Coalition Politics and War*

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Abstract

War rearranges incentives between friends as well as enemies. I analyze a model in which (a) coalition partners disagree over how to share a pie over which they also compete with an enemy state, (b) fighting prevents power from shifting in the enemy's favor but shifts relative power inside the coalition, and (c) coalition members pay individual costs for public disagreement over war aims. War may occur between coalition and enemy for three reasons. First, intra-coalition power will shift so much during war that the rising partner can't be compensated at peace for the foregone distributive benefits of fighting. Second, beginning from an already inequitable distribution of power inside the coalition, the declining state pushes for war to increase its share of the pie. Third, war may also occur due to shifting across-side power, but declining and rising partners' relative sensitivity to public disagreement determines whether war is more or less likely than it would be absent coalition politics. I illustrate the model's logic by applying it to war termination, explaining how the Paraguayan and First World Wars ended in ways at variance with standard models of war termination.

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Common enemies notwithstanding, distributive conflicts between military coalition partners are common. Even as they cooperated to defeat Paraguay from 1864-1870, Brazil and Argentina vied for control over territory and political supremacy in the broader Río de la Plata Basin. Multinational intervention into China's Boxer Rebellion in 1900 activated Russo-Japanese rivalry over dominance in northeast Asia, prompting the former to invade and occupy Manchuria while Japan and the other coalition members marched on and sacked Beijing. In 1912, Serbia and Bulgaria anticipated territorial disagreements over lands they'd eventually seize from the Ottoman Empire in the First Balkan War, papering over them with a halfhearted promise to seek Russian mediation after victory. And during the First World War, Austria chafed under the looming possibility of German domination after victory, while the Americans and the Entente disagreed about political influence over a final settlement that would reset the global balance of power. Some of these disagreements led to subsequent fighting—the Russo-Japanese and Second Balkan Wars—and all of them influenced calculations about whether to make peace and threatened to undermine postwar cooperation, yet they're largely absent from theories of war.

Most work on coalitions and war focuses on externalities like collective action problems (Powell 2017, Weitsman 2003, Yuen 2009) or inefficiencies associated with size (Cunningham 2006, Huth, Bennett and Gelpi 1992), abstracting away from disagreements between partners over how to divide the pie. Yet intramural competition over private goods isn't fundamentally different from competition across warring sides, and the act of fighting can allow some coalition partners to secure more of the pie from their partners than they would at peace. In each example above, one state—Brazil, Russia, Serbia, Germany, the United States—gained in relative power at its partners' expense as a direct result of waging coalition war. I explore how this mechanism affects decisions over war and peace in a three-player model in which (a) coalition partners want to maximize their own shares of a pie over which they compete with an enemy state, (b) fighting prevents a shift in power favorable to the enemy but causes a shift in power between coalition members, and (c) partners prefer to avoid a public breach over war aims. In contrast, most models in which war solves commitment problems analyze shifting power only across sides (see, *inter alia*, Debs and Monteiro 2014, Leventoğlu and Slantchev 2007, Powell 2006, Wolford, Reiter and Carrubba 2011). Some models explore bargaining frictions within sides—typically rendered as non-unitary states, but the comparison holds—yet they abstract away from across-side bargaining frictions (Powell 2006, 189-192, Smith n.d., Davis n.d., but see Wolford 2014*b*, 520-525). My model speaks to both bodies of work by allowing war to alter the distribution of power across *and* within warring sides, rendering some commitments credible while rendering others incredible, and shedding light on the outbreak and termination of interstate war.

Standard models of shifting power and war identify one rising and one declining side, where the former experiences a boost to its relative power that it can't credibility promise not to use if given the chance (Debs and Monteiro 2014, Powell 1999, 2006, Wolford, Reiter and Carrubba 2011). In my model, both coalition partners decline relative to their enemy if they don't launch a preventive war, but waging a preventive war also creates a separate rising-declining relationship inside the coalition.[1] If the coalition attacks the enemy state,

[1] I use the term "preventive war" to describe any conflict aimed at ending, arresting, or reversing such adverse shifts in power.

one partner will be able to secure a larger share of the postwar pie from the other by gaining important territory, shouldering an increasing share of the war effort, or sustaining a domestic consensus where its partner's fails. This shift in intra-coalition power creates disagreement about the attractiveness of preventive war against the enemy. Just as the enemy state can't credibly promise to compensate the coalition for foregoing preventive war once power shifts across sides, the rising coalition partner can't promise to give its declining partner a larger share of the postwar pie if they go on to defeat their enemy.

The coalition and its enemy reach a settlement in equilibrium when (a) across- and within-side distributions of power are relatively stable and (b) the within-side distribution of power doesn't already favor the rising partner too much. War occurs or, if war is ongoing, continues in equilibrium for three reasons. First, when fighting effects a sufficiently large shift in the distribution of intra-coalition power, a rising partner can't be compensated at peace for the foregone benefits of war—in this case, a larger intra-coalition share of a larger pie. As such, the rising partner pushes the coalition to attack the enemy state even if across-side power is stable. Second, when the rising partner begins the game at a substantial advantage over its partner and power is shifting far enough across sides, the declining partner pushes the coalition to war for the sake of increasing the coalition's share of the pie. For the declining partner, a slightly smaller share of a larger pie is more attractive than a slightly larger share of a smaller pie the coalition enjoys at peace. Finally, when the distribution of intra-coalition power is both stable and equitable, the coalition attacks the enemy when the across-side distribution of power is shifting far enough. This result is isomorphic to dyadic models of shifting power, but the distributive consequences of war inside the coalition determine whether preventive war is more or less likely that it would be absent coalition politics. When the declining partner has more to lose from a public breach over war aims, fighting is more likely, occurring for smaller shifts in power than it would in two-player models, because the rising partner can't be restrained from taking the coalition to war. But when the rising partner has more to lose from a public breach, fighting is less likely, as the rising partner's relatively deeper concern about breach allows the declining partner to restrain it. These settlements are, however, struck for shifts that would otherwise cause war, leaving bargaining problems unsolved that would otherwise see violent resolution. I illustrate the results with brief applications to war termination, explaining how the Paraguayan War of 1864-1870 ended after and the First World War of 1914-1818 ended before standard models of shifting power and war termination would predict.

Coalitions and War

Military coalitions have participated in roughly 40% of interstate wars since 1816 (Sarkees and Wayman 2010) and 25% of all interstate crises since 1946 (Wolford 2015), yet most models of war are dyadic (see, *inter alia* Fearon 1995, Leventoğlu and Slantchev 2007, Powell 2006, Thomas, Reed and Wolford 2016). The two-player assumption is often innocuous; adding a third player to Fearon's (1995) analysis of bargaining and war, for example, wouldn't change *why* private information and shifting power cause war. But in some cases the two-player assumption obscures more than it clarifies. Singletons and coalitions differ in the rates at which their disputes escalate to war, with most of the difference accounted for

by factors other than variation in size and military capabilities (Wolford 2015, 41-45, Ch. 4). Coalition politics also influences conflict expansion (*ibid.*, Ch. 5.) and duration (Chiba and Johnson 2019), battlefield performance (Zielinski and Grauer 2020), war outcomes (Graham, Gartzke and Fariss 2017, Kenkel and Ramsay n.d., Morey 2016, 2020, Starr 1972), and the durability of postwar peace (Phillips and Wolford 2021, Wolford 2017). Most work that tries to explain these patterns, however, focuses on collective action problems and coalition size at the expense of distributive rivalry between partners.

Collective action problems are a common way of thinking about coalition politics. In models of endogenous coalition formation, which includes models of extended deterrence, war imposes an externality on third parties—typically, a policy outcome—that leads to free-riding or to active belligerence (e.g. Fang, Johnson and Leeds 2014, Gallop 2017, Powell 2017, Smith n.d., Wolford 2014*a*, Yuen 2009). Other arguments link collective action problems to an under-provision of war effort (see, e.g. Auerswald and Saideman 2013, Choi 2012, Weitsman 2004, 2010). Both Bennett and Stam (1996, 423-424) and Weitsman (2003, 86) conjecture that collective action problems shorten coalition conflicts by undermining the ability to wage war to a victorious conclusion. Yet some coalition wars last a few weeks, like the 1991 Gulf War, and others, like the Korean War, last years; further, the shorter of the two was a coalition victory, the longer one a draw. Other work questions the systematic importance collective action problems. First, coalition-builders may compensate partners to offset the private costs of war, which reduces free-riding (Henke 2017, 2019, Wolford 2015, Wolford and Ritter 2016), or simply avoid partnering with likely free-riders altogether (Wolford 2015, 66-67). Second, partners often have private incentives to contribute to the collective good, from preserving their reputations for honoring commitments (Leeds 2003*a*, Morrow 1994) to making the case for stronger ties with their partners (Gannon and Kent 2020). Finally, disagreements over how to divide the postwar pie encourages partners to fight to position themselves for postwar negotiations. For example, collective action problems weren't a dominant issue for the Allies during First World War: from 1914's Battle of the Marne through 1918's Hundred Days, the British, the French, and (later) the Americans had clear private incentives—the realization of which depended on a seat at the negotiating table—to contribute to the collective military effort (see Wolford 2019, Ch. 7).

A second set of arguments links coalition size to inefficiency, but they typically lack underlying theories of war or preference aggregation. Papayoanou (1997), Byman and Waxman (2002), and Kreps (2011) tie coalition politics to signaling failures or delays that increase the risks of war, and Lake (2010/11) links multiple players to the outbreak of war through exacerbated information problems. Both Blainey (1988, 197) and Vasquez (1993, 258–260) contend that more participants imply longer interstate wars, and Cunningham (2006) argues that civil wars with more parties last longer than those with fewer parties by exacerbating information problems.[2] These arguments follow a shared line of reasoning; the more parties that can veto peace or the more parties whose uncertain interests must be judged in formulating bargaining postures, the harder it is to strike a peaceful settlement (see also Bas and Schub 2016, Chiba and Johnson 2019, Huth, Bennett and Gelpi 1992). Yet in many cases, like extended deterrence (Fang, Johnson and Leeds 2014, Leeds 2003*b*, Phillips and Wolford

[2]Findley and Rudloff (2012), however, find that rebel group fragmentation can be associated with longer or shorter civil wars.

2021), coercive bargaining (Wolford 2014*a*, Wolford 2015, Ch. 4), and third-party interventions (Arena and Pechenkina 2016, Favretto 2009, Kydd 2003, Yuen 2009), the involvement of more actors can *reduce* inefficiency by solving information problems or smoothing out shifts in power. Finally, as it is with collective action problems, coalition politics is often animated by attempts to mitigate problems of size (Fordham and Poast 2016, Wolford 2015, Ch. 5), many of which entail distributive disagreements (Riker 1962).

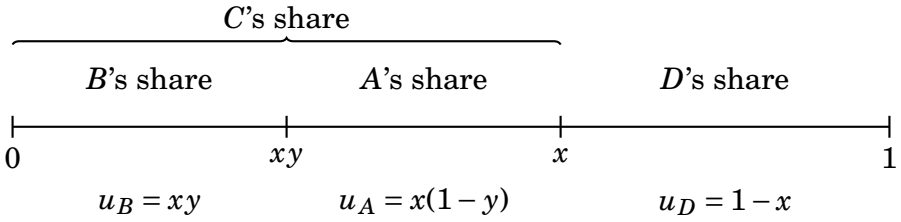
Neither collective action nor coalition size approaches to war consider disagreements among coalition partners over the distribution of private goods. Collective action accounts necessarily deal with externalities—e.g., shared victory or policy outcomes—as opposed to private goods like territory and influence, and size accounts rarely offer an explicit model of *how* coalitions aggregate preferences in an underlying model of war. My model accounts for both elements of coalition politics—distributive conflict and preference aggregation—in an otherwise standard bargaining model. First, like Serbia and Bulgaria during the First Balkan War, who cooperated to defeat the Ottoman Empire yet disagreed over how to divide newly conquered territory, or Brazil and Argentina, who clashed during their war against Paraguay over dominance of the postwar order, coalition members each wish to maximize private shares of the pie. Second, the act of fighting alters the distribution of power between coalition partners even as it stabilizes the distribution of power with an enemy state, like Brazil, the United States, and Serbia all rising relative to their partners due to shouldering larger parts of the burden, the capture of strategic or disputed territory, or the erosion of one partner's fighting capacity or domestic consensus. Shifting intra-coalition power influences partners' shares of the pie, which may create intra-coalition disagreement over bargaining postures and war aims. Finally, public disagreement over bargaining postures is costly, sowing distrust for future cooperation over collective deterrence or maintaining the postwar order, creating political openings for leaders' domestic opposition, or sending unfavorable signals to other potential friends and enemies. For example, as much as they disagreed over how to order the postwar world—the Entente's empires in particular—American, British, and French leaders all worried about how intra-coalition discord might undermine their own domestic agendas (Stevenson 2005, 120-122) or make it more difficult to cooperate in the face of the Russian Civil War (Gerwarth 2020, Ch. 3, McCrae 2019, 243) and the dissolution of the Ottoman Empire (see Fromkin 1989). I show next that the interaction between across- and within-side bargaining problems can enhance our understanding of the link between coalition politics and both the onset and duration of war.

Model

Suppose that a coalition of two states, $C = \{A, B\}$, bargains with an enemy state D over a continuously-divisible pie of unit size. Players may be at peace when play begins, in which case we have a model of crisis bargaining, or at war, in which case we have a model of war termination. If the coalition attacks at the first move, its chances of defeating D are greater than if it negotiates, which sees relative military power shift in D's favor (see Powell 2006).[3]

[3]Power shifts across multiple periods in most such models (see Powell 2006), but the single-period representation generates isomorphic results; war due to D's rise occurs when the shift in power is greater than the costs of war, but in a single period there's no additional condition on the players' patience.

Figure 1: A two-dimensional settlement



But fighting also shifts power inside the coalition, such that B becomes more powerful relative to A if the coalition attacks D in the first move. The coalition has already formed when the game begins, whether because of prior negotiations (see Wolford 2015, Ch. 3) or an ongoing conflict, such that they fight together against D if the game ends in war. This rules out defections (Choi 2012, Smith n.d., Weisiger 2016, Wolford 2014*a*), side-switching (Powell 2017, 232), and side payments by which one partner might prevent the other from fighting (Henke 2019, Wolford 2015), but this violation of descriptive realism helps isolate the mechanism of interest: intramural competition over shares of the pie in dispute.[4] Alignments notwithstanding, all players wish to increase their individual shares of the pie. This implies the two-dimensional peace settlement in Figure 1, where an *across-side bargain* allocates linear (i.e., risk-neutral) shares $x \in [0,1]$ to the coalition and $1-x$ to D, and *within-side bargain* allocates linear shares of x, $y \in [0,1]$ to B and $1-y$ to A. This rules out the externalities that drive most models of endogenous coalition formation (e.g. Powell 2017, Smith n.d., Wolford 2014*a*, Yuen 2009). Finally, coalition partners pay a cost for public breach if they disagree over whether to fight, but intra-coalition bargaining is otherwise frictionless, such that the within-side bargain automatically reflects the distribution of military power between partners (cf. Phillips and Wolford 2021).[5] But as shown in Figure 2, C and D may go to war over the terms of the across-side bargain.

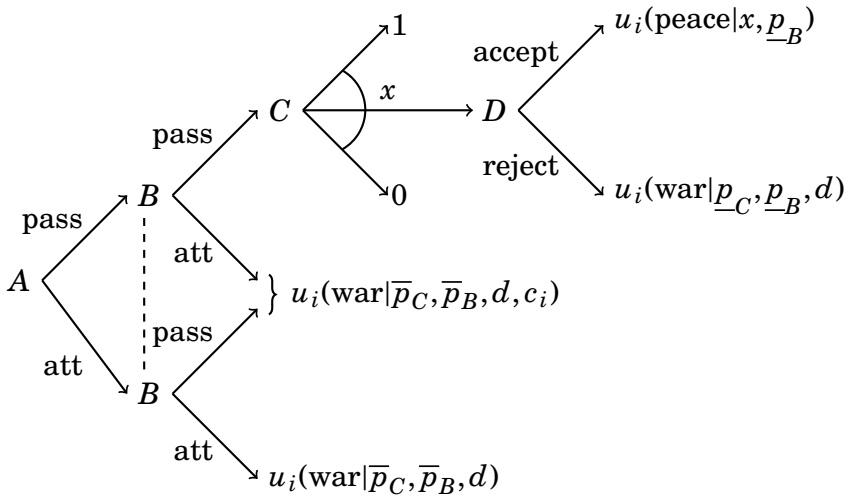
The game begins as coalition partners choose simultaneously whether to attack D or to pass. If both players pass, then Nature chooses a partner at random—collapsed into a single choice for C in Figure 2—to propose an across-side bargain $x \in [0,1]$ to D. (I show in the Proof of Lemma 1 that each partner would make the same proposal x if given the chance, so either can be the proposer without loss of generality.) If D accepts, the game ends peacefully such that

$$u_i(\text{peace}|x, \underset{\sim}{p}_B) = \begin{cases} x(1-\underset{\sim}{p}_B) & \text{if } i = A \\ x(\underset{\sim}{p}_B) & \text{if } i = B \\ 1-x & \text{if } i = D, \end{cases}$$

[4] Even if one partner forces the other to end the fighting, or even if the enemy were to split the coalition (Crawford 2021), the reason behind B's desire to continue and A's desire to stop would be the same: effecting or preventing, respectively, a shift in intra-coalition power.

[5] I impose this restriction to keep things tractable, but it's without loss of generality; even if coalition bargaining were made explicit after either making peace with or defeating D, partners would be sure to strike a deal that would reflect the distribution of power between them.

Figure 2: The extensive form



where the within-side bargain is determined by B's relative military power ($y = \underline{p}_B$) and where $\underline{p}_B \in (0,1)$ represents B's chances of defeating A in an intra-coalition war given that the crisis ended peacefully. If D rejects C's proposal, the crisis ends in a costly war that destroys a share $d \in (0,1)$ of the pie and that eliminates D with probability $\underline{p}_C \in (0,1)$; D eliminates C with probability $1 - \underline{p}_C$. Payoffs for a war following negotiation are

$$u_i(\text{war}|\underline{p}_C, \underline{p}_B, d) = \begin{cases} \underline{p}_C(1-d)(1-\underline{p}_B) & \text{if } i = A \\ \underline{p}_C(1-d)(\underline{p}_B) & \text{if } i = B \\ (1-\underline{p}_C)(1-d) & \text{if } i = D, \end{cases}$$

where $y = \underline{p}_B$. If either coalition partner chooses to attack at the initial move, war occurs at a distribution of power more favorable to the coalition, such that C defeats D with probability $\overline{p}_C \in (0,1)$, where $\overline{p}_C > \underline{p}_C$. War prevents power from shifting in D's favor, which could occur due to the completion of armament programs (Debs and Monteiro 2014), operational advantages enabled by a pause in fighting (Leventoğlu and Slantchev 2007), the consolidation of wartime gains (Carter 2010), or the rise of hawkish leadership (Wolford 2018). The act of fighting, however, also shifts intra-coalition power: B becomes more powerful relative to A, or $\overline{p}_B$ where $\overline{p}_B > \underline{p}_B$. B may take on larger shares of the war effort, consolidate control over strategic territory, increase mobilization and productive capacity over time, or see its partner's capabilities fall due to military exhaustion or a collapsing domestic consensus. If both partners reject, there are no additional costs, but if one plays pass while the other plays attack, partners pay a cost $c_i > 0$, which represents costs on issues unrelated to the distribution of the pie (see also Fang, Johnson and Leeds 2014, 779). A public breach can lead to delay or friction in implementing war plans, bad blood or eroded intra-coalition trust, counterproductive signals to friendly and enemy audiences, compromised collective deterrence after the war (Phillips and Wolford 2021), and opportunities for the domestic opposition in partner countries (Arena 2015). If there's going to be a war, partners prefer not to disagree

about it publicly beforehand, but they differ in their sensitivity to the consequences of a public breach. Letting $\beta = \{0,1\}$ indicate such a breach, payoffs for attacking are

$$u_i(\text{war}|\overline{p}_C, \overline{p}_B, d, \beta, c_i) = \begin{cases} \overline{p}_C(1-\overline{p}_B)(1-d) - \beta c_A & \text{if } i = A \\ \overline{p}_C(\overline{p}_B)(1-d) - \beta c_B & \text{if } i = A \\ (1-\overline{p}_C)(1-d) & \text{if } i = D. \end{cases}$$

As it does in models of shifting across-side power, war can solve D's commitment problem by imposing a settlement at the initial distribution of power ($\overline{p}_C > \underline{p}_C$). Solving D's commitment problem activates another, though, because B grows stronger relative to its partner over the course of the fighting, allowing it to claim a larger share of the postwar pie at its partner's expense ($\overline{p}_B > \underline{p}_B$).

Several other models consider shifting power between multiple parties contending over private goods. Powell (1999, Ch. 5) studies a model in which an attacker's prospective elimination of a target can shift power against a bystander, and though states bargain over the shared prize if they defeat the other state as a coalition, their individual capabilities are fixed. Chadefaux (2011) studies a case where one rising state faces multiple declining states but abstracts away from alignments, showing that rising states may be unable to compensate multiple opponents even when they can negotiate over the sources of military power. Finally, in the model closest to this one, Phillips and Wolford (2021) show that a shared threat can enhance the credibility of commitments between coalition partners who would otherwise go to war due to one's rise, but in contrast to this model only the enemy state has a choice over initiating across-side conflict.

Equilibrium

Subgame Perfect Equilibrium (SPE) rules out incredible threats, which makes it appropriate for studying commitment problems, where rising states can't credibly promise not to leverage increased relative strength if given the chance. This is explicitly the case for D, with whom the coalition bargains if it doesn't attack, but it's also the rationale behind the shift in the distribution of benefits between A and B that occurs if they attack D in the first move.[6] I first establish that the coalition's negotiations with D are sure to end peacefully and that attack/pass decisions are unanimous in equilibrium, which ensures that meaningful intra-coalition politics occurs in the initial moves. Next, I characterize equilibria in the unrestricted model, clarifying how shifting power across and within sides interacts to explain both war and peace when they wouldn't occur in dyadic settings. Finally, I use a pair of restricted cases—a unitary coalition and stable-across side power—as comparisons to show how the model can also shed light on war termination.

Power shifts in D's favor if the coalition passes, so it's useful to begin at game's end, where D considers the coalition's proposal x. D accepts proposals that leave it with at least as much as it could secure by fighting, or $1-x \geq (1-\underline{p}_C)(1-d)$, which defines a range of proposals $x \leq \underline{p}_C(1-d)+d$ that the coalition can make without provoking war. Power is now

[6] Recall that imposing peaceful bargains here is without loss of generality as long as relative power shapes the terms of within-side bargains.

static inside the coalition, ensuring that partners agree on the attractiveness of war, so we can represent a generic proposer as C. Next, given that power is no longer shifting for any player and war is costly, the coalition proposes to take as much as it can from D without provoking war, or $x^* = \underline{p}_C(1-d)+d$, which ensures acceptance.

Lemma 1. *If C passes, negotiations with D end peacefully, because C sets*

$$x^* = \underline{p}_C(1-d)+d$$

and D accepts if $x \leq \underline{p}_C(1-d)+d$.

Lemma 1 highlights two important features of the model. First, if coalition politics is to shape equilibrium outcomes, it must be in the game's initial moves, before power can shift in any player's favor. Second, the outcome of negotiations reflects both D's increased power ($\underline{p}_C$) and, given that the coalition chose not to fight, a foregone increase in B's power relative to its partner, such that $u_A = x^*(1-\underline{p}_B)$ and $u_B = x^*(\overline{p}_B)$.

Anticipating outcomes in the negotiation subgame, coalition politics entails potential disagreement between A and B about the relative attractiveness of negotiating and attacking. Settlement requires unanimity by construction, but Lemma 2 states that decisions to attack are also unanimous. One partner's choice to attack is sufficient to prevent negotiations and force a war, which ensures that the other player also attacks rather than suffer costs of discord c_i that can't affect the outcome.

Lemma 2. *Attack and pass decisions are unanimous in equilibrium.*

That negotiations, not war, require unanimity is an auxiliary feature of the model, i.e. one that helps isolate the model's representational features (Ashworth, Berry and Bueno de Mesquita 2021, Ch. 2). To that end, Lemma 2 implies that there can be only two outcomes of intra-coalition politics: either both partners pass or both partners attack. This doesn't affect why war or peace occurs, but it ensures that the conditions for peace also define those supporting war. If both partners have profitable deviations from passing, we can say that partners agree on the attractiveness of war, but if only one partner prefers attack to passing, thereby ensuring war and forcing its partner to agree lest it pay the costs of discord, then we can say that the partner with the profitable deviation is the one that takes the coalition to war. Lemma 2 also implies that the costs of discord are never paid in equilibrium, but the desire to avoid them ensures that they still shape the conditions under which war and peace occur.[7] I show next that relative sensitivity to the costs of breach shapes political power inside the coalition and, as a result, one partner's ability to restrain the other when it finds war relatively more attractive.

Together, Lemmas 1 and 2 ensure that the game has two SPE, one peaceful and one violent. A and B both pass at the peaceful SPE, allowing across-side power to shift in D's favor but preventing within-side power from shifting in B's favor. At the violent SPE, both partners attack, but Proposition 1 below uses the logic of Lemma 2 to identify when one

[7]The costs of breach can encourage peace regardless of how far power is shifting when they're sufficiently high, but that's an artifact of the unanimity requirement for peace; therefore, I limit discussion of the costs of discord to conditions under which they're not trivially large.

partner drags the other into war and when both agree on waging preventive war against D. Coalition members weigh three quantities when they consider passing and attacking: (a) the net private benefits of fighting, represented by the difference between their shares of the pie after war and peace; (b) the private costs of war, represented by the costs of breach and the share of the bargaining surplus that would accrue to each player at peace; and (c) the public costs of war. Lines (1) and (2) state that the game ends peacefully when the net private benefits of war are smaller than the ratio of the private costs of war to the size of the pie after war, or

$$\overline{p}_C(1-\overline{p}_B)-\underline{p}_C(1-\underline{p}_B)\leq \frac{c_A+d(1-\underline{p}_B)}{1-d} \tag{1}$$

for A and

$$(\overline{p}_C\cdot\overline{p}_B)-(\underline{p}_C\cdot\underline{p}_B)\leq \frac{c_B+d\underline{p}_B}{1-d} \tag{2}$$

for B. Substantively, each partner reasons that the gains to be had from preventing D's rise don't outweigh the costs of fighting. This is isomorphic to the rationale behind peace in dyadic models, where the key factor is the across-side shift in power $\overline{p}_C-\underline{p}_C$. But since fighting also shifts power inside the coalition, the net benefits of fighting also depend on how war rearranges intra-coalition power. War ensures B a larger share of a larger pie—net the costs of fighting—and A a smaller share of that same larger pie. When the private gains aren't too great, both partners pass.

Proposition 1 states that Lines (1) and (2) hold when B's initial share of intra-coalition power ($\underline{p}_B$) is neither too small nor too large and when the shift in across-side power ($\overline{p}_C-\underline{p}_C$) isn't too large.

Proposition 1. *The game ends peacefully if*

$$\underline{p}_B^{\,l}\leq \underline{p}_B\leq \underline{p}_B^{\,h} \tag{3}$$

and

$$\overline{p}_C-\underline{p}_C\leq \frac{d-c_A+c_B}{1-d}. \tag{4}$$

The coalition attacks if either (3) *or* (4) *fails.*

When Lines (3) and (4) are both satisfied, the peaceful equilibrium exists. Each coalition partner is satisfied, because the net benefits of waging a costly war are too small. When either condition fails, however, at least one coalition member has a profitable deviation, which ensures that the violent SPE in which the coalition attacks D exists. Results 1-3 identify three pathways along which the conditions supporting the peaceful SPE can fail.

Result 1. *When fighting will shift power far enough in B's favor, B can push the coalition to war for any* $\overline{p}_C\geq\underline{p}_C$.

First, if Line (3) is violated because $\underline{p}_B < \underline{p}_B^l$, where

$$\underline{p}_B^l = \frac{\overline{p}_C \overline{p}_B (1-d) - c_B}{\underline{p}_C (1-d) + d},$$

then B's pre-shift share of the within-side bargain is so small—and its post shift share correspondingly high—that it can't be compensated at peace for the foregone benefits of war. This constraint is easiest to satisfy when the across-side shift $\overline{p}_C - \underline{p}_C$ is large and B's costs for breach are small, but notably it can hold even when the across-side shift is so small that it wouldn't otherwise cause war. Indeed, the condition can still be satisfied if across-side power is fixed, $\overline{p}_C = \underline{p}_C$, such that B may take the coalition to war even in the absence of across-side bargaining frictions. This result is isomorphic to other models in which shifting power inside states can lead to external war (Powell 2006, 189-192, Wolford 2014*b*, Smith n.d., Davis n.d.), but I show below that it can also explain why some wars last longer than the endpoint predicted by models of endogenous war termination.

Result 2. *When the within-side distribution of power heavily favors B, A can push the coalition to war as long as power is shifting ($\overline{p}_C > \underline{p}_C$).*

Second, if Line (3) is violated because the within-side distribution of power is skewed in B's favor when play begins, or $\underline{p}_B > \underline{p}_B^h$ where

$$\underline{p}_B^h = 1 - \frac{\overline{p}_C (1-\overline{p}_B)(1-d) - c_A}{\underline{p}_C (1-d) + d},$$

then A pushes the coalition to war despite the prospect of an unfavorable shift in intra-coalition power. A's share of the pie begins small and will stay relatively small if the coalition fights, because probabilities of victory are bounded such that $\overline{p}_B < 1$. As a result, B isn't eager for war—its share begins and remains large—but its declining partner *is*, because A finds fighting at a favorable across-side distribution of power ($\overline{p}_C$) and tolerating a small shift in B's favor preferable to the settlement that follows D's rise. To see this, note that $\underline{p}_B > \underline{p}_B^h$ can't be satisfied if the across-side distribution of power is static, i.e. if $\underline{p}_C = \overline{p}_C$. What matters for A in driving the coalition's war aims upward is a sufficiently favorable initial chance of defeating D, or

$$\overline{p}_C > \frac{c_A}{(1-\overline{p}_B)(1-d)}.$$

In this case, war occurs not because power is shifting too far in B's favor but because distributive competition inside the coalition gives A no other outlet to increase its share of the pie: the gains from attacking at $\overline{p}_C$ outweigh the costs of eventual peace at $\underline{p}_C$, because A is already disadvantaged and the intra-coalition shift against it is relatively small. Contrary to accounts in which relatively weak coalition partners force their stronger counterparts to moderate their demands (Kreps 2011, Papayoanou 1997), the weaker partner sets the coalition's aims above what the stronger partner would and drives the coalition to war.

Result 3. *When neither partner will force a war unilaterally but power is shifting across sides, war is more likely when the rising partner has less to lose from an open breach ($c_B < c_A$) and less likely when the declining partner has less to lose from an open breach ($c_A < c_B$).*

Finally, war may also occur if Line (3) is satisfied but Line (4) fails. Disagreements inside the coalition aren't sufficient for one partner to drag the other into fighting, but shifting across-side power is sufficient to create agreement on the desirability of war. Just like in dyadic models, the declining side (here, the coalition) attacks the rising side when the across-side shift in power is sufficiently large relative to the costs of fighting. Formally, Line (4) ensures that the range $(\underline{p}_B^l, \underline{p}_C^h)$ defined in Line (3) is nonempty. But if

$$\overline{p}_C - \underline{p}_C > \frac{d - c_A + c_B}{1 - d},$$

then across-side power is shifting so far that both A and B are willing to wage a costly preventive war against D. Coalition politics, however, determines whether war occurs for a larger or a smaller across-side shift than it would in a dyadic setting, where the right-hand side of the inequality is simply $d/(1-d)$. When $c_A > c_B$, A pays larger costs for breach than B, and the coalition attacks for smaller shifts in across-side power. And when $c_A < c_B$, B's greater fear of an open breach with its partner imposes restraint, and war occurs only for larger shifts in across side power. Therefore, when power is shifting both across and within sides, fighting is more likely when the rising partner has less to lose from an open breach and less likely when the declining partner has less to lose from an open breach.

Results 1-3 show that distributive politics inside military coalitions can make war either more or less likely than it is in standard dyadic models of the commitment problem, in some cases with the declining partner driving the coalition's aims high enough to ensure war. Power need not be shifting across sides for a rising partner to take the coalition to war, and when a weak and declining partner takes the coalition to war, it does so precisely because a preventive war promises a larger share of the pie than waiting, because the intra-coalition shift will be minimal. Finally, when neither partner has a sufficient unilateral incentive to take the coalition to war, their relative sensitivities to public disagreement over war aims determines whether the shift in across-side power necessary for war is more or less permissive than it is in the baseline dyadic case. As I show next, these results also implicate how we understand war duration and termination.

War Termination

The theory of war termination anticipates that belligerents will bring wars to an end as soon as fighting solves the underlying bargaining friction, whether information (Filson and Werner 2002) or commitment problems (Leventoğlu and Slantchev 2007), to save the further costs of war (Wagner 2000). Yet some wars drag on well past that point, while others end short of solving the problem that took belligerents to war in the first place. Most attempts to resolve this puzzle focus on late (e.g., Beard 2019, Ch. 3, Croco 2015, Cunningham 2006, Stanley 2009) or early (Bennett and Stam 1996, Weitsman 2003, Werner and Yuen 2005) terminations at the exclusion of the other, often introducing private benefits from fighting, collective action problems, coalition size, or exogenous events like exhaustion and third-party imposition. I show in this section, however, that my model of coalition politics can account for wars that end "on time," "early," and "late" while retaining basic assumptions of two-player models in which war is costly and the stakes in dispute are private goods.

Suppose that a war between C and D is ongoing when play begins. Decisions over attacking and passing now imply continuing and terminating the war, respectively, and by varying the extent to which power is shifting across sides we can consider the interaction between shifting power between partners and the pre-game course of fighting. If $\overline{p}_C = \underline{p}_C$ such that power is no longer shifting in D's favor, then we can say that the fighting has already resolved the commitment problem that motivated it. If $\overline{p}_C > \underline{p}_C$, then power is still shifting in D's favor, and fighting hasn't yet solved the war's underlying bargaining problem. I compare each case to the conditions under which war would end in a baseline unitary-coalition model, which defines an "on time" end. If the war continues when it would've ended in the baseline case, then it ends "late." If the war ends when it would've continued—e.g., allowing otherwise-intolerable shifts in D's favor—then it ends "early." After describing the unitary coalition case, I discuss cases in which fighting has and hasn't already solved the war's underlying bargaining problem, with the Paraguayan War as an example of a "late" termination and the First World War as an example of an "early" termination.

Proposition 2. *When C is unitary, war ends iff*

$$\overline{p}_C - \underline{p}_C \leq \frac{d}{1-d}, \tag{5}$$

such that the war ends on time.

Proposition 2 treats the coalition as a unitary actor, with no distributive tensions between members and no costs for breach, and Line (5) stipulates that war ends in such a model when power is no longer shifting so far in D's favor that it outweighs the costs of fighting (see Leventoğlu and Slantchev 2007, Powell 2012, Wolford, Reiter and Carrubba 2011). For purposes of comparison to coalition-politics models, Line (5) also defines when wars end "on time" in the theory of war termination: immediately upon the resolution of the war's motivating bargaining problem (see Wagner 2000).

Proposition 3. *Fix $p_C = \overline{p}_C = \underline{p}_C$, such that fighting has solved D's commitment problem. War ends iff*

$$\overline{p}_B - \underline{p}_B \leq \frac{c_B + \overline{p}_B d}{\underline{p}_C(1-d)+d}, \tag{6}$$

which ensures that the war ends late.

Proposition 3 considers a case in which power is no longer shifting across sides, such that fighting has already solved D's commitment problem. Dyadic models of war termination anticipate that the war should end immediately: D can credibly commit to a bargain based on $\underline{p}_C$, which renders further fighting wasteful. Line (6), however, shows that this prediction depends on a sufficiently stable distribution of intra-coalition power, i.e. a small value of $\overline{p}_B - \underline{p}_B$. When power is shifting far enough in B's favor to violate Line (6), then B forces a continuation of the war to increase its own share of the pie at its declining partner's expense—and despite the fact that A has no individual incentive to continue the war beyond fear of a public breach. This constraint is harder to satisfy when B pays a higher cost of discord, such that the value of cooperation with A can encourage termination of the war in

some cases, but when continuing the war will increase B's power sufficiently, the war ends later than it would in the baseline case.

The logic of Proposition 3 offers a plausible account of the Paraguayan War's termination, which ended with the killing of Paraguay's leader, Javier Solano López, well after he'd lost control of the government, the capital, and most of Paraguay. The war could plausibly have ended in 1869 once the victors had stabilized the regional (read: across-side) distribution of power (Strauss 1978, 21), yet it continued for another year, as Brazil insisted on a total military victory despite Argentina's preference for negotiations. One reason for this difference in aims was Brazil's relatively larger share of the war effort and control of key rivers, which would ensure not only that it could dominate the postwar occupation but that it could dictate terms to both Paraguay *and* Argentina (Warren 1972, 388-390). Brazil's continuation of the war risked coalition discord (see Strauss 1978), but its lower sensitivity to disagreement ($c_B < c_A$) enabled it to force Argentina to accept both the continuation of the war and a smaller share territory than it had been promised in the Treaty of Triple Alliance at the outset of the war. The equilibrium also offers an alternative to Weisiger's (2013) account of the war's duration, which relies on faulty Brazilian and Paraguayan inferences about each other's goals in the conflict; such uncertainty may have been present, but the intra-coalition rivalry between Brazil and Argentina can account for the former's more extensive war aims *and* its ability to limit the latter's postwar territorial gains.

Proposition 4. *When $\overline{p}_C > \underline{p}_C$ such that fighting hasn't solved D's commitment problem. War ends early iff*

$$\underline{p}_B^l \leq \underline{p}_B \leq \underline{p}_B^h \quad \textit{and} \quad c_A < c_B. \tag{7}$$

Otherwise, war ends (weakly) late.

Proposition 4 describes cases in which fighting has yet to stabilize the across-side distribution of power: if the coalition chooses negotiations, power will shift in D's favor, leaving its commitment problem unsolved. Recall that the baseline case anticipates that war should end when Line (6) is satisfied, or when

$$\overline{p}_C - \underline{p}_C \leq \frac{d}{1-d}.$$

Proposition 4, however, identifies conditions under which war can continue when Line (6) anticipates termination and end when Line (6) anticipates continuation. If power is shifting far enough in B's favor, if A is already disadvantaged by an inequitable settlement, or if B is relatively unconcerned about breach even when the previous two conditions fail, war continues whether or not it would've ended at the unitary-coalition baseline. Line (7), however, also identifies cases when the war ends early despite B's prospective rise in power. When intra-coalition power isn't shifting too far and the present distribution isn't too inequitable, neither partner has a unilateral incentive to force the other into continuing the war. However, the size of the shift in across-side power for which war can end depends on partners' relative costs for disagreement, such that war ends when

$$\overline{p}_C - \underline{p}_C \leq \frac{d - c_A + c_B}{1-d}.$$

As just noted, war ends late when B pays a lower cost for breach, but when B pays a higher cost for breach ($c_A < c_B$), then

$$\frac{d - c_A + c_B}{1 - d} < \frac{d}{1 - d}$$

and the coalition agrees on ending the war for levels of shifting across-side power that would see the war continue at the baseline. Therefore, coalition politics can lead wars to end short of their "natural" endpoints, leaving opponent's bargaining problems unsolved in ways that wouldn't occur absent coalition politics. If intra-coalition power were stable, distributive issues inside the coalition wouldn't make the war last any longer or shorter than the baseline; but the interaction of shifting power between partners and the costs of a public breach can lead some coalitions to leave the bargaining problem animating the war unsolved.

Proposition 4 resolves an important puzzle about the end of the First World War, which left Germany itself unconquered and the Allies concerned about its ability to rest, regroup, and restart the war from an advantageous position (Gerwarth 2020, 71, Stevenson 2005, 120). Allied thinking had long centered on the idea that only military victory, which would require fighting into at least 1919, promised sufficient guarantees of a stable peace (French 2002, Ch. 10, McCrae 2019), like the disempowerment of Germany's generals and the creation of buffer states on the Rhine (Stevenson 2005, 124-125). The Allies were also unaware of just how badly Germany was beaten when it requested an armistice in October 1918 (*ibid.*, 108). So why did the Allies, flush American dollars, dreadnoughts, and doughboys, settle for an armistice in Belgium instead of victory in Germany?

Intra-coalition politics offers an answer. First, members of the coalition disagreed over how to share the postwar pie, with Britain and France trying to hold onto their empires and the Americans aiming to supplant them (Goemans 2000, Parsons 1977, Rothwell 1971, Tooze 2014). Second, intra-coalition power was shifting in the Americans' favor, which would eventually allow them to "decide the outlines of the settlement" (Stevenson 1982, 110); the Americans also knew that they held the ring and that their grip would grow only tighter (Mayer 1969, 332, Stevenson 2005, 112). Yet French Premier Georges Clemenceau and Marshal Ferdinand Foch "had no particular interest in going on to Berlin if it would weaken France and strengthen America's relative position" (Stevenson 2005, 125, 127). Better to end the war in 1918 than to make the Entente more vulnerable to American predominance. Finally, relatively larger concerns about maintaining Allied unity ($c_A < c_B$) guided American support for the armistice despite its their rising power. Recognizing that threats to return to war were a critical backstop in securing advantageous terms (Lowry 1996, 24), President Wilson took several steps to avoid a public breach with the Entente, including a studied refusal to give a formal interpretation of his Fourteen Points (31) and promises not to act unilaterally in imposing terms on Germany (34). Wilson also feared that continuing the war would undermine progressive politicians in Britain and France—to say nothing of his own domestic agenda—all of which might make it more difficult to get the terms he wanted even after a total victory (Stevenson 2005, 120-122). Ending the war in 1918 served an additional collective goal that open discord might have compromised: cooperation in the face of the perceived threat of Bolshevism spreading outward from Russia (Gerwarth 2020, Ch. 3, McCrae 2019, 243) and managing the dissolution of the Ottoman Empire (see Fromkin 1989). The costs of discord loomed large for the Allies in 1918, though a bit larger

for the Americans given their central place in the postwar order. And though the winners harbored doubts about the credibility German commitments to peace, they agreed to grant the armistice rather than see within-side power shift dramatically across the Atlantic.

Conclusion

Most theories of war account for fighting that rearranges incentives across warring sides, but war can also rearrange incentives *within* warring sides, strengthening some partners at others' expense. This implicates how coalition partners are to share the pie and whether decisions over war and peace with an opponent become instruments of within-side, as well as across-side, competition. Distributive politics inside military coalitions can shape decisions over war a peace as a function of (a) shifting power inside the coalition, (b) relative fears of a public breach over war aims, and (c) the extent of bargaining frictions with their potential enemies. First, when one partner will grow at the other's expense over the course of fighting, then it can push the coalition to war to secure a larger share of the pie, even when the distribution of power with an enemy is stable. Second, when the distribution of power is inequitable and already favors a rising partner, the declining partner may push the coalition to war—even as the rising partner is happy to seek piece—simply to increase its share of the pie. Finally, even when both partners agree on the attractiveness of preventive war against an enemy state, war is more likely than it is in standard dyadic models when the rising state pays lower costs for breach but less likely when the declining state pays a lower cost for breach. I also show that the logic applies to war termination as well with brief discussions of the "late" end of the Paraguayan War and the "early" end World War I, accounting for both types of war termination in a single model.

From a research design standpoint, the model shows how coalition partners can raise or lower the probability of fighting (see also Wolford 2015, Ch. 4), as well as lengthen or shorten ongoing conflicts. Simply counting the number of states on a side in a given dispute or including a dummy variable for coalitions, for example (see Chiba and Johnson 2019, Werner 1999), may be insufficient for understanding how coalition politics shapes the risk or duration of war, because the effect is conditional on (a) the difference between present and future distributions of power and (b) relative sensitivities to public disagreement. The results on war termination also point to conditions under which wars are particularly likely to recur—that is, when coalition partners agree to end a war with an adversary before the conflict's underlying bargaining problem has been solved (cf. Werner and Yuen 2005)—and when they'll last particularly long—when a rising state will risk coalition discord to continue the war and cement its dominance of the eventual settlement. Both sets of results, however, point to the absence of a consistent bivariate relationship between coalition participation and conflict. To the extent that we find such bivariate relationships in observational data, they may be masking underlying conditional relationships.

Finally, future work might take the model in several directions. First, the most important representational feature of the model is shifting power inside the coalition, which in this case interacts with an enemy's commitment problem. But the across-side bargaining friction need not be shifting power. It could also be an information problem, where the enemy has private information about the attractiveness of war and incentives to misrepresent

it. Fighting (or fighting on) in the absence of uncertainty is consistent with the late-ending wars of Proposition 3, and it's a reasonable conjecture that rising and declining partners might disagree, as they do in Proposition 4, over the wisdom of fighting (or fighting on) to separate enemy types or settling "early," striking a less favorable bargain in return to ending the war before revealing as much information as fighting would. Therefore, the model's key results likely apply to the both major classes of rationalist explanations for costly conflict: commitment and information problems.[8] Second, the model has an intentionally spare representation of coalition politics in which neither partner has proposal power, each pays a private cost for disagreeing with its partner, and bargaining is constrained to be efficient. Other models of preference aggregation are possible, including not just proposal power but also the time required to negotiate coalition war aims and how those might be tied to specific concessions over shares of the pie and the credibility of those concessions.

Proofs

Proof of Lemma 1. Begin by defining B's acceptance rule, such that it accepts any proposal satisfying

$$1-x \geq (1-\underline{p}_C)(1-d) \Leftrightarrow x \leq \underline{p}_C(1-d)+d.$$

Moving back up the tree, let a generic coalition proposer k's share of the pie be $s_k \in [0,1]$. The proposer either meets D's acceptance constraint at equality, $x* = \underline{p}_C(1-d)+d$, since it has no incentive to under-propose, or sets $x^* > \underline{p}_C(1-d)+d$, which provokes rejection. The proposer meets D's acceptance constraint at equality when

$$\Big(\underline{p}_C(1-d)+d\Big)(s_k) \geq \underline{p}_C(1-d)(s_k),$$

which is true because $d \in (0,1)$ and for all s_k. □

Proof of Lemma 2. The game form ensures that passing is unanimous. Next, if generic partner $-k$ is sure to attack, attacking is partner k's best response, because

$$\overline{p}_C(1-d)(s_k) \geq \overline{p}_C(1-d)(s_k) - c_k$$

is sure to be true given $c_k > 0$. □

Proof of Proposition 1. By Lemma 1, the negotiation subgame ends peacefully with agreement on $x^* = \underline{p}_C(1-d)+d$. Both partners pass when $u_A(\text{pass}_A, \text{pass}_B) \geq u_A(\text{reject}_A, \text{pass}_B)$ and $u_B(\text{pass}_A, \text{pass}_B) \geq u_B(\text{pass}_A, \text{reject}_B)$, or when

$$x^*\Big(1-\underline{p}_B\Big) \geq \overline{p}_C(1-d)\big(1-\overline{p}_B\big) - c_A$$

for A and

$$x^*\underline{p}_B \geq \overline{p}_C\overline{p}_B(1-d) - c_B,$$

[8] Recall that Powell (2006, 177-180) shows Fearon's (1995) third bargaining friction, bargaining indivisibilities, are really a special case of commitment problems.

for B. Both constraints are satisfied iff

$$\frac{\overline{p}_C\overline{p}_B(1-d)-c_B}{\underline{p}_C(1-d)+d} = \underline{p}_B^l \leq \underline{p}_B \leq \underline{p}_B^h = 1-\frac{\overline{p}_C(1-\overline{p}_B)(1-d)-c_A}{\underline{p}_C(1-d)+d}$$

and

$$\overline{p}_C - \underline{p}_C \leq \frac{d-c_A+c_B}{1-d}.$$

If either constraint is violated, at least one player as a profitable deviation from passing and by Lemma 2, A and B both attack. □

Proof of Proposition 2. Suppose that there are no distributive politics inside the coalition and $c_i = 0$. Lemma 1 establishes the terms of agreement in the negotiation subgame, so C prefers passing to attack when

$$x^* = \underline{p}_C(1-d)+d \geq \overline{p}_C(1-d)$$

or when $\overline{p}_C - \underline{p}_C \leq d/(1-d)$ as stated in Line (5). □

Proof of Proposition 3. By Lemma 1, the negotiation subgame ends peacefully with agreement on $x^* = \underline{p}_C(1-d)+d$. Both partners pass when $u_A(\text{pass}_A, \text{pass}_B) \geq u_A(\text{reject}_A, \text{pass}_B)$ and $u_B(\text{pass}_A, \text{pass}_B) \geq u_B(\text{pass}_A, \text{reject}_B)$, or when

$$x^*\left(1-\underline{p}_B\right) \geq \underline{p}_C\left(1-\overline{p}_B\right)(1-d)-c_A$$

for A and

$$x^*\left(\underline{p}_B\right) \geq \underline{p}_C\left(\overline{p}_B\right)(1-d)-c_B$$

for B. A's constraint is sure to be satisfied given $d \in (0,1)$ and $\overline{p}_B > \underline{p}_B$, but B passes only when

$$\overline{p}_B - \underline{p}_B \leq \frac{c_B+\overline{p}_B}{\underline{p}_C(1-d)+d}$$

as defined in Line (6) and ends otherwise. □

Proof of Proposition 4. Follows immediately from Propositions 1 and 2. □

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