coalition wins with probability  $p \in (0, 1)$ , and  $G$  wins with the complementary probability,  $1 - p$ . The stakes are larger, in that the winning side captures the whole pie, but continuing the war costs each player  $c_i > 0$ , where  $i = \{G, A, B\}$ . The cost term represents any disutility associated with continuing the war, like blood or treasure, but it also represents how states weigh the payment of costs against the attainment victory. When  $c_i$  is low, a belligerent has more at stake in the war outcome, i.e. it “cares more,” than it does when  $c_i$  is high. If war puts one state’s survival or status in the power hierarchy in jeopardy, for example, its stakes are higher (and its value of  $c_i$  lower) than they are for states that intervene from abroad or whose status is less sensitive to the war’s outcome; France’s stakes in the First World War, for example, were higher than those of the United States. Next, should the coalition win,  $A$ ’s influence over the final settlement will have increased, just as the United States’ would’ve had the war continued into Germany in 1919, with more boots on the ground and partners more firmly in its financial grasp. As such, the within-side bargain grants  $\bar{a} \in (0, 1)$  to  $A$  and  $1 - \bar{a}$  to  $B$ , where  $\underline{a} < \bar{a} < 1$ . Finally, if  $B$  vetoes  $A$ ’s proposal to grant the armistice, each member pays an additional wartime cost ( $d > 0$ ) of intra-coalition disagreement. These costs can arise from deepened intramural mistrust or the political costs—domestic or international—of public disagreement, as well as military opportunity costs like delays in lending, granting licenses for firms to export arms to allies,

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<sup>7</sup>This is without loss of generality; if  $G$  were to get some  $b < 1$  and the coalition  $1 - b$ , for example, then armistice becomes less attractive for the former and more so for the latter, but the effect of shifting intra-coalition power on why a war ends in armistice or total war would be the same.

or the opening of extra fronts to relieve pressure on partners.<sup>8</sup> When  $d$  is high, defying the coalition leader is more painful than when  $d$  is low, and when  $d = 0$ , disagreement over continuing the war is frictionless (though  $A$  retains agenda-setting power).<sup>9</sup> Letting  $I = 1$  after intra-coalition disagreement and  $I = 0$  otherwise, payoffs for war are

$$u_i(\text{war}) = \begin{cases} 1 - p - c_G & \text{if } i = G \\ p\bar{a} - c_A - Id & \text{if } i = A \\ p(1 - \bar{a}) - c_B - Id & \text{if } i = B. \end{cases}$$

Readers will note that I treat some parameters—the military situation ( $v$ ), the chances of coalition victory ( $p$ ), and the probability that the armistice produces a settlement ( $s$ )—as independent when, in practice, we’d expect all of them to track together. I relax that assumption in the appendix, exploring potential relationships between each combination of these parameters; I show that forcing any combination of these parameters to track together can change the strategies for  $G$  but *not* for the coalition, whose members grant and refuse armistices in equilibrium for the same reasons they do in the main version of the game.

The model isolates two strategic tensions, one for the across- and another for the within-side bargain, both of which were present in intra-Allied negotiations over the Western Front armistice. First, continuing the war holds out the costly promise of controlling the entire prize, solving  $G$ ’s commitment problem by disarming it if the coalition wins. An armistice, on the other hand, saves the costs of further fighting but may give  $G$  an opportunity to overturn the settlement, leaving the commitment problem only imperfectly solved. Commitments to peace aren’t automatically credible after an armistice, as they would be if the coalition were to win a total war. Second, ending the war in an armistice today allows the declining

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<sup>8</sup>I’m indebted to Pat McDonald for the opportunity costs examples.

<sup>9</sup>An alternative model would let the realization of intra-coalition disagreement reduce the coalition’s military prospects, but this would only encourage  $B$  to go along with  $A$ ’s willingness to grant armistice; it wouldn’t change *why* shifting power shortens the war, but it might represent an alternative to the relative stakes story on which the equilibrium analysis focuses.

coalition partner to secure a larger share of the postwar pie should the settlement stick, albeit of a smaller pie than victory could secure. Armistice also requires that the rising side forego the larger share of the larger pie it can assure itself if the war continues to total victory. I show in the next section that these tensions can interact, such that shifting intra-coalition power can shorten or extend the war relative to a case in which intra-coalition power is static, shedding light on why the First World War ended in 1918's armistice rather than an ultimate disarmament of Germany.

## Analysis

How does shifting intra-coalition power shape the duration of war? Answering this question entails identifying the game's Subgame Perfect Equilibria (SPE, or just "equilibrium"), where strategy profiles constitute Nash Equilibria in every proper subgame, thereby ruling out incredible threats and promises. I build the argument in three steps. First, I show that if an equilibrium doesn't entail an armistice, it's guaranteed to entail total war. This allows me to focus only on proving the existence of armistice equilibria: if an armistice equilibrium doesn't exist, then the war is sure to continue. Second, I analyze a restricted version of the model in which intra-coalition power is static, such that  $\underline{a} = \bar{a} = 1/2 = a$ . Fixing  $a = 1/2$  is without loss of generality, since no actions on any player's part can change the value of  $a$  realized in the payoffs; it just eases the presentation. I then analyze the model with shifting power, where  $\underline{a} = 1/2$  and  $\bar{a} \in (1/2, 1)$ , which facilitates comparison to static-power equilibria. This restriction is also without loss of generality; shifting intra-coalition power won't shorten or lengthen the war for different reasons if  $\underline{a} \neq 1/2$ . Finally, I identify the conditions under which shifting intra-coalition power encourages and discourages war termination.

There are two relevant types of SPE. At an *armistice equilibrium*,  $G$  asks,  $A$  grants, and  $B$  assents, and at a *war equilibrium*, at least one player takes an action that ensures continued fighting. Proposition 1 establishes that, unless an armistice equilibrium exists,  $G$

is sure to continue the war in its first move.

**Proposition 1 (War).** *If an armistice SPE does not exist, then all SPE entail  $G$  fighting at the first move. See appendix for proof.*

Unless it turns down an armistice that would otherwise be granted,  $G$  is indifferent between asking and fighting for most cases covered by Proposition 1. Indifference is sufficient for fighting to be a best response, but the claim holds strictly for SPE in which no armistice would be accepted as long as there's a small cost—say, appearing weak or indecisive before international or domestic audiences—to asking for an armistice and being denied. Therefore, if the armistice SPE identified below doesn't exist, then the war continues, whether  $G$  forgoes a chance to end the war or the coalition refuses to grant an armistice. The multiple causal pathways behind the war SPE are interesting, but for the purposes of identifying the effects of shifting power on war termination, we can set them safely aside.

## Static Intra-Coalition Power

In both static- and shifting-power variants of the game, armistices emerge for the same reason: both sides find reaching a settlement that reflects the military situation, even a fragile one, more attractive than paying the costs of further fighting.

**Proposition 2 (Static Power).** *When  $\underline{a} = \bar{a} = 1/2$ , the armistice SPE exists and is unique when*

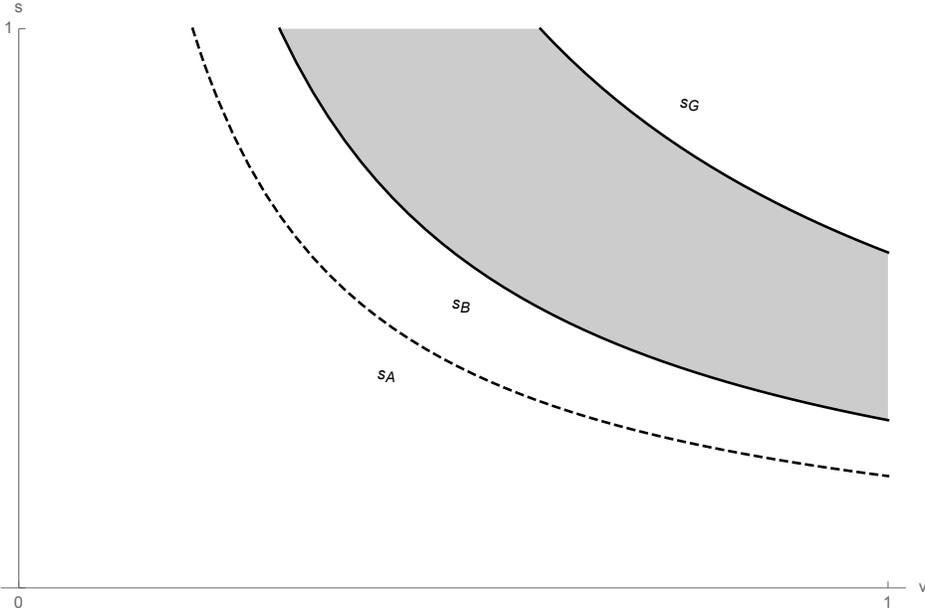
$$\max\{s_A, s_B\} \leq s \leq s_G \quad \text{and} \quad v > \max\{p - 2c_A, p - 2(c_B + d)\}$$

where

$$s_A = \frac{p - 2c_A}{v}, \quad s_B = \frac{p - 2(c_B + d)}{v}, \quad \text{and} \quad s_G = \frac{p + c_G}{v}.$$

*See appendix for proof.*

**Figure 2:** The Equilibrium Space by Probability of Armistice Success ( $s$ ) and Military Situation ( $v$ ), where  $B$  Sets the Binding Constraint for Armistice



Proposition 2 describes the conditions supporting the armistice SPE when intra-coalition power is static, and Figure 2 presents them graphically, where the parameter values supporting the armistice SPE are colored gray. First, the armistice must be sufficiently likely to succeed if it's to win the coalition's agreement, reaching minimum thresholds of success for each partner ( $s \geq s_A$  and  $s \geq s_B$ ), but nor can it be too likely to bind  $G$  to the present military situation ( $s \leq s_G$ ). Second, the military situation ( $v$ ) must be sufficiently favorable for the coalition to find peace attractive; but since armistice offers only  $G$  a chance to break out of the terms, asking for armistice is always attractive when  $v$  is low and the battlefield favors it. This explanation for armistice falls roughly in line with models of bilateral war termination, where conflicts end when (a) belligerents can offer terms that reflect shared expectations about the costs and likely outcome of continued fighting (see [Filson and Werner 2002](#), [Powell 2004](#), [Slantchev 2003](#)) and (b) the risks of one's opponent renegeing aren't too great (see [Leventoglu and Slantchev 2007](#), [Wolford, Reiter and Carrubba 2011](#)).

Intra-coalition politics enters the story through the lead state's political power and part-

ners' relative stakes in the conflict. First, the costs of disagreement ( $d$ ) encourage  $B$  to accept an armistice if  $A$  proposes one, lowering the threshold of settlement success ( $s$ ) above which  $B$  assents to negotiations. The lead state can thus leverage  $B$ 's distaste for disagreement to secure some armistices that would otherwise be rejected. Second,  $A$ 's agenda-setting power, combined with the costs of disagreement, ensures that it often sets the binding constraint for the armistice equilibrium. That is,  $s_A > s_B$ , such that  $A$  can drag  $B$  into an armistice that it would otherwise not grant.  $A$ 's political power can be offset, though, when  $B$  has enough at stake in the war. When  $c_B < c_A - d$ , such that  $B$ 's stakes in the war outweigh both  $A$ 's lower stakes and the costs of disagreement,  $B$  sets the binding constraint ( $s_B > s_A$ ). This ensures that  $B$  can push  $A$  to grant armistices it would otherwise refuse. At this static distribution of power, intra-coalition politics determines both the range of the parameter space over which the armistice SPE exists and which partner sets the binding constraint—that is, which partner requires better chances of settlement success before it agrees to end the fighting. I show in the next section that the introduction of shifting intra-coalition power can either discourage or encourage armistice relative to the static case, but whether it does so depends on both relative stakes and political power inside the coalition.

## Shifting Intra-Coalition Power

Proposition 3 characterizes the conditions that support the existence of an armistice SPE when intra-coalition power is shifting in  $A$ 's favor. As they do in the static-power version of the model, armistices emerge in equilibrium when (a) their terms are likely, but not too likely, to remain intact and (b) the military situation is favorable enough for the coalition. And though  $G$ 's threshold for requesting armistice ( $s \leq s_G$ ) remains unchanged, the coalition's threshold values ( $s_A$  and  $s_B$ ) now depend on the intra-coalition power that  $A$  will wield if the war continues beyond today's opportunity for armistice.

**Proposition 3** (Shifting Power). *When  $\underline{a} = 1/2$  and  $\bar{a} \in (1/2, 1)$ , the armistice SPE exists and*

is unique when

$$\max\{s_A, s_B\} \leq s \leq s_G \quad \text{and} \quad v > \max\{2p\bar{a} - 2c_A, 2p(1 - \bar{a}) - 2(c_B + d)\}$$

where

$$s_A = \frac{2p\bar{a} - 2c_A}{v}, \quad s_B = \frac{2p(1 - \bar{a}) - 2(c_B + d)}{v}, \quad \text{and} \quad s_G = \frac{p + c_G}{v}.$$

See appendix for proof.

How does shifting intra-coalition power affect the conditions for armistice? Key to the answer is that  $A$ 's rising power moves coalition partners' minimum success thresholds,  $s_A$  and  $s_B$ , in opposite directions.<sup>10</sup> As  $\bar{a}$  increases,  $A$  finds a fight to the finish more attractive, because it promises a larger share of a larger pie.  $A$  thus requires an increasing chance of settlement success (higher  $s$ ) and a more favorable military situation (higher  $v$ ) before it proposes to grant an armistice. State  $B$ , on the other hand, accepts longer odds of settlement success (lower  $s$ ) and less favorable military situations (lower  $v$ ) than it would at a static distribution of power as the price of an armistice that prevents it from conceding a larger share of the postwar pie to its rising partner. Whether shifting power makes armistice SPE more or less likely than the static case, though, depends on the ordering of each partner's success thresholds at a static distribution of power (as described in Proposition 2) and the magnitude of the increase in  $A$ 's power occasioned by a continuation of the war.

Proposition 4 describes how shifting power narrows the range of the parameter space for which the armistice SPE exists (which makes armistice less likely) and when it widens that range (making armistice more likely). Under fairly general conditions,  $A$ 's proposal power and rising strength ensure that it can force a continuation of the war, paying the upfront costs of continued fighting for a larger share of a larger pie should the coalition win. But under some conditions the declining partner can secure an armistice that prevents power

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<sup>10</sup>Formally,  $\partial s_A / \partial \bar{a} = 2p/v > 0$  and  $\partial s_B / \partial \bar{a} = -2p/v < 0$ .

from shifting too far in  $A$ 's favor.

**Proposition 4** (Shifting Power and War Duration). *When*

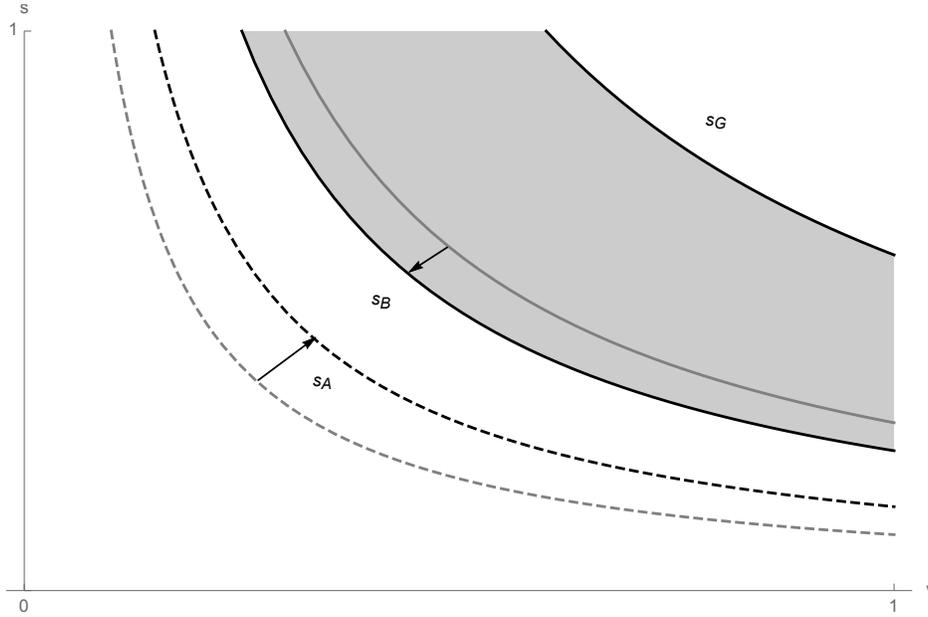
$$c_B < c_A - d \quad \text{and} \quad \bar{a} - \frac{1}{2} < \frac{c_A - (c_B + d)}{2p},$$

*armistices are more likely under shifting than static intra-coalition power; when either condition fails, armistices are less likely under shifting than static intra-coalition power.*

The easiest way to understand the effect of shifting power is to focus on the relative ordering of coalition members' success thresholds ( $s_A$  and  $s_B$ ) under static power, then show how shifting power changes the magnitudes and ordering of these thresholds. Recall that (a) the higher of the two thresholds is the binding constraint and (b) shifting power raises  $A$ 's threshold, making it less inclined to armistice, as it lowers  $B$ 's, such that the declining partner is more inclined to grant  $G$ 's request. First, when  $A$  has enough at stake that it sets the binding constraint under static power, or  $c_A < c_B + d$  such that  $s_A > s_B$ , shifting power makes an armistice equilibrium less likely. The rising partner can dictate a continuation of the war under conditions that would otherwise produce armistice if power were static. And when the declining partner has a sufficient stake in the war ( $c_B < c_A - d$ ) to set the binding constraint under static power ( $s_B > s_A$ ),  $A$ 's power may still grow sufficiently that its success threshold overtakes  $B$ 's.  $A$ 's desire to continue the war means that it sets the binding constraint under shifting power where it wouldn't under static power; shifting power makes armistice less likely under these conditions by shifting the distribution of intra-coalition political influence away from  $B$  and towards  $A$ .

Suppose, however, that  $s_B > s_A$  under shifting power and that  $B$ 's threshold ( $s_B$ ) doesn't fall so far that  $s_A$  overtakes it. Figure 3 plots this graphically, where (a) static-power success thresholds are plotted in gray and shifting-power thresholds in black and (b) the extent to which the thresholds move as a result of shifting power is represented by the black arrows. Even as  $A$ 's required threshold tightens and  $B$ 's loosens due to shifting power,  $B$  continues

**Figure 3:** The Equilibrium Space by Probability of Armistice Success ( $s$ ) and Military Situation ( $v$ ), where shifting power makes armistice more likely



to set the binding constraint ( $s_B > s_A$ ), and that constraint is easier to satisfy than it is under static power. Formally,  $B$  sets the binding constraint under shifting power when

$$\bar{a} - \frac{1}{2} < \frac{c_A - (c_B + d)}{2p}, \quad (1)$$

where the left side of Inequality (1) is the size of the shift in power, the right side's numerator is the difference between  $A$ 's and  $B$ 's costs for continuing the war (note that the latter's also entails the costs of intramural disagreement), and the denominator is proportional to the coalition's probability of winning a total war.<sup>11</sup> This constraint becomes easier to satisfy as the differences in partners' stakes,  $c_A - (c_B + d)$ , increases—i.e., as  $B$  cares more about the outcome relative to  $A$ —and as the coalition's military prospects fall. But as partners' stakes in the war become more similar (or as  $A$ 's stakes rise above than  $B$ 's) and as the chances of ultimate victory increase, then  $A$  finds armistice less and less attractive, and its desire to

<sup>11</sup>If this looks like a variant of Powell's (2006) inefficiency condition, that's no coincidence; here, though, the shift in power *doesn't* outweigh the costs of war.

continue the war once again binds over  $B$ 's desire to end it.

What can this model tell us about the effect of shifting intra-coalition power on war termination? First, whether shifting power increases or decreases the chances of war ending in an armistice depends on the distribution of war costs and political power inside the coalition. When (a) the declining partner has enough at stake in the war to outweigh both the rising partner's stakes and the political costs of disagreement and (b) power won't shift too far, shifting intra-coalition power makes armistices more likely than they would be under static power, thereby shortening the war. Second, if either condition in Proposition 4 fails—if power is shifting substantially in  $A$ 's favor or  $B$ 's stakes in the war aren't sufficiently larger than  $A$ 's—then shifting power makes armistices less likely and, as a consequence, wars longer. The model predicts no consistent bivariate relationship between shifting intra-coalition power and the duration of multilateral wars in the empirical record. The observed relationship in either large samples or any given case can be positive or negative, depending on how the stakes of the war, political authority, and power are distributed inside the coalitions in the sample. Therefore, empirical models that find either positive or negative average effects are subject to omitted variable bias; the relationship in a given sample may be positive or negative, but only because the un-modeled distribution of war costs and political authority in the sample favors a positive or negative effect of shifting power.

It's also notable that the mechanism driving variation in coalition behavior has nothing to do with collective action problems (Olson 1965), which factor often into the study of multilateral conflict (Papayoanou 1997, Saideman and Auerswald 2014). Bennett and Stam (1996) follow the same cue and argue that free-riding can account for sub-optimally short wars, but the same desire to shift the burden of fighting onto others can also explain long wars if it means that the putatively winning side delays application of sufficient force; collective action problems alone can't explain either short or long wars without additional premises. Accounts rooted in collective action failures also elide the fact that coalition leaders often compensate partners to discourage free-riding (Wolford 2015, Ch. 3, 4), keeping all

but the most minor collective action problems off the equilibrium path—i.e., out of the empirical record.<sup>12</sup> In fact, competition over shares of the postwar pie is a compelling explanation for why collective action problems were minimized between Entente and Allied powers, even as they plagued the Central Powers throughout the War (Wolford 2019b, Ch. 7). It's thus a virtue that the present model can explain why some coalition wars end “early” and others “late” without reference to the collective action problem.

## The Armistice of 1918

Why did the First World War end on the Western Front before Allied armies could put paid to Germany's imperial ambitions? Answering this question requires showing that the model can explain the Allied decision to grant Germany's request for armistice when continued fighting promised a more robust solution to the commitment problem. The Entente and the United States were both mindful of the costs of fighting, but that doesn't explain why the Entente would settle for an armistice that didn't preclude a German revival and why the rising United States, relatively insulated from the costs of war, wasn't more eager to fight on to the finish and establish an American peace. Resolving puzzles like this requires treating the entire equilibrium, which depends on both the extensive form of the game and the solution concept, as the causal mechanism (Goemans and Spaniel 2016).<sup>13</sup> This requires the analyst to show that (a) the structure of interactions to be explained is similar to the game form, (b) the facts of the case match the parameter values that support the existence of the equilibrium that implies the explanandum, and (c) decision-makers reasoned as actors do at the relevant equilibrium, particularly with respect to what they believed would be the consequences of choosing other than they did.<sup>14</sup> To that end, I provide evidence in this section that the Americans, British, and French believed that a longer war would increase

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<sup>12</sup>See Henke (2017) for an analysis of how the United States compensates partners in the construction of military coalitions.

<sup>13</sup>I don't like the term “causal mechanism,” and I'm not sure I ever will. I'm using it in protest.

<sup>14</sup>For a concise guide to process-tracing, see Ricks and Liu (2018).

the former's influence over the final settlement, that the Entente accepted a potentially fragile armistice to avert an American-dominated victory, and that the Americans accepted the same early end thanks in part to lower stakes in the war, which rendered them more willing to accept the credibility of German moves toward civilian government.

First, how well does the structure of the model represent the case? To say that the Allies were engaged in a costly war with Germany is unproblematic; the costly lottery is a flexible means of representing both the outbreak and end of war (Powell 2004, 349-350). The model also reflects the fact that continuing the war would've given the Allies a high probability of ultimate victory ( $p$ ), higher even than that promised by the current military situation ( $p > v$ ), at a cost distributed unevenly inside the coalition ( $c_A \neq c_B$ ). The British and French had much more at stake than the United States in 1918; either defeat or a Pyrrhic victory would've compromised their survival as great (which in the early 20th century meant "imperial") powers. The United States, on the other hand, would've entered a new era of economic and military (primarily naval) power, regardless of who ended up in control of Europe. Coalition members were also well aware of possible rivalries over the fruits of victory, which amounted to nothing more than a say in designing a new international legal-political regime (Fromkin 1989, Hull 2014, Parsons 1978, Rothwell 1971, Stevenson 1982), the scope of which had been increased by Lenin's and Wilson's competing appeals to overturn the old imperial system—and replace it with Russian- and American-led systems (see Manela 2009, Tooze 2014). Goemans (2000b, 291) notes that the Allies were each "concerned almost as much about how the terms of settlement would affect their power relative to their enemy as how they would affect their power relative to their current allies."

The model's characterizations of the armistice and intra-coalition politics also represent key elements of the case. First, armistice works as it did in the minds of the participants, creating a pause in the fighting that froze the military situation as the basis for negotiations, saving the present costs of war at some risk that the armistice might break down after conferring an advantage on the side that currently has its back to the wall. Fearing an unsta-

ble armistice, Allied leaders emphasized military victory in both public and private. Reiter (2009) recounts discussions in Britain's War Cabinet in the fall of 1917 expressing fears that a settlement that reflected German gains—it still held or dominated large swathes of foreign territory when it requested an armistice—would allow it to grow stronger and resume its attempts to dominate Europe, “making a limited war outcome unstable,” (173) and he notes that the French also feared that an unconquered Germany would make another bid at Continental supremacy. Finally, German military leaders were ambivalent about armistice, even when the true scale of imminent military disaster became clear in October 1918. The military was only too happy to pin the blame on the new civilian government that agreed to ask for it after Ludendorff accepted the inevitability of defeat and the army's inability to crush internal rebellion while fighting on (Leonhard 2018, 782-788). Both sides of the war, then, agreed that a negotiated settlement based on the Fourteen Points, which entailed the prospect of finalizing the dismemberment of Russia's East European empire, would give Germany a chance to recover that total military defeat would not.

Second, the model's spare representation of intra-coalition politics reflects both American agenda-setting power and the Entente's ability to, at some cost proportional to their dependence on American arms and finance, veto the agenda-setter's initiatives. Recognizing both American power and divergent intra-coalition preferences, Germany pointedly made its first appeal to the United States (Herwig 2014, 411), because Wilson had shown himself to be only a reluctant friend of the Entente; true to form, he largely sidelined Britain and France throughout October (Stevenson 1982, 114-115). Consistent with German hopes, much of the intra-allied bargaining came down to whether the Fourteen Points, a set of vague principles on which both France (Stevenson 1982, Ch. IV) and Britain (Rothwell 1971, Ch. VI) looked with scorn, could be accepted as the basis of negotiations. Finally, the Entente tried its best to limit American political influence as the Allies begin rolling up the German army after the failure of the *Kaiserschlacht* in the spring of 1918, limiting the deployment of American troops by diverting shipping efforts away from deployments to the

Continent (Parsons 1977). Therefore, it's reasonable that the United States plays the role of *A* in the model and that *B*, the Entente, both recognizes and tries to limit the costs it might pay (*d*) for defying the coalition's leader. The model's costs of disagreement are exogenous, but conscious Entente attempts to shape them indicate their importance in 1918.

Finally, it remains to show that the model's critical moving part, which links the continuation of the war to a shifting distribution of the postwar pie, was known to both rising and declining partners. First, McCrae (2019, Ch. 5) shows that by 1918 the Allies expected that (a) the war would go on into 1919, thanks to Germany's ability to exploit Russia's collapse and the signing of the Treaty of Brest-Litovsk, and (b) American manpower, up to 100 divisions by some estimates, would be necessary to ensure victory. But in summer 1918, barely a third of that number was in the field, thanks to British foot-dragging. Nonetheless, the Americans were well aware that they held the ring and that their grasp would only grow tighter. Wilson wrote to House that "When the war is over we can force [Britain and France] to our way of thinking because by that time they will, among other things, be financially in our hands" (Mayer 1969, 332).<sup>15</sup> And when the Entente moved to impede the arrival of doughboys in Europe, American generals and members of the Wilson administration expressed frustration, the former because they wanted a larger share of the credit for victory and the latter because they wanted a credible claim on postwar political influence (Parsons 1978, 143). Second, the British and the French lamented rising American power throughout the summer of 1918. As the American war effort spun up to capacity,

Clemenceau confided to Lloyd George his fear that if America supplied too many of the effectives on the Western Front it would be able to decide the outlines of the settlement. (Stevenson 1982, 110)

By early November, American "effectives" (that is, combat soldiers) outnumbered British and would in a matter of months outnumber French forces as well (*ibid.*, 131). Thus, rising

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<sup>15</sup>I owe my awareness of this quote to Goemans (2000b), who found it in Stevenson's (1982) footnotes. On American financial power and Wilson's faith in it as tool for reshaping global order, see Tooze (2014).

American power inside the Allied coalition was widely anticipated and, in the case of the British slowing the flow of doughboys to France, resisted once victory looked likely.

Explaining why the war ended early requires explaining why both the Entente and the United States were willing to forego military victory over Germany, when (a) the former saw total victory as necessary to solve the German question that had vexed Europe for centuries and (b) the latter knew that victory could secure an unprecedented degree of influence over such a settlement. Divergent stakes in the war's outcome provide the answer. The armistice equilibrium sees the Entente reasoning that an early end, even with an uncertain solution, is better than a later end with a more complete solution that would be guaranteed by American arms. As the Imperial War Cabinet debated armistice in October, Jan Smuts drew a distinction between the "British peace" made possible by an armistice and the "American peace" that would follow military victory in 1919 (Goemans 2000*b*, 292-294), and "[o]n 26 October, finally, the War Cabinet agreed that Britain would get a better peace in 1918 than in 1919" (*ibid.*, 293), leading to an acceptance of the armistice despite widespread skepticism that Germany's new civilian government could ensure compliance with whatever settlement came out of an armistice. This was no small sacrifice on the part of the British, but they saw in American dominance a prohibition on their right of blockade (Rothwell 1971; Goemans 2000*b*, 297); better to end the war on imperfect terms than let the Americans, Wilson in particular, carry the day and gain the political and military weight to rewrite the laws of the sea around their own impending naval dominance.

And what of the United States, the coalition partner that stood the most to gain from taking the war into 1919, and thus into Germany? Wilson's desire to reshape the world required the humbling of the European powers, especially the imperial heavyweights of Britain and France in whose favor American intervention had tilted the balance in 1917 (on this, see Tooze 2014). So why help those same imperial powers to victory? The rising partner's willingness to grant at the armistice equilibrium offers an answer. Wilson, perhaps uniquely among Allied leaders, saw international threats emerging from other countries' political sys-

tems rather than the international environment (see [Saunders 2011](#)). As such, he found the German “revolution from above,” which nominally broke the Hindenburg-Ludendorff military dictatorship that had ruled Germany in the second half of the war, a relatively credible solution to the problem of German commitment to the terms of armistice (see [Wolford 2019b](#), Ch. 14); this enabled him to accept a rate of settlement success that his partners might otherwise reject out of hand but that, under the circumstances, they were willing to tolerate. Further, while driving into Germany would let him dictate a democracy, getting one on the cheap was much more preferable. This willingness to trust commitments made by “popular” governments over those made by autocrats or generals ([Meyer 1916](#), 69) allowed the United States to tolerate lower probabilities of settlement success than the Entente—i.e., if each partner had its own estimate of  $s$ , or  $s_i$ , then  $A$ ’s threshold  $s_A$  would be still lower (this can be verified with an appropriate modification of the model, but it’s not necessary to generate an armistice equilibrium). Wilson may be unnecessary to the story, however, if we focus on the fact that the United States had lesser interests at stake than its Entente partners ( $c_A < c_B$ ); separated from Europe by an Ocean, it wasn’t within Germany’s military reach, and the consequences of a faulty peace wouldn’t fall immediately in its lap. If, however, the rising coalition partner were a European power, then we could imagine the war dragging on to ensure that it would end at a different distribution of intra-coalition power.

The fraught politics of shifting intra-coalition power offers a useful explanation for the “early” end of the First World War on the Western Front. Germany, its army exhausted and nearly mutinous (and its navy *actually* mutinous), requested an armistice that preserved a chance of breakout, a chance to make another *griff nach der weltmacht*, that total defeat would foreclose. The British and French, faced with the tradeoff of breaking German power at the cost of American dominance, were inclined to a settlement that, all else equal, they’d reject in favor of a knockout blow. Yet as hard as intra-coalition bargaining was, with threats of separate peaces lobbed across those partners that had and hadn’t signed the Declaration of London (see [Rapp Hooper 2014](#)), it would’ve been harder still for the British

and the French had the war dragged into 1919. And finally, the United States, putative beneficiary of a total victory, granted the armistice because its leadership believed that the democratic promise of Prince Max’s civilian government made German commitments to the peace that would follow an armistice tolerably credible. American willingness to accept what the British and French viewed as lower probabilities of armistice success only made the armistice equilibrium even more likely. But had the American stake in the war, its ability to impose its will its coalition partners, or the extent of shifting power been greater, the model suggests that the war could’ve dragged on far longer in search of a victory that would’ve secured the fruits of shifting intra-coalition power.

## Coalitions and War Duration

Some coalition wars can end early and others late, but how does the mere presence of a coalition partner shape the duration of war? Table 1 shows that there’s no straightforward answer. Assessing differences across bilateral and coalition wars requires holding constant the chances of total victory and fixing a unitary cost of fighting. Relative capabilities are systematically different across coalition and dyadic conflicts (see [Wolford 2015](#), Ch. 2), but making the proper comparison requires isolating variation in intra-coalition politics: shifting power ( $\bar{a} - 1/2$ ), the costs of disagreement ( $d$ ), and the costs of fighting ( $c_{A,B}$ ). In this section, I analyze a restricted version of the game in which  $G$  chooses whether to request an armistice of a unitary opponent  $C$ , who wins a continued war with probability  $p$  and pays costs  $c_C > 0$  for continuing the fight. All other payoffs remain the same, enabling a comparison of the relative prospects of armistice and total war across bilateral and coalition equilibria. Proposition 5 summarizes differences in war duration across coalition and bilateral games. I save the formalities of demonstrating existence for bilateral SPE and comparing them to coalition SPE for the appendix.

Proposition 5 describes the relative probability of armistice as a function of  $C$ ’s costs of

fighting to the finish: When our hypothetical unitary belligerent's costs for total war are sufficiently low, then it's more likely to deny requests for an armistice and fight on than a coalition with at least one very low-cost (or high-stakes) member.

**Proposition 5** (Coalition Vs. Bilateral War Duration). *When*

$$c_C < \min \{p(2\bar{a} - 1) + 2(c_B + d), p(1 - 2\bar{a}) + 2c_A\}. \quad (2)$$

*bilateral wars are less likely than coalition wars to end in armistice; otherwise, coalition wars are more likely to end in armistice.*

Of more interest, though, is what intra-coalition politics does to the relative rates of armistice. First, as the chances of winning a total war ( $p$ ) increase, the right-hand side of Inequality (2) becomes harder to satisfy, as long as power is shifting between coalition partners (i.e., as long as  $\bar{a} > 1/2$ ). As the chances of ultimate victory increase, the rising partner pushes harder to continue the war, and the declining partner is also more willing to tolerate an outcome in which it gets a smaller share of the pie, because the pie itself is bigger in expectation. A growing pie encourages the declining partner to tolerate its partner's rising power through a longer war; but when the chances of ultimate victory are lower, then coalition wars are on average more likely to end short of totality. Second, as the costs of intramural disagreement ( $d$ ) increase, coalition wars become more likely to drag on than bilateral wars. Rising partners can under these conditions pursue total victory with greater freedom, because declining partners are less willing to pay the price of intramural disagreement. Inequality (2) shows that this relationship is true whether or not power is shifting between partners, because political authority can empower those members of the coalition with larger stakes to keep the war going. And if we take wars in parallel to indicate low costs for intra-side disagreement, Proposition 5 offers an explanation for why wars in parallel are shorter than bilateral wars in Table 1's event-history analysis.

The model thus accounts for the absence of a consistent bivariate relationship between

coalition participation and war duration, showing that both intra-coalition politics and the chances of total victory determine the direction of the relationship. Whether or not intra-coalition power is shifting, some coalition wars will last longer than bilateral wars and *vice versa* due strictly to different assessments of the costs of fighting on and of disagreeing about whether or not to fight on. And once we introduce shifting power, we can explain why some coalition wars end uniquely early and why some last far longer than the costs of war and the risks of armistice lead us to expect—that is, why some prophesied knockout blows come to fruition and others don't.

## Conclusion

The First World War may have ended with an unexpected whimper, but 1918's armistice is a useful example of how intra-coalition politics can shape the duration of war. First, holding fixed the chances of victory, intra-coalition politics can either lengthen or shorten the expected duration of war. There's no consistent bivariate relationship between the presence of a coalition partner and the duration of war; shifting power, the distribution of stakes, and the costs of disagreement can all conspire to make coalition wars either longer or shorter than bilateral wars. Second, under fairly general conditions, shifting intra-coalition power encourages rising partners to continue the war even in the face of credible opportunities to end it, but when (a) power isn't shifting too dramatically and (b) declining states have enough at stake in the outcome, they can force an "early" end to the war, even when all parties agree that the war's underlying bargaining problem remains unresolved. The model explains why the First World War ended short of an Allied military victory *and* why the conditions supporting that early end were rare: the rising United States had less at stake than its French and British partners living next to Germany, which made it more difficult for any prospective shift in power to outweigh the attractiveness of ending the war on imperfect terms. Intra-coalition politics can thus explain why some wars end without solving the

bargaining problems that necessitated fighting in the first place.

The model also explains variation in war duration within coalition wars and relative to bilateral wars without reference to collective action problems. Incentives to shirk, as well as attempts to mitigate them, are plausible factors in coalition war duration, but analyzing them requires a different theoretical structure. Still, this model does identify three mechanisms by which coalitions manage to structure private incentives to contribute to collective goods: (a) private shares of the postwar pie, (b) agenda-setting power, and (c) costs for disagreement. If victory is a collective good that players would otherwise like to see provided on the cheap, these private inducements can overcome incentives to under-contribute to the war effort. How (and whether) coalitions provide them can shape both the chances of victory and the willingness to contribute; Britain and France, for example, overcame incentives to shirk early in the war thanks to the promise of a share of the postwar pie, while Germany and Austria-Hungary failed to cooperate effectively in light of the latter's expectation that Germany would dominate the postwar peace in any case (see [Wolford 2019b](#), Ch. 7). Future work might explore how the private inducements driving behavior in this model might shape coalition effectiveness (see [Weitsman 2003](#)) and, as a consequence, the attractiveness of continuing the fight when faced with a request for armistice.

Finally, the model charts a clear path for empirical evaluations of its implications. If standard models of war duration can be augmented with measures of shifting intra-coalition power, political authority inside the coalition, and different stakes in the war's outcome, then we'd expect an improvement over the rough empirical analysis presented in Table 1. [Morey's \(2016\)](#) distinction between coalition wars and wars in parallel might offer a rough approximation of the costs of disagreement, such that they'd be higher for partners that've coordinated their efforts and those that simply fight the same enemy on individual terms. Relative stakes in the war's pose a different challenge, though a simple measure of distance from the main theater of the war might capture some of what creates variation in the costs of continuing the war; had the United States been as close to Europe as Britain, its

stakes in the war might've been significantly higher. The largest obstacle, however, relates to scope conditions: the model here represents a war driven by a commitment problem, represented by the fact that armistice might fail where total victory doesn't, but it's difficult ex ante to judge which wars are driven by commitment problems and which are driven by uncertainty. Uncertainty can be present, for example, yet wholly irrelevant to the outbreak and duration of war when power is shifting substantially (Wolford, Reiter and Carrubba 2011, 564-567), setting a high bar for useful sample selection. Provided measurement issues can be addressed, however, the present model promises to shed light on not just why some coalition wars end early and others late but also why they end earlier or later than wars involving only two belligerents.

## Appendix

### Proofs

*Proof of Proposition 1.* Unless  $A$  grants and  $B$  assents,  $G$ 's payoff for asking is  $1 - p - c_G$ .  $G$  thus has no profitable deviation from fighting, since  $1 - p - c_G \geq 1p - c_G$ .  $\square$

*Proof of Proposition 2.* Begin with the game's final move, where  $B$  assents if

$$sv \left(1 - \frac{1}{2}\right) \geq p \left(1 - \frac{1}{2}\right) - c_B - d,$$

or when

$$s \geq \frac{p - 2(c_B + d)}{v} \quad \text{and} \quad v > p - 2(c_B + d).$$

Anticipating that  $B$  assents,  $A$  grants when

$$sv \left(\frac{1}{2}\right) \geq p \left(\frac{1}{2}\right) - c_A,$$

or when

$$s \geq \frac{p - 2c_A}{v} \quad \text{and} \quad v > p - 2c_A.$$

Anticipating an armistice if it requests one,  $G$  asks when

$$s(1 - v) + s \times 1 \geq 1 - p - c_G,$$

which is satisfied when either  $v \leq p + c_G$  or

$$v > p + c_G \quad \text{and} \quad s \leq \frac{p + c_G}{v}.$$

Each player chooses optimally given the history of play, so the proposed strategy profile constitutes an SPE.  $\square$

*Proof of Proposition 3.* Begin with the game's final move, where  $B$  assents if

$$sv \left(1 - \frac{1}{2}\right) \geq p(1 - \bar{a}) - c_B - d,$$

or when

$$s \geq \frac{2p(1 - \bar{a}) - 2(c_B + d)}{v} \quad \text{and} \quad v > 2p\bar{a} - 2(c_B + d).$$

Anticipating that  $B$  assents,  $A$  grants when

$$sv \left(\frac{1}{2}\right) \geq p\bar{a} - c_A,$$

or when

$$s \geq \frac{2p\bar{a} - 2c_A}{v} \quad \text{and} \quad v > 2p\bar{a} - 2c_A.$$

Anticipating an armistice if it requests one,  $G$  asks when

$$s(1 - v) + s \times 1 \geq 1 - p - c_G,$$

which is satisfied when either  $v \leq p + c_G$  or

$$v > p + c_G \quad \text{and} \quad s \leq \frac{p + c_G}{v}.$$

Each player chooses optimally given the history of play, so the proposed strategy profile constitutes an SPE.  $\square$

*Proof of Proposition 4.* For armistices to be less likely under shifting power, it must be the case that  $s_A > s_B$  under both static and shifting power. Otherwise, an increase in  $s_A$  induced by shifting power either means that  $A$  still sets the binding constraint or that it does after shifting power when it wouldn't under static power; in these cases, shifting power makes armistice less likely. Thus, we solve two inequalities,

$$\frac{p - 2(c_B + d)}{v} > \frac{p - 2c_A}{v} \quad \text{and} \quad \frac{2p(1 - \bar{a}) - 2(c_B + d)}{v} > \frac{2p\bar{a} - 2c_A}{v},$$

which are jointly satisfied when

$$c_B < c_A - d \quad \text{and} \quad \bar{a} - \frac{1}{2} < \frac{c_A - (c_B + d)}{2p},$$

and when either constraint is not satisfied, shifting power makes armistice less likely.  $\square$

*Proof of Proposition 5.* It's necessary first to prove the existence of an armistice equilibrium.  $C$  grants when  $sv \geq p - c_C$ , or when

$$s \geq \frac{p - c_C}{v} = s_C \quad \text{and} \quad v > p - c_C.$$

By Proposition 1,  $G$  fights when an armistice is not forthcoming. But when  $C$  will grant,  $G$  asks when  $s(1-v) + (1-s) \geq 1 - p - c_G$ , or when either  $v \leq p + c_G$  or  $v > p + c_G$  and  $s \leq (p + c_G)/v$ .

Two points are notable before beginning comparisons. First, comparing constraints over  $s_{A,B,C}$  is without loss of generality, since no armistice is possible if  $v$  is too small. Second, constraints over  $s_{A,B}$  under shifting power collapse to the same constraints under static power when  $\bar{a} = 1/2$ , so it's also without loss of generality to focus on the shifting power case described by Proposition 3. Therefore, the range of the parameter space supporting armistices is lower for bilateral than coalition wars when

$$\frac{p - c_C}{v} > \max \left\{ \frac{2p(1 - \bar{a}) - 2(c_B + d)}{v}, \frac{2p\bar{a} - 2c_A}{v} \right\},$$

or when

$$c_C < \min \{ p(2\bar{a} - 1) + 2(c_B + d), p(1 - 2\bar{a}) + 2c_A \}.$$

When either constraint fails, coalition wars are less likely to end in armistice. □

## Robustness

The above model is highly stylized, and reasonable readers can wonder how robust the results are to potential alternative specifications. First, the model assumes that the probability of total victory ( $p$ ), armistice success ( $s$ ), and the prevailing military situation at armistice ( $v$ ) are uncorrelated. I show below that forcing any combination of variables to track together can change incentives for the armistice-requesting side but not for the armistice-granting side. Second, breaking out of armistice in the present model lets  $G$  recapture the entire prize, which may be unrealistic; but I show that, as long as the potential gains of a breakout aren't too low, armistice still happens, and intra-coalition politics won't change that fact.

First, consider potential relationships between  $p$ ,  $s$ , and  $v$ , for which we can focus on the bilateral case without loss of generality. First, suppose that  $p = v \neq s$ .  $A$  grants when

$$sp \geq p - c_A \Leftrightarrow s \geq 1 - \frac{c_A}{p},$$

and if  $A$  grants,  $G$  requests when

$$s(1 - p) + (1 - s) \geq 1 - p - c_G,$$

which is sure to be true as long as  $c_G < 1 - p$ , which itself is true by assumption. Second, suppose that  $v = s \neq p$ .  $A$  grants when

$$s^2 \geq p - c_A \Leftrightarrow s \geq \sqrt{p - c_A},$$

and if  $A$  grants,  $G$  requests when

$$s(1-s) + (1-s) \geq 1-s-c_G$$

which is also true by assumption since  $p = s$ . Third, suppose that  $p = s \neq v$ .  $A$  grants when

$$pv \geq p - c_A \Leftrightarrow v \geq 1 - \frac{c_A}{p},$$

and if  $A$  grants,  $G$  requests when

$$p(1-v) + (1-p) \geq 1-p-c_G,$$

which is also true by assumption. Fourth, suppose that  $p = v = s$ .  $A$  grants when

$$p^2 \geq p - c_A \Leftrightarrow c_A \geq p - p^2,$$

and if  $A$  grants,  $G$  requests when

$$p(1-p) + (1-p) \geq 1-p-c_G,$$

also true by assumption. Relationships between  $p$ ,  $s$ , and  $v$  therefore have minor effect on the willingness to grant an armistice, but if at least two are equal, then  $G$  requests an armistice any time that  $A$  will grant one. How intra-coalition politics affects the occurrence of armistice, then, doesn't depend on the independence of  $p$ ,  $v$ , and  $s$ .

Next, suppose that breaking out of the armistice yields not 1 for  $G$  but  $b \in (0, 1)$ . This will simply make armistice less attractive for  $G$  and more so for the coalition, because armistice payoffs are

$$u_A = sv + (1-s)(1-b) \quad \text{and} \quad u_B = s(1-v) + (1-s)b.$$

To the extent that coalition members find the payoffs for  $G$ 's breakout equally painful, then it's weighed equally against the potential value for continuing the war; further, as long as introducing  $1-b$  as the post-breakout pie entails a division at the initial distribution of intra-coalition power, the effects of shifting intra-coalition power would remain the same in equilibrium.

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