

# Stalling

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August 6, 2018

## Abstract

This paper argues that stalling—fighting to maintain the status quo until military defeat—is a rationalist explanation for war. We develop a model in which a delay exists between war’s initiation and termination. During that time, states maintain a status quo share of the good in dispute. If states discount the future at different rates, no mutually preferable settlement may exist. War is more likely when a comparatively patient state is powerful but holds a disproportionately small share of the status quo. In addition, the parameters for war are nonmonotonic in the length of conflict, with fighting only occurring when the time to termination falls in a middle range. We then relate these results to existing theories of civil war, democratic peace, and the offense-defense balance.

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The Sri Lankan Civil War began in 1983 when the Tamil Tigers tried to create a break-away state. The conflict raged on for almost 26 years before the Sri Lankan government militarily defeated the uprising. From one perspective, the Tamil Tigers failed—they did not achieve their war aims. But from another perspective, the war was a success. For more than two decades, the Tigers held territorial sovereignty over Tamil Eelam. At its peak, this *de facto* state had a capital in Kilinochchi, created a functioning court system, and ran the Bank of Tiger Eelam. The Tamil Tigers achieved—at least temporarily—some of their war aims merely by fighting. Conflict may have been costly, and defeat may have perhaps been inevitable, but the Tamil Tigers nevertheless enjoyed the *intrabellum* status quo.

When would we expect to observe wars due to stalling? To answer this question we develop a formal model of bargaining and conflict. In short, we argue that stalling is a rationalist explanation for war. We find two that two key features of the dyadic relationship make states more inclined to stall: (i) when they expect a war not to terminate too quickly nor drag on indeterminately; and (ii) a disparity exists between the distribution of goods during war and the expected post-war distribution.

Given current theories of conflict, stalling wars seem unlikely. As long as fighting is inefficient, settlements mutually preferable to war should certainly exist (Fearon, 1995). An *intrabellum* status quo may affect war payoffs, but it does not change the fact that there is a larger pie to divide in peace than war. It therefore stands to reason that settlements mutually preferable to war exist that factor in both the status quo and probabilities of victory.

To demonstrate that bargaining range may be empty, we relax two standard assumptions from the bargaining model of war literature. First, we include the aforementioned *intrabellum* status quo; during war, each state enjoys a share of the good in dispute. Second, we allow actors to have noncommon discount factors. Relaxing either of these assumptions in isolation generates peace with certainty. But together, they create the perfect storm for war.

The intuition is as follows. Suppose an impatient state is militarily weak but will hold a disproportionate share of the disputed good during a war. Securing a peaceful settlement requires giving that state a large share of the good, despite its weakness. This is because it can fight a war to stall for time, obtaining a large share in the interim. In the long run, this plan backfires—it will likely lose and ultimately receive nothing. Yet it does not care because it is impatient.

Now consider that state's more patient opponent. It too requires a large share of

the settlement to maintain the peace. After all, in the long term, this state is likely to win a military confrontation. Fighting will give the actor a poor *intrabellum* payoff. However, this will not dissuade the actor from pursuing war—it weighs future payoffs greater than the present. Combining these together, each party’s minimum share of a settlement exceeds the most the other is willing to give up. War occurs as a result.

At its core, our mechanism is a commitment problem. Settlements exist that leave both parties better off. For example, suppose that the parties peacefully divide the stakes according to the *intrabellum* values for the length of time war would last. Afterward, the parties would redivide the good according to the military balance for the rest of time. Such a division improves welfare because it matches the intertemporal war payoffs but does not create inefficient costs. However, it is also not credible to implement. At the time of the transition period, the impatient state would not want to follow through. Instead, it would prefer fighting a war to hold the status quo for even longer. Recognizing this from the start, the patient state would never agree to the deal in the first place. We show that this problem is endemic to the strategic situation—even if states can freely renegotiate over time to allow for a smooth transition, war may still be inevitable.

Although stalling is a commitment problem, it is a part of a unique subclass that warrants its own analysis. According to the standard commitment problem mechanism, large and rapid shifts in power render deals incredible over time (Powell, 2006). Power remains static in our setup, and thus our mechanism is also distinct from wars due to imperfect information about arming (Debs and Monteiro, 2014) or war debt to produce military power (Slantchev, 2012). In addition, war payoffs do not need to be a function of previous offers to obtain conflict (Chadefaux, 2011). This gives it a close connection to issue indivisibility (Powell, 2006). States could resolve the problem with an *ex ante* efficient mechanism (a weighted coin flip in the case of issue indivisibility, a defined transition point in ours) but the states cannot follow through on those solutions.

Substantively, our results speak to three literatures on conflict. First, our mechanism is more likely to cause war when the disparity between military power and the *intrabellum* status quo is large. Wars of independence—like the Sri Lankan Civil War—often follow this pattern. Weak rebellions can hold onto territory for the duration of war but face an uphill battle in defeating a better organized and funded central government. Counter to fears of perverse incentives (Kuperman, 2008; Spaniel, 2018), prospects for foreign interventions can incentivize peace here by better balancing the distribution of power and *intrabellum* status quo. The underlying commitment problem also suggests that peacekeeping missions can succeed by enforcing a change in distribution of the disputed

good over time.

Second, stalling wars are more likely to begin when there is a greater disparity between the parties' levels of patience. Work in comparative politics suggests that autocracies have longer time horizons than democracies (Haggard and Kaufman, 1995). Thus, all else equal, our mechanism suggests greater conflict between dissimilar dyads. When combined with *monadic* theories of democratic, these two mechanisms can create a *dyadic* democratic peace, which is an empirical regularity in the quantitative international relations literature.

Third, peace is certain when wars are fast or will endlessly persist. This provides a new perspective to the offense-defense balance in international relations. Existing theories argue that war is most likely when military technologies favor offensive maneuvers (Jervis, 1978) or defensive maneuvers (Fearon, 1997). Our model instead indicates that wars of stalling are most prevalent in a middle ground.

Formally, our results connect to a broader class of bargaining games. In our baseline model the proposer makes an ultimatum offer. When conflict is immediately resolved our model is identical to the crisis bargaining model (Fearon, 1995). When conflict lasts indefinitely, however, the model is equivalent to agenda setter models in which the status quo policy prevails should bargaining fail (Romer and Rosenthal, 1978). Thus, our model incorporates both of these standard bargaining frameworks. As expected, actors are always able to find a successful bargain in either extreme. However, we show that bargaining failures may exist outside of these cases.

A growing literature highlights various forces that can cause bargaining delay with complete information. Chatterjee et al. (1993), Ray and Vohra (1999), and Gomes (2005) show that inefficient delay can arise in models with coalitional bargaining, where players bargain cooperatively within coalitions but the coalitions bargain non-cooperatively with each other. In purely non-cooperative settings, delay can occur if (i) previously rejected proposals commit players to reject any subsequent proposals that are worse (Fershtman and Seidmann, 1993), (ii) there are stochastic shocks to the size of the bargaining surplus (Merlo and Wilson, 1995), (iii) there are multiple issues and players can reach partial agreements (Acharya and Ortner, 2013), or (iv) one player bargains sequentially and bilaterally with multiple other players, with uncertainty regarding future proposal power (Iaryczower and Oliveros, 2018). Additionally, delay can derive from players holding different beliefs about future bargaining power if those beliefs can evolve over time (Yildiz, 2004; Ortner, 2013), or the bargaining environment is multilateral (Ali, 2006).

Another strand of the bargaining literature studies why delays frequently resolve close

to exogenous deadlines. Proposers delay to take advantage of *deadline effects* (Ma and Manove, 1993; Jehiel and Moldovanu, 1995), and more generally *durability effects* (Simsek and Yildiz, 2016), that increase their own bargaining leverage. In particular, Ma and Manove (1993) study a setting in which players can delay their proposals without losing control of the agenda and each proposal is followed by an uncertain amount of time before other players can respond. Our model allows players to respond immediately to proposals, but rejection leads to a period of delay during which the status quo persists before the long-term consequences are realized. Furthermore, when we allow for short-term agreements and an endogenous status quo in our dynamic extension, we do not impose an exogenous deadline.

Also related is Banks and Duggan (2006), which demonstrates that delay can arise in a general model of multi-lateral bargaining if the status quo policy is particularly favorable to a player with veto power. We focus on bilateral bargaining in a distributive setting and model the resolution of delay as a costly lottery, but the quality of the status quo for the veto player is an important factor underlying delay in this paper.

Beyond international and civil conflict, the framework we analyze here can be adopted to a number of other settings. For example, pretrial settlement negotiations are often conceptualized as bilateral bargaining (e.g., Mnookin and Kornhauser (1979), Spier (1992)). In this case, disagreement in our model can be interpreted as the decision to go to court, rather than settle. Given that forgoing settlement for trial can result in costly drawn out legal battles, the status quo division or policy may be in place for a long time and, thus, play an important role in litigants' calculus. Another natural application of our analysis is to bargaining between workers and firms (e.g., Svejnar (1986), Fernandez and Glazer (1989)). If a strike should occur, how the actors expect to fare in the interim, how long they expect it to last, and their relative patience are all important elements in labor negotiations. By explicitly incorporating these elements we provide conditions under which we should expect strikes to occur.<sup>1</sup>

## Motivation

Our paper diverges on two dimensions from the standard assumptions in the bargaining model of war literature. Both changes are necessary to obtain our key result. However,

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<sup>1</sup>As in the study of crisis bargaining, incomplete information as a driving force of bargaining failure has also been widely studied in both of these literatures. For examples, see Bebchuk (1984), Fudenberg, Levine and Ruud (1985), Hart (1989), and Kennan and Wilson (1993).

researchers have relied on the assumptions that we relax out of mathematical convenience rather than empirical accuracy. We use this section to support that claim.

First, we allow states to have noncommon discount factors. Discount factors weigh how an actor values today versus future periods—either due to pure impatience or because they believe that the interaction is not likely to continue long into the future. Most models within the conflict literature assume that states are equally impatient. This is useful for creating a more parsimonious model—rather than needing  $\delta_A$  and  $\delta_B$  to represent two states’ discount factors, the modeler can simply set them equal to each other and call it  $\delta$ . But this is purely for notational convenience. Using a single discount factor is an edge case and likely does not have much empirical grounding.

Indeed, a large literature in comparative politics claims that discount factors vary across states and regimes. Haggard and Kaufman (1995) argue that autocratic leaders generally have longer time horizons than democracies. Intuitively, stable autocratic leaders face less competition and need not worry about term limits. Nor can a domestic population blame them for short-term costs of war at the polls (Levy, 2011, 92-93). As such, they are more willing to forgo small payoffs today for larger payoffs in future years. Variation also exists within regime types. Countries with longer tenured leaders (Bienen and Van de Walle, 1992), better economic growth (Londregan and Poole, 1990), and with no ongoing sanctions episodes (Marinov, 2005) are more likely to maintain their current regimes into the next year. Beyond that, governments formed in the wake of a coup survive longer when they are well-received from the international audience (Thyne et al., 2018), while potential targets of coups are less likely to face a plot in the first place when challengers cannot easily obtain funds from the international community afterward (Marinov and Goemans, 2014). These differences in time horizons drive state level behavior a number of fronts, including the personal accumulation of wealth extracted (Wright, 2008), investment in public health (Dionne, 2011), and shares of cartel rents (Blaydes, 2004).

Although these mechanisms are diverse, discount factors are a useful way to model their common incentives.<sup>2</sup> Correspondingly, we are not the first to incorporate noncommon discount factors in a bargaining model of war context.<sup>3</sup> Toft (2006) discusses asymmetric time horizons in the context of valuing the afterlife, and Kertzer (2016) accounts for variation in time preferences in predicting intervention outcomes. More related to our

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<sup>2</sup>We lose some nuance by doing this—e.g., not having a full model of domestic politics causing leadership turnover—but capturing a more general incentive structure is worth that price.

<sup>3</sup>Outside the crisis bargaining literature, Barkin (2004) studies the effect of noncommon time horizons on the production of public and common pool goods. In addition, Werner (1998) adapts the Rubinstein (1982) bargaining model in a discussion of conflict incentives.

interests, Chadeaux (2011) finds asymmetric patience can lead to war when the object negotiated today affects the probability of victory tomorrow. As we detail below, our mechanism is distinct. Conflict only occurs when we also include an *intrabellum* status quo payoff. No such payoff exists in Chadeaux's framework. And as we detail in the modeling section, if anything, bargaining over objects that influence future bargaining power ought to have a pacifying effect under these conditions.

Speaking of *interbellum* status quo payoffs, the second assumption that we relax is that war immediately produces a change to the issues at stake. In most models, following a rejection, players receive a war payoff. There is no delay. States instantaneously pay their costs of fighting, and Nature determines each state's share of their benefits. The status quo does not play a role.

In practice, this is not the case. Civil wars are notoriously long affairs; in 1999, the *average* length of civil conflicts still ongoing was 16 years (Fearon, 2004, 275-276). Prominent interstate conflicts have also dragged on: World War II lasted six years, World War I lasted more than four years, and the Iran-Iraq War lasted almost eight. The U.S. War in Afghanistan, begun in 2001, continues in some form at the time of this writing.

Combatants can pay heavy costs during these periods, but even a side woefully out-matched can benefit from delaying the inevitable. As long as war wages, a breakaway region can continue administering the territory it claims. The opening case of the Tamil Tigers illustrates this. Countries oppressing a minority group can maintain their discriminatory laws until an outside intervention finishes the process of regime change. Citizens can stay in disputed territories until forced out. In the extreme, a political body can maintain its existence until completely eradicated. For example, the Siege of Carthage may have ended in Roman victory and a complete destruction of the city and its population, but Carthaginians survived for three years simply by electing to fight (Tucker, 2010, 65-67).

Relaxing the instantaneous war assumption seems innocuous. After all, it appears to only devalue war for the actor disadvantaged by the status quo. Delay may shift the terms of settlement—the disadvantaged actor would accept less given the time delay—but it ought not cause bargaining breakdown. Indeed, some existing models (Slantchev, 2003; Powell, 2004) include a status quo payoff until war is resolved and do not find the effect. And Powell (1999) compares the status quo and the distribution of power in a more general conversation about stable settlements.

However, no existing work simultaneously incorporates both noncommon discount factors and delay in war outcomes. We by and large support this practice, as more

parsimonious models make mechanisms more transparent. But it is still important for researchers to understand how more empirically accurate assumptions interact with one another, as mixing common features of conflict can yield new results (Wolford, Reiter and Carrubba, 2011). Here, our model shows delay and noncommon discount factors combine to create a pernicious effect—impatient actors who hold an advantageous status quo may be unwilling to accept the most a patient actor is willing to offer.

## Model

Suppose two states,  $A$  and  $B$ , are in a dispute over a good represented by the unit interval. The states bargain over the good, and the dispute may end in conflict or a peaceful settlement. The good is initially divided between the two states according to a status quo division, with  $A$  enjoying  $q \in [0, 1]$  and  $B$  possessing  $1 - q$ . Bargaining begins with  $A$  proposing a settlement  $x \in [0, 1]$ . Next,  $B$  chooses to accept or reject  $A$ 's offer. If  $B$  accepts then the good is divided according to  $x$  and peace prevails forever after. If  $B$  rejects then the states fight a war.

In our model, war does not resolve immediately. Instead, conflict lasts for  $0 \leq T < \infty$  periods, at the end of which one side prevails and obtains the entire good; in an extension, we show the results hold for a more general model with stochastic stopping times. At the end of  $T$  periods,  $A$  wins the war with probability  $p \in [0, 1]$  and  $B$  is victorious with probability  $1 - p$ . In the baseline,  $T$  is fixed and known by both players at the outset. These assumptions are not crucial, however, and in the appendix we show that allowing  $T$  to be a random variable does not change the key insights.

Throughout an ongoing conflict, the status quo remains in place and players obtain utility each period according to the division  $q$ . Once conflict resolves, the winner controls the entire good and states accrue utility in each subsequent period according to this new division. Furthermore, each state  $i \in \{A, B\}$  incurs a per-period cost  $c_i$  in perpetuity.<sup>4</sup> Dynamic payoffs are given by the sum of per period payoffs and each state  $i$  discounts future periods according to  $\delta_i \in [0, 1)$ . All the parameters of the model are common knowledge to both states.

We are now in position to formally express each state's expected payoffs. First,  $A$ 's payoff if  $B$  accepts an offer  $x$  is  $\sum_{t=0}^{\infty} \delta_A^t x = \frac{x}{1-\delta_A}$ . On the other hand, if  $B$  rejects the

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<sup>4</sup>In an extension we show that our results continue to hold under more general assumptions about costs.

offer, then  $A$ 's expected payoff is

$$\sum_{t=0}^{T-1} \delta_A^t q + \sum_{t=T}^{\infty} \delta_A^t p - \sum_{t=0}^{\infty} \delta_A^t c_A.$$

$B$ 's payoffs for peace and conflict are analogous. If  $B$  accepts a settlement  $x$ , then it enjoys a per-period payoff of  $1 - x$ , which accrues to provide  $B$  with a dynamic payoff equal to  $\sum_{t=0}^{\infty} \delta_B^t (1 - x) = \frac{1-x}{1-\delta_B}$ . If  $B$  rejects, then its expected payoff equals

$$\sum_{t=0}^{T-1} \delta_B^t (1 - q) + \sum_{t=T}^{\infty} \delta_B^t (1 - p) - \sum_{t=0}^{\infty} \delta_B^t c_B.$$

To recap our baseline setting, the game begins with  $A$  making an offer that  $B$  can accept or reject. If  $B$  rejects, then a war breaks out. The war lasts for a finite number of periods before being resolved according to a lottery. Thus, our baseline model retains the ultimatum structure assumed in much of the crisis bargaining literature. However, although bargaining is one-shot, payoffs accrue dynamically. In the appendix, we demonstrate that our main intuitions still hold if we relax numerous assumption in the baseline model, for example by allowing for (i) uncertain conflict length, (ii) time-dependent relative power and/or costs of conflict, and (iii) evolving status quo. In particular, we show that the assumptions driving our results in the baseline model, non-common discount factors and intermediate war duration, are necessary for conflict to obtain. That is, peace always prevails if we generalize other features of the bargaining environment, but assume either  $\delta_A = \delta_B$ ,  $T = 0$  or  $T = \infty$ . Following the baseline analysis, we show that conflict can also occur if there is repeated peacetime bargaining

## Analysis

We study the subgame perfect equilibria (SPE) of our model. First, we characterize equilibrium behavior for both states. Using this characterization, we provide scope conditions for peace to be an impossibility in our setting. In turn, these conditions shed light on which features of our model can generate conflict. Building upon that understanding, we explore how changes in these features make conditions for conflict more or less favorable. Specifically, we show that increasing the duration of conflict initially makes conditions more favorable for conflict to occur, but beyond a certain point this makes conditions less favorable for conflict. Moreover, we characterize conflict duration that is uniquely most

favorable for conflict and explore how it varies with respect to the relative patience of both states.

To characterize behavior that occurs in every SPE, we work backwards from  $B$ 's decision to accept or reject a given offer  $x$ . If  $B$  accepts, then it receives  $1 - x$  in each period, which accrues over time to yield a dynamic payoff of  $\frac{1-x}{1-\delta_B}$ . On the other hand, rejection leads to conflict, where  $B$  receives its status quo division  $1 - q$  for  $T$  periods and with probability  $1 - p$  wins the right to enjoy prize in all periods following  $T$ . Additionally, conflict saddles  $B$  with a cost  $c_B$  that is incurred in every period.<sup>5</sup> Consequently,  $B$  accepts  $x$  only if

$$\sum_{t=0}^{\infty} \delta_B^t (1 - x) \geq \sum_{t=0}^{T-1} \delta_B^t (1 - q) + \sum_{t=T}^{\infty} \delta_B^t (1 - p) + \sum_{t=0}^{\infty} \delta_B^t c_B, \quad (1)$$

which rearranges to yield

$$x \leq q + c_B + \delta_B^T (p - q) \equiv x^*. \quad (2)$$

Inspecting (2) reveals that  $B$ 's reservation value,  $1 - x^*$ , depends on (i) the status quo division,  $q$ ; (ii)  $B$ 's cost of conflict,  $c_B$ ; and (iii) the discrepancy between relative power and the status quo division,  $p - q$ , discounted by  $B$ 's present value of payoffs received after  $T$  periods of conflict,  $\delta_B^T$ .

Working backwards to  $A$ 's proposal decision,  $A$  anticipates  $B$ 's acceptance behavior and structures its offer accordingly. Any accepted offer  $x$  provides  $A$  with a payoff of  $x$  in every period. Alternatively, any rejected offer leads to  $A$  receiving  $q$  for  $T$  periods, winning the conflict with probability  $p$  and enjoying the prize in each period after  $T + 1$ , and incurring the cost  $c_A$  in each period. Thus, all policies that lead to conflict are payoff equivalent for  $A$ .

In equilibrium,  $A$  compares its optimal acceptable offer against its expected dynamic payoff from conflict. In our setting,  $A$  has a uniquely optimal acceptable offer, which provides  $B$  with its reservation value,  $1 - x^*$ . As is standard,  $B$  must accept this offer with probability one in equilibrium, otherwise  $A$  has a best response problem. Thus,  $A$  makes a peaceful offer in a SPE only if

$$\sum_{t=0}^{\infty} \delta_A^t x^* \geq \sum_{t=0}^{T-1} \delta_A^t q + \sum_{t=T}^{\infty} \delta_A^t p + \sum_{t=0}^{\infty} \delta_A^t c_A. \quad (3)$$

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<sup>5</sup>Equivalently, we can assume that  $B$  pays a one time cost of  $\frac{c_B}{1-\delta_B}$ .

Using (2) to substitute for  $x^*$  and rearranging yields

$$c_A + c_B \geq (\delta_A^T - \delta_B^T)(p - q). \quad (4)$$

We say that  $A$  has *unrealized potential* if  $p > q$ , reflecting that its relative power is larger than its share of the status quo division. Conversely, we say that  $B$  has unrealized potential if the opposite inequality holds. Notably, (2) indicates that if  $A$  has unrealized potential, then  $B$  is willing to accept less favorable offers and this effect is more pronounced as  $B$  places more value on the future.

Proposition 1 collects the preceding observations and characterizes equilibrium behavior.

**Proposition 1.** *In every SPE,*

1.  $B$  accepts an offer  $x$  only if  $x \leq q + c_B + \delta_B^T(p - q) \equiv x^*$ ; and
2.  $A$  makes the peaceful offer  $x^*$  if and only if  $c_A + c_B \geq (\delta_A^T - \delta_B^T)(p - q)$ , and otherwise offers  $x > x^*$ , which leads to conflict.

It is immediate from part 2 of Proposition 1 that conflict cannot occur in equilibrium if either (i) both states value the future identically,  $\delta_A = \delta_B$ , or (ii) neither state has unrealized potential,  $p = q$ . The latter reflects a common theory that stable international systems require a match between status quo benefits and the distribution of power (Powell, 1999). Additionally, conflict cannot occur if conflicts resolve immediately,  $T = 0$ , or conflicts never resolve,  $T = \infty$ , because  $\delta_A^T - \delta_B^T = 0$  in either of these cases. Corollary 1.1 collects these observations.

**Corollary 1.1.** *There are no parameters under which war occurs in a SPE if any of the following are true: (i) conflicts resolve immediately, (ii) conflicts are interminable, (iii) states are equally patient, or (iv) neither state has unrealized potential.*

If none of the knife-edge conditions of Corollary 1.1 hold, however, then  $A$  can make an unacceptable offer if the cumulative costs of conflict are small enough. Specifically, if one state is (i) relatively more patient and (ii) has unrealized potential, then conflict occurs in an open set of parameters. Thus, conflict can arise from stalling incentives if (i) one of the states has unrealized potential, (ii) that state is relatively more patient, and (iii) conflict is temporary. In the Appendix, we show that these conditions can be further weakened. Throughout the rest of the analysis, we suppose that one state has unrealized potential.

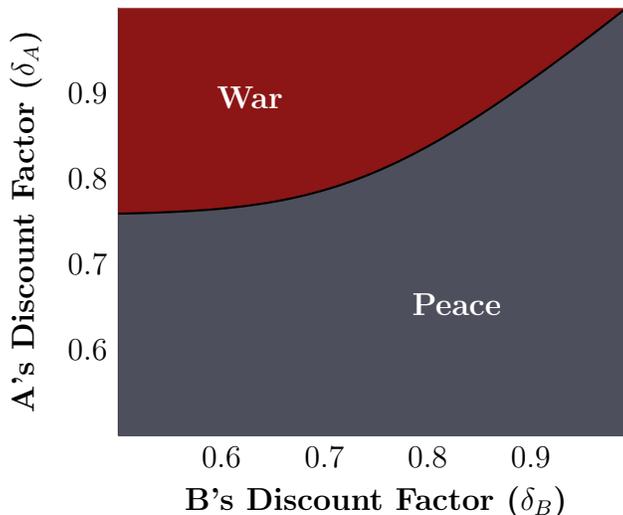


Figure 1: Equilibrium outcomes as a function of both states' discount factors. The figure uses  $c_A + c_B = .05$ ,  $T = 10$ , and  $p - q = .8$ .

## Comparative Statics on Conditions for Conflict

In a certain sense, Proposition 1 has implications for the conflict propensity. We say the dyad is *more bellicose* as  $(\delta_A^T - \delta_B^T)(p - q)$  increases, and less bellicose as this expression decreases. This terminology reflects expansion or compression of the region of the parameter space in which conflict occurs.

**Corollary 1.2.** *The dyad's bellicosity weakly increases in unrealized potential,  $|p - q|$ .*

In general, the dyad is more bellicose as the unrealized potential of the more patient state increases. For example, if  $\delta_A > \delta_B$  and  $A$  has unrealized potential, then bellicosity strictly increases with  $A$ 's unrealized potential. Under these conditions,  $A$ 's current share of the good is low relative to its expected success from conflict. As this discrepancy grows,  $A$  requires a more favorable settlement from  $B$  to avoid conflict. In the canonical conflict bargaining framework, which is equivalent to our setting with  $T = 0$ , the states can find a peaceful resolution that accounts for  $A$ 's relative power. If  $0 < T < \infty$ , then  $B$  disproportionately discounts  $A$ 's power because it places relatively less weight on the future. Consequently,  $B$  fights to, at worst, temporarily preserve the status quo. A similar logic applies to the case where  $B$  is more patient and has unrealized potential.

By part 2 of Proposition 1, conflict does not occur if the more patient state does not possess unrealized potential. In these cases, the state with unrealized potential is not willing to wait out conflict and an always peaceful settlement exists. Thus, increasing unrealized potential does not affect bellicosity in this case.

Our second comparative static analyzes the effect of varying the discrepancy between how both states value the future.

**Corollary 1.3.** *The dyad's bellicosity weakly increases in the patience gap,  $|\delta_A - \delta_B|$ .*

The effect cataloged in Corollary 1.3 arises from greater bellicosity as the patience of the state possessing unrealized potential increases relative to other state. To illustrate, if  $A$  has unrealized potential, then bellicosity increases with  $\delta_A$ . Increasing  $\delta_A$  causes  $A$  to value the outcome of conflict more heavily when formulating its proposal, whereas  $B$  places relatively more weight on receiving the status quo before conflict resolves. Consequently,  $A$  is more willing to incite conflict and  $B$  is more willing to endure it, making the dyad more bellicose.

### Conflict Duration and Bellicosity

Thus far, we have fixed conflict duration,  $T$ , and studied how unrealized potential and the patience gap affect bellicosity. Next, we analyze how  $T$  affects bellicosity. Throughout this section, to focus on cases where conflict can occur, we maintain the assumption that one state has unrealized potential and is relatively more patient.

By Corollary 1.1, conflict does not occur if it resolves immediately or lasts interminably. This observation implies that  $T$  has a non-monotonic effect on bellicosity. We can be more precise, however, and show that bellicosity is single-peaked with respect to  $T$ . Specifically, Proposition 2 shows that bellicosity increases with  $T$  up to a certain point, and decreases in  $T$  beyond that point.

**Proposition 2.** *The dyad's bellicosity is non-monotonic and single-peaked in the duration of conflict,  $T$ . That is, there exists a  $T^* \geq 1$  such that the dyad is (i) more bellicose as  $T$  increases towards  $T^*$  and (ii) less bellicose as  $T$  increases above  $T^*$ .*

By Proposition 1,  $(\delta_A^T - \delta_B^T)(p - q) > 0$  is necessary for conflict, which holds that the state with unrealized potential is more patient. Because  $T$  does not affect unrealized potential, changing  $T$  alters bellicosity only through the difference between the states' respective present values for payoffs at the end of conflict,  $\delta_A^T - \delta_B^T$ . For example, if  $A$  has unrealized potential, that is  $p > q$ , then  $\delta_A > \delta_B$  is necessary for conflict. Under this ordering, Proposition 2 shows that  $\delta_A^T - \delta_B^T$  increases in  $T$  up to  $T^*$  and then diminishes. Thus, shifting  $T$  towards  $T^*$  increases the combination of  $A$ 's willingness to incite conflict and  $B$ 's willingness to temporarily preserve the status quo. Bellicosity consequently increases.

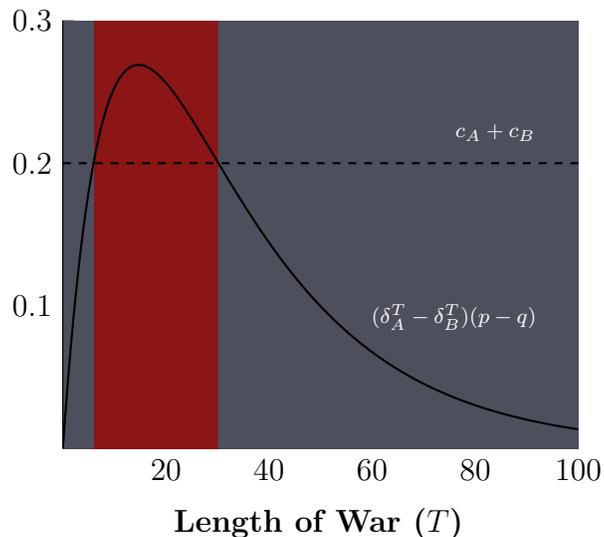


Figure 2: Illustration of Proposition 2’s critical cutpoint. When the cumulative costs of war are the difference between the outcome of war and the status quo weighed by the difference in the states’ time preferences, the bargaining range is empty. War occurs for  $t$  values in the red region. The figure uses  $c_A + c_B = .2$ ,  $\delta_A = .96$ ,  $\delta_B = .9$ , and  $p - q = .8$ .

Having shown that bellicosity is single-peaked in  $T$ , we next study the location of this peak. Specifically, we shed light on the conflict duration that maximizes the bellicosity of a fixed dyad.

We say that a conflict is *protracted* if  $T \geq 2$  and *brief* if  $T = 1$ . Proposition 3 establishes that the most bellicose conflict duration is protracted if and only if the cumulative patience of both states is sufficiently high. Otherwise, brief conflict is maximally bellicose.

**Proposition 3.** *Protracted conflict maximizes the dyad’s bellicosity if and only if the dyad is sufficiently patient.*

Because bellicosity is single-peaked in  $T$  and only affected by  $T$  through  $\delta_A^T - \delta_B^T$ , brief conflict is maximally bellicose if and only if  $\delta_A^2 - \delta_B^2 < \delta_A - \delta_B$ , which for this parameter space is equivalent to  $\delta_A + \delta_B < 1$ . If cumulative patience is low, then protracted conflicts shrink the difference in the value that each places on the conflict outcome. Shrinking this wedge smooths the bargaining friction caused by unrealized potential, reducing bellicosity. On the other hand, this wedge grows as conflict becomes protracted if cumulative patience is high. Consequently, brief conflicts do not make the dyad maximally bellicose in this case. See Figure 2 for an illustrated example with high cumulative patience. Overall, the prospect of unrealized potential facilitating conflict is strongest for (i) short conflicts in impatient dyads and (ii) longer conflicts in patient dyads.

Although Proposition 3 uses the dyad’s cumulative patience to characterize whether brief or protracted conflicts are most favorable for conflict, it is not necessary for both states to be very patient. Corollary 3.1 states an equivalent result using only the patience of the state with unrealized potential.

**Corollary 3.1.** *Protracted conflict makes the dyad maximally bellicose if and only if the state with unrealized potential is sufficiently patient.*

Corollary 3.1 ensures that protracted conflict can maximize dyadic bellicosity even if one state is very impatient. To illustrate, suppose  $A$  has unrealized potential. Fixing  $B$ ’s patience,  $\delta_B$ , there is a threshold on  $A$ ’s patience  $\bar{\delta}_A = 1 - \delta_B$  such that protracted conflict maximizes dyadic bellicosity if and only if  $\delta_A > \bar{\delta}_A$ .

## Short-Term Agreements

The baseline model most directly represents bargaining situations in which today’s proposal does not affect the war-period payoffs of future negotiations. This has many applications. Take negotiations between the United States and a regime committing human rights violations as an example. Suppose the U.S. and that state reach an agreement this year that reduces the level of abuse. Such a deal does little to change the situation on the ground next year should war break out—the state can go right back to committing those violations while the United States initiates a conflict to try to stop it.

Not all issues at stake have this flavor. Consider instead territorial disputes. Redrawing borders today changes tomorrow’s status quo. To illustrate, the transfer of Alsace-Lorraine following World War I meant that France could control the area until Germany achieved military victory. Thus, transfers today alter tomorrow’s war payoffs—in a sense, the parties now bargain objects that influence future bargaining power. Such a connection can cause conflict (Fearon, 1996; Chadeaux, 2011).

Unlike prior research on the subject, stalling in a static model leads to war. Thus, the key question we now must address is whether war also occurs in a dynamic setup. The answer is not immediately obvious. Bargaining over objects that influence future bargaining power is not an inherently possible task. Fearon (1996) shows that peace prevails when parties share a discount rate and the function mapping the division to a level of power is continuous. Chadeaux (2011), however, shows that war can result when players have noncommon discounts.

Still, it is conceivable that short-term agreements changing the status quo during future wars may have a pacifying effect. In the standard bargaining over power setup, the

central tension is that a concession today makes the opponent stronger tomorrow. Thus, concession has a pernicious effect. There is no analogous pernicious effect in our model.

Indeed, the central bargaining tension here is that weak and impatient states currently enjoying the status quo have incentives to maintain it. Negotiations seem to alleviate this problem. That is, such a state could make a small concession to its opponent in the present. It would therefore maintain a large share of the status quo in the short term—what it values most—and avoid paying the cost of war. Meanwhile, if these concessions continue, the patient actor eventually receives a large share. Because the short-term is less important to that actor, it may also benefit from avoiding the costs of conflict.

We show this pacifying effect of short-term agreements never arises in equilibrium under certain conditions. To demonstrate this, consider the following extension to the baseline model. In each period, if conflict has not previously occurred, then  $A$  makes an offer  $x_t$ . If  $B$  accepts, then  $A$  and  $B$  receive payoffs  $x_t$  and  $1 - x_t$ , respectively, in period  $t$ . Next, the game continues with  $x_t$  as the status quo in period  $t + 1$ . Finally, assume that rejection still leads to war, which proceeds as in the baseline model and effectively concludes the strategic interaction. Thus, the status quo in each period is endogenous to the outcome of bargaining in the previous period.

**Proposition 4.** *Consider the short-term agreements extension. If (i)  $A$  is sufficiently impatient, (ii)  $B$  is sufficiently patient, and (iii)  $B$  has unrealized potential in the first period, then there exists an open set of parameters in which conflict occurs in every stationary SPE.*

Loosely, conflict occurs in Proposition 4 because  $A$  prefers to start a conflict to enjoy status quo for a while, even though its prospects for ultimately prevailing are not particularly great, rather than have  $B$  accept an offer that is weakly better for  $A$  than any acceptable equilibrium offer. Because  $B$  is very patient, it overwhelmingly values the payoff it receives once conflict resolves. In turn, this makes  $A$ 's best peaceful offer less favorable for  $A$ . Because  $A$  is very impatient, its focus centers on enjoying the status quo before conflict resolves and is virtually unconcerned about the prospect of losing. Together, these forces create conditions under which  $A$  always makes an unacceptable offer that leads to conflict.

## Discussion

Our model connects the incentive to stall to the outbreak of war. Although the mechanism has a natural intuition, some of the implications of the model are not obvious. In this

section, we compare our results to existing theories in militarized conflict. We focus on counterintuitive implications across four disparate subject matters: regime type and conflict, civil wars, the offense-defense balance, and patience.

**Democratic Peace Theory.** The democratic peace is one of the deepest literatures in international relations. Most quantitative works report a *dyadic* relationship. Pairs of democracies engage in fewer conflict than any other pairs of states. However, dispute rates between pairs of autocracies and mixed pairs are indistinguishable. This suggests that democratic regimes are no more peaceful in isolation than autocracies. Rather, pairs of democracy drive the effect.

Given the law-like relationship between democracies and conflict, many scholars have offered theories to explain the lack of disputes. Democratic institutions tend to be more transparent (Mitchell, 1998); if incomplete information causes war (Fearon 1995), then transparent states ought to fight less. Alternatively, democracies can create greater audience costs than autocracies; thus, even if democracies are not naturally more transparent, endogenous actions taken during crises again increase the information provision (Fearon, 1994; Schultz, 1998). Large electorates give democratic leaders incentives to provide public goods; they therefore avoid fighting wars that can only serve a narrow interest (Buono de Mesquita et al., 2005). Democracies, by their domestic methods of conflict resolution, may be more willing to adopt similar processes on the international front (Dixon, 1994). Finally, checks and balances within a democracy may make it more difficult for such a regime to escalate a conflict to war (Maoz and Russett, 1993).

Despite their ubiquity, these theories suffer from a common problem: they predict a *monadic* peace at least to some extent, not the dyadic one observed in the data. Transparency and information should help democracies avoid war against both other democracies and autocracies. Yet, at least in the aggregate, that seems not to be the case. A similar logic applies to public goods provision and norms. Some scholars—perhaps seeing an absence of a compelling theory for a *dyadic* democratic peace—have turned to other explanations for the observation (Gartzke, 2007; Gibler, 2007).

Our results suggest it may be premature to discard monadic theories of democratic pacifism. No single mechanism drives all conflict in international relations, and Wagner (2007, 20) warns of drawing broad empirical implications from single causal mechanisms. With that in mind, suppose another mechanism implied little conflict between pairs of democracies and pairs of autocracies but moderate amounts of conflict between mixed dyads. In conjunction with a monadic democratic peace, a world driven by these two

mechanisms would see little conflict between democracies. It would also see moderate amounts of conflict between autocratic dyads, as the supposed mechanism would drive no conflict but the absence of democratic institutions would. Lastly, it would see moderate amounts of conflict between mixed dyads, as both mechanisms predict that rate of conflict.

Stalling is exactly this type of mechanism. If discount factors are similar across all governments that share a regime type, stalling predicts little conflict between democratic and autocratic dyads. This was the central finding of Corollary 1.1 and reflects what happens when our model converges to the traditional crisis bargaining setup—war is costly, so the parties agree to a settlement. However, different discount factors across regime types spell trouble. This mechanism nevertheless does not predict widespread conflict—a disparity between the more patient actor’s power and status quo to overrides war’s inefficiency. The additional conflict between mixed dyads masks the pacifying monadic effect of democracy.

Putting additional structure on the parameters allows us to deepen the empirical implication. Suppose that autocracies are indeed more patient than democracies (Haggard and Kaufman, 1995). Democracies can better mobilize their latent military capacity; domestic constraints mean that citizens do not need to worry that leaders will eventually turn that power against them. Consequently, democracies win wars more often (Lake, 1992; Reiter and Stam, 1998). The model suggests that this distribution of power and patience leads to less stalling. Indeed, to observe war featuring a powerful but impatient actor, that actor must either have an even greater share of the status quo or be facing an even more impatient actor.

Of course, none of this reasoning suggests that stalling wars do not occur in identical regime type dyads. As the motivation section highlighted, time horizons vary within autocracies and democracies based on a wide range of characteristics and circumstances. Rather, under the framework of Haggard and Kaufman (1995), cross-regime type variation may produce more stalling.

**Wars of Independence and the Underlying Commitment Problem.** The model’s comparative statics show that war becomes more likely as the gulf between power and the *intrabellum* distribution grows. A natural implication of this brings us back to our opening anecdote on Tamil Elam and wars of independence in general. Rebel groups wishing to establish an independent state can often do this—at least for a while—simply by declaring war. However, established governments have an inherent military advantage in these conflicts, given their standing armies and existing sources of tax revenue. In

short, the independence movement maintains majority of the good in dispute during war but the existing government holds a majority of the power. The model says that these conditions are ripe for war, so long as the government is more patient.

Conventional wisdom on civil wars suggests that third-party peacekeeping is critical to resolving disputes (Walter, 1997). Our model also indicates that third-parties can resolve the problem, but sets out different scope conditions and recommends a radically different approach. For greater background, Walter's commitment problem emphasizes an issue that civil war combatants face after a conflict has begun. In the absence of a third-party, civil wars tend not end short of military defeat because the disadvantaged combatant worries that the party in control of government will renege on any agreement once the first has laid down its arms. The solution is to find a third-party enforcer who will uphold a peaceful distribution of the good in dispute according to the military balance at the end of the war, regardless of how strong one side grows afterward. That is, although power may shift, *the deal must remain static*.

Note that because disarmament is the central issue, this commitment problem is a greater concern for center-seeking civil wars. When the sides do not have an obvious territorial division and share a mutual goal of securing the capital, disarmament is a prerequisite for peace. The commitment problem is not as serious in wars over autonomy. Under these conditions, the parties can reach a truce based on the current level of military power and distribute regional autonomy accordingly. The side seeking independence can maintain its armaments inside of that zone, which prevents the central government from renegeing on the terms.

Almost all of those conditions and implications run the opposite way for our model. First, our model mainly explains war initiation. Second, no shifting power is necessary to explain conflict here—the probability of victory is fixed at  $p$  in our model. Third, given the necessary discrepancy between military power and the *intrabellum* distribution, our model explains why wars of independence begin. In contrast, initiators of center-seeking civil wars are more likely to have little to hold onto while they fight to obtain the capital. As such, the central government's power is more likely to match its share of the good *intrabellum*.

How, then, can third-party peacekeeping prevent wars of stalling? Contrary to the standard recommendation, a peacekeeper must force a transfer of the good over time. Recall that the underlying mechanism is a commitment problem. Both parties would be better off agreeing to a division that matches the *intrabellum* distribution for however long a war would last and then a division that matches the distribution of power thereafter.

This matches exactly what a war would generate but comes at no cost. In contrast, a peacekeeping mission that aims to keep a static settlement will create war for the same reason that no mutually preferable settlement exists in the baseline model.

The war parameters also generate a logic that runs counter to a common concern about intervention in civil conflict. The post-Cold War era has seen an international effort to intervene on behalf of weak rebellions. Critics worry that the shadow of intervention has a perverse effect—strengthening weak groups and saving them the costs of conflict incentivizes conflict to begin that would not have otherwise (Kuperman, 2008). Indeed, for many rationalist explanations for war, decreasing expected costs causes parties to run greater risks in bargaining (Spaniel, 2018). The overall takeaway from this literature is that international institutions need to think carefully about the second-order effects of their actions and perhaps reduce the number of interventions.

We do not dispute the validity of those claims, but our model indicates that the overall policy prescription may not be so clear. As described above, balancing military power and the *intrabellum* distribution is an effective way to induce peace. Given that fledgling independence movements are militarily weak and can sustain some level of *de facto* statehood during the war, a solution is to intervene on behalf of the rebels. This induces the parties to reach an agreement—greater regional autonomy, for example—and not begin a war. Following the perverse incentives literature’s prescription has the opposite effect and exacerbates the discrepancy between power and *intrabellum* holdings. In short, failure to support independence wars may lead to more wars of independence.<sup>6</sup>

As a final note on this topic, recall that the disparity between rebel power and rebels’ ability to create a *de facto* state *intrabellum* only matters when the government is more patient than the rebel group. When those time preferences run the opposite way, peace prevails, and the need to close the gap or enforce a shift in distribution over time disappears. Unfortunately, existing empirical work on the time preferences of rebel groups is lacking. Cederman and Gleditsch (2009) call for more dyadic research on civil conflict, and our model underscores that point. Without calculating a potential rebellion’s time horizons, we cannot predict which states are at greater risk of civil war.

We can further drive home this point by exploring a common finding in the civil war literature. Democracies experience few civil conflicts (Hegre et al., 2001).<sup>7</sup> One

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<sup>6</sup>By the same logic, international bodies can also incentivize peace by sanctioning rebellions during war. Insofar as this would shift the *intrabellum* distribution in the government’s favor, such actions are peace promoting.

<sup>7</sup>To be thorough, Hegre et al. report a nonmonotonic relationship between democracy and civil war. Deeply autocratic states have enriched repression systems, making it harder to initiate a conflict. Our mechanism accounts for this. If repression is extremely effective, then the length of war  $T$  is small. As

explanation for this is that democracies divide goods in a manner that is self-sustaining. Following Haggard and Kaufman (1995), an alternative explanation is that democracies are simply impatient, making it difficult for the discount factors to align properly for the stalling mechanism to take hold.

**Offense-Defense Balance.** Stalling has counterintuitive implications for theories of offense-defense balance as well. Jervis (1978) outlines a straightforward argument: when the technology of conflict favors offensive maneuvers, war is more prevalent. The logic is merely about capacity and costs. Defensive technology increases the barriers to extraction and raises the costs of securing war aims, and so it should naturally suppress the frequency of war.

Nevertheless, the offense-defense balance manipulates many other incentives, and so the relationship may not be so obvious. Indeed, Fearon (1997) conceptualizes the offense-defense balance differently. Rather than considering first strike versus second strike advantages, he thinks about offense as the ability to decisively win wars. When states are risk averse, this leads to a counterintuitive implication. Beginning a war when technology favors the offense puts the capital at stake. Because risk averse states fear such an outcome, they are less inclined to begin a war.

Operationalizing the offense-defense balance in a similar way, the stalling mechanism makes a different prediction. The parameter  $T$  reflects how long war lasts. One could say that offensive military technology correlates with lower levels of  $T$  while defensive technology correlates with higher levels. That is, the more technology favors countries decisively winning battles, the faster war will conclude. Proposition 2 and Figure 2 shows that stalling wars are most likely when  $T$  falls in a middle range, so much that technology neither favors the offense nor the defense too much.

In turn, whether changes to the offense-defense balance increase or decrease the prevalence of stalling wars depends on the current status of that balance. If technology heavily favors the offensive, then slight improvements to defense increase the prevalence of war as Fearon argues, though due to a different mechanism.<sup>8</sup> On the other hand, if technology begins balanced, further improvements to defense decrease the prevalence of war as Jervis argues, though again due to a different mechanism.<sup>9</sup>

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Figure 2 illustrates, stalling wars do not occur when fighting would end fast.

<sup>8</sup>The “slight” qualifier is necessary because large changes could push the parameters beyond the point where they maximize conflict. Also, one can observe that the mechanism is distinct by noting that the states have risk neutral preferences in our setup.

<sup>9</sup>One can observe this by noting that the costs of war remain static in our setup, which is what drives Jervis’s theory.

**Patience and War.** The conventional wisdom in the conflict literature is that more patient actors are more likely to engage in war. (Kertzer, 2016, 39-40) describes states with longer time horizons as being more “resolved” and are therefore more willing to endure costs to obtain their goals. Toft (2006) argues that this explains why stopping religiously motivated terrorists is so difficult. Such individuals place almost no discount on the future and are therefore willing to pay any price to achieve victory.

Nevertheless, our model shows that the relationship between patience and peace is not at all straightforward. Whether increasing an actor’s patience increases conflict depends on a complicated interaction between the opponent’s patience, the balance of power, and the status quo distribution of benefits. Under certain conditions, decreasing one party’s patience can incentivize war. What the current literature misses is the titular stalling incentive. Greater impatience disincentivizes a state from fighting for the long-term purpose of obtaining the policy in dispute. But it also incentivizes fighting to hold onto the policy in the short term at the expense of war costs and long-term security of the policy. All this requires is the state in question to be less patient than its opponent and its share in the status quo to outstrip its military power.

## Conclusion

In the standard bargaining model of war, fighting ends instantaneously, and states discount the future at a common rate. This paper shows that when we relax both of these simultaneously—but not in isolation—war occurs with complete information. We describe such conflicts as war of stalling because a weak but impatient actor fights for the purposes of holding onto a status quo for as long as possible. A commitment problem underlies the mechanism. If states could agree to transfer the policy after a set period of time, both would be better off. However, once the states reached that previously agreed to time period, the state enjoying the advantageous status quo would prefer to fight to hold onto the object for longer. Renegotiating the policy over time does not solve the underlying problem.

Our results indicate that scholars must be careful in applying theoretical mechanisms to substantive expectations and policy recommendations. Some of our comparative statics run in opposite directions depending on other parameters. For example, increasing a state’s power increases the parameters for which war occurs when the state is relatively patient but decreases the probability of war when the state is relatively impatient. Meanwhile, many of our results are not consistent with empirical implications of models

featuring other mechanisms.

On one hand, these are negative results in the sense that we argue against making blanket, unnuanced recommendations to policymakers. Nevertheless, they highlight the value of formalization of arguments. We can still make useful recommendations to policymakers featuring our results, and others from the bargaining model of war. However, as Fey and Ramsay (2011) note, mechanisms causing war are not identical. Recommendations need to take the form of conditional statements, requiring policymakers to identify the current incentives at play that then allow them to draw the correct policy conclusion.

Finally, although we have focused on war initiation, our model also makes predictions about war duration. Existing empirical work on bargaining and war duration tends to focus on asymmetric information and learning (Slantchev, 2004). However, the length of conflicts caused by our mechanism should cluster around  $T^*$ . Future research ought to consider how empirical models of stalling could generate different expectations.

# Appendix

## Proofs of Main Results

**Proposition 1.** *In every subgame perfect equilibrium,*

(i) *state B accepts an offer  $x$  only if  $x \leq q + c_B + \delta_B^T(p - q) \equiv x^*$ ; and*

(ii) *state A offers  $x^*$  if and only if  $c_A + c_B > (\delta_A^T - \delta_B^T)(p - q)$ , and offers  $x < x^*$  if and only if  $c_A + c_B < (\delta_A^T - \delta_B^T)(p - q)$ .*

*Proof.* Consider the baseline model.

First,  $B$ 's payoff from accepting an offer  $x$  is  $\frac{1-x}{1-\delta_B}$ . Next,  $B$ 's payoff from rejecting an offer and starting conflict is

$$\frac{(1 - \delta_B^T)(1 - q) + \delta_B^T(1 - p) - c_B}{1 - \delta_B}. \quad (5)$$

Therefore  $B$  accepts an offer  $x$  only if

$$1 - x \geq (1 - \delta_B^T)(1 - q) + \delta_B^T(1 - p) - c_B \quad (6)$$

$$x \leq x^* \equiv q + c_B + \delta_B^T(p - q). \quad (7)$$

This completes the part (i) of the proof.

From (7), it follows that  $A$  will propose either  $x^*$  or a policy that results in war. First,  $A$ 's payoff from proposing  $x^*$  is

$$u_A(x^*) = \frac{q + c_B + \delta_B^T(p - q)}{1 - \delta_A}. \quad (8)$$

Next,  $A$ 's payoff from proposing any policy that results in conflict is

$$u_A(\text{war}) = \frac{(1 - \delta_A^T)q + \delta_A^T p - c_A}{1 - \delta_A}. \quad (9)$$

Consequently,  $A$  strictly prefers to propose a policy that results in war if and only if

$$u_A(x^*) < u_A(\text{war}) \quad (10)$$

$$q + c_B + \delta_B^T(p - q) + c_B < (1 - \delta_A^T)q + \delta_A^T p - c_A \quad (11)$$

$$c_A + c_B < (\delta_A^T - \delta_B^T)(p - q). \quad (12)$$

If the strict inequality in (12) is reversed, then  $A$  strictly prefers to propose  $x^*$ .  $\square$

**Proposition 2.** *Assume  $p > q$  and  $\delta_A > \delta_B$ . War does not occur in any SPE if  $T = 0$ , or  $T \rightarrow \infty$ . Furthermore, there exists a finite  $T^* > 1$  such that as  $T$  increases*

1. *the conditions for war become less restrictive if  $T < T^*$ , and*
2. *otherwise the conditions for war become more restrictive.*

*Analogous results hold if  $p < q$  and  $\delta_A < \delta_B$ .*

*Proof.* By Proposition 1, conflict occurs in a SPE only if

$$c_A + c_B \leq (\delta_A^T - \delta_B^T)(p - q). \quad (13)$$

Assume  $p > q$  and  $\delta_A > \delta_B$ .

*Part 1.* If  $T = 0$ , then the right-hand side of (13) is zero and war cannot occur in any SPE. Similarly, the right-hand side of (13) goes to zero as  $T \rightarrow \infty$ . Thus, war does not occur in any SPE if  $T$  is sufficiently large.

*Part 2.* We show the existence of  $T^* > 1$  such that the right-hand side of (13) strictly increases if  $T < T^*$  and strictly decreases if  $T > T^*$ . Define

$$T^* = 1 + \frac{\ln(1 - \delta_A) - \ln(1 - \delta_B)}{\ln(\delta_B) - \ln(\delta_A)}. \quad (14)$$

We show that  $\delta_A^T - \delta_B^T > \delta_A^{T-1} - \delta_B^{T-1}$  if and only if  $T < T^*$ , which implies the desired result.

Simplifying and rearranging, we have

$$\delta_A^T - \delta_B^T > \delta_A^{T-1} - \delta_B^{T-1} \quad (15)$$

$$\delta_B^{T-1} - \delta_B^T > \delta_A^{T-1} - \delta_A^T \quad (16)$$

$$\delta_B^{T-1}(1 - \delta_B) > \delta_A^{T-1}(1 - \delta_A) \quad (17)$$

$$\left(\frac{\delta_B}{\delta_A}\right)^{T-1} > \frac{1 - \delta_A}{1 - \delta_B}. \quad (18)$$

Taking the natural log of both sides yields

$$(T - 1) \left( \ln(\delta_B) - \ln(\delta_A) \right) > \ln(1 - \delta_A) - \ln(1 - \delta_B) \quad (19)$$

$$T < 1 + \frac{\ln(1 - \delta_A) - \ln(1 - \delta_B)}{\ln(\delta_B) - \ln(\delta_A)} \equiv T^*, \quad (20)$$

where (20) follows because  $\delta_B < \delta_A$  implies  $\ln(\delta_B) < \ln(\delta_A)$ . Notice that  $T^* > 1$  because  $\ln(\delta_B) < \ln(\delta_A)$  and  $\ln(1 - \delta_A) < \ln(1 - \delta_B)$ .

An analogous argument establishes the result if  $p < q$  and  $\delta_A < \delta_B$ .  $\square$

**Proposition 3** *Suppose the state with unrealized potential is more patient. Protracted conflict makes the dyad maximally bellicose if and only if the dyad is sufficiently patient.*

*Proof.* Suppose WLOG  $p > q$  and  $\delta_A > \delta_B$ . Proposition 2 implies that  $T^* \geq 2$  if and only if  $\delta_A^2 - \delta_B^2 \geq \delta_A - \delta_B$ . We have  $\delta_A^2 - \delta_B^2 = (\delta_A - \delta_B)(\delta_A + \delta_B)$ , which is greater than or equal to  $\delta_A - \delta_B$  if and only if  $\delta_A + \delta_B \geq 1$ .  $\square$

## Short-term Agreements Extension

**Proposition 4.** *Consider the model with short-term agreements. If  $\delta_A$  is sufficiently low,  $\delta_B$  is sufficiently high, and  $q_1 > p$ , then there exists an open set of parameters in which conflicts occurs in every stationary SPE.*

*Proof.* Consider the dynamic extension of the baseline model and fix first-period status quo  $q_1$ . Suppose  $q_1 > p$ .

State  $A$ 's normalized expected dynamic payoff from a war initiated in the first period is  $w_A(q_1) = (1 - \delta_A^T)q_1 + \delta_A^T p - c_A$ . Next,  $A$ 's normalized expected dynamic payoff in a stationary SPE in which war never occurs is bounded above by  $1 - w_B(0) = 1 - \delta_B^T(1 - p) + c_B$ .

A sufficient condition for conflict to occur in every equilibrium is

$$1 - \delta_B^T(1 - p) + c_B < (1 - \delta_A^T)q_1 + \delta_A^T p - c_A \quad (21)$$

$$c_A + c_B < \delta_A^T(p - q_1) + \delta_B^T(1 - p) - (1 - q_1). \quad (22)$$

As  $\delta_A \rightarrow 0$  and  $\delta_B \rightarrow 1$ , the RHS of (22) goes to  $q_1 - p$ , which is strictly positive because  $q_1 > p$ . Thus, the desired result follows by continuity.  $\square$

## A Generalized Model of Stalling

Our model shows how relaxing standard assumptions about the bargaining model of war can lead to new insights. In particular, conflict can occur with complete information. Furthermore, in our baseline model it is necessary to relax that war resolves immediately and that states have common discount factors. However, it could be that other generalizations of our baseline model allow us to produce conflict in equilibrium without relaxing both of these factors. In this section we generalize the model in a number of ways and show that this is not the case. Thus, the conditions identified in the baseline model are necessary for a stalling war.

We now directly generalize the baseline model by allowing for (i) an uncertain ending time for conflict, as well as variation over time in (ii) the status quo, (iii) discount factors, (iv) each state's costs of war and (v) the balance of power.

First, assume that the length of conflict,  $T$ , is unknown prior to conflict. Let  $\mathcal{T} = \{0, \dots, N\}$  denote the space of possible conflict durations, where  $N > 0$  is an integer, and let  $\mu \in \Delta(\mathcal{T})$  denote the common belief over conflict duration, where  $\Delta(\mathcal{T})$  is the space of probability measures over  $\mathcal{T}$ . Thus,  $\mu(T)$  is the probability that a conflict lasts for  $T$  periods and  $\sum_{T \in \mathcal{T}} \mu(T) = 1$ .

Second, we allow the status quo vary as a function of time, as represented by the mapping  $q : \mathbb{N} \rightarrow [0, 1]$ .

Third, we allow each player's discount factor to vary as a function of time. In particular, state  $i \in \{A, B\}$  values its payoff in each period according to the function  $\delta_i : \mathbb{N} \rightarrow [0, 1]$ . To ensure that players do not discount the present, define  $\delta_i(0) = 1$  for  $i \in \{A, B\}$ .

Fourth, each state accrues cost in each period. We allow these costs to possibly vary over time and depend on whether a conflict is ongoing. Formally, each state  $i \in \{A, B\}$  has the cost function  $c_i : \mathbb{N} \times \{0, 1\} \rightarrow \mathbb{R}$  that maps from time periods and conflict status to the positive reals.

Fifth, we also allow the relative power to vary as a function of the period that conflict ends. Specifically, state  $A$ 's probability of winning the conflict is represented by the mapping  $p : \mathbb{N} \rightarrow [0, 1]$ .

**Proposition 5.** *Consider the generalized model. If there is positive probability that conflict does not resolve immediately and in some period the states value the future differently, then there exists an open set of parameter for which conflict occurs in every SPE.*

**Corollary 5.1.** *If  $\delta_A(t) = \delta_B(t)$  for all  $t$ , or  $\mu(0) = 1$ , then every SPE of the generalized*

model is peaceful.

*Proof.* Consider the extension with uncertain conflict duration, varying status quo, varying relative power, and varying costs of conflict. Assume that  $\mu$  is not degenerate on  $T = 0$ .

For convenience, define  $\tilde{\delta}_i(t) = \prod_{t'=0}^t \delta_i(t')$ . State  $B$ 's expected utility from conflict is

$$U_B(\text{war}) = \sum_{T=0}^N \mu(T) \left[ \sum_{t=0}^T \tilde{\delta}_B(t) \left[ (1 - q_t) - c_B(t, 1) \right] + \sum_{t=T+1}^{\infty} \tilde{\delta}_B(t) \left[ (1 - p(T)) - c_B(t, 0) \right] \right], \quad (23)$$

and  $B$ 's expected utility from accepting an offer  $x$  is  $\sum_{t=0}^{\infty} \tilde{\delta}_B(t)(1 - x)$ . Define

$$\bar{W}_B = \sum_{T=0}^N \mu(T) \left[ \sum_{t=0}^T \tilde{\delta}_B(t) \left[ (1 - q_t) \right] + \sum_{t=T+1}^{\infty} \tilde{\delta}_B(t) \left[ (1 - p(T)) \right] \right] \quad (24)$$

and

$$\bar{C}_B = \sum_{T=0}^N \mu(T) \left[ \sum_{t=0}^T \tilde{\delta}_B(t) \left[ c_B(t, 1) \right] + \sum_{t=T+1}^{\infty} \tilde{\delta}_B(t) \left[ c_B(t, 0) \right] \right]. \quad (25)$$

Define  $\bar{W}_A$  and  $\bar{C}_A$  analogously.

Thus,  $B$  accepts an offer  $x$  only if  $1 - x \geq U_B(\text{war})$ , which is equivalent to

$$\sum_{t=0}^{\infty} \tilde{\delta}_B(t)(1 - x) \geq \bar{W}_B - \bar{C}_B \quad (26)$$

$$x \leq 1 - \frac{\bar{W}_B - \bar{C}_B}{\sum_{t=0}^{\infty} \tilde{\delta}_B(t)} \equiv x^*. \quad (27)$$

Next,  $A$ 's expected utility from conflict is

$$U_A(\text{war}) = \sum_{T=0}^N \mu(T) \left[ \sum_{t=0}^T \tilde{\delta}_A(t) \left[ q_t - c_A(t, 1) \right] + \sum_{t=T+1}^{\infty} \tilde{\delta}_A(t) \left[ p(T) - c_A(t, 0) \right] \right] \quad (28)$$

$$= \bar{W}_A - \bar{C}_A. \quad (29)$$

Define  $D_i = \sum_{t=0}^{\infty} \tilde{\delta}_i(t)$  for  $i \in \{A, B\}$ . Since  $A$  proposes either  $x^*$  or something that

leads to conflict, it follows that  $A$  strictly prefers conflict if

$$D_A x^* < \bar{W}_A - \bar{C}_A \quad (30)$$

$$D_A - \frac{D_A}{D_B} \left( \bar{W}_B - \bar{C}_B \right) < \bar{W}_A - \bar{C}_A \quad (31)$$

If  $\delta_A(t) = \delta_B(t)$  for all  $t$  then  $D_A = D_B = D$ , and using equation (31), we have that state  $A$  prefers conflict if

$$D - \frac{D}{D} \left( \bar{W}_B - \bar{C}_B \right) < \bar{W}_A - \bar{C}_A \quad (32)$$

$$D < \bar{W}_A + \bar{W}_B - \bar{C}_A - \bar{C}_B \quad (33)$$

$$D < D - \bar{C}_A - \bar{C}_B, \quad (34)$$

where equation (34) follows because  $D_A = D_B$ , and so,  $\frac{\bar{W}_A + \bar{W}_B}{D} = 1$ . As (34) can never hold, if the states have the same discount factors in all periods then state  $A$  always makes a peaceful offer.

Next, assume that  $\mu(0) = 1$ . In this case, war terminates immediately,  $\bar{W}_A = D_A p(0)$  and  $\bar{W}_B = D_B(1 - p(0))$ , while  $\bar{C}_A = D_A \sum_{t=0}^{\infty} c_A(t, 0)$  and  $\bar{C}_B = D_B \sum_{t=0}^{\infty} c_B(t, 0)$ . Using equation (30) and substituting we have that state  $A$  makes a conflict inducing offer if

$$D_A \left[ 1 - \frac{D_B [1 - p(0)] - \bar{C}_B}{D_B} \right] < D_A p(0) - \bar{C}_A \quad (35)$$

$$p(0) + \sum_{t=0}^{\infty} c_B(t, 0) < p(0) - \sum_{t=0}^{\infty} c_A(t, 0). \quad (36)$$

$$\sum_{t=0}^{\infty} [c_A(t, 0) + c_B(t, 0)] < 0. \quad (37)$$

As equation (37) can never hold, indeed it is the same condition from the standard complete information crisis bargaining model but with a more complicated costs structure, if  $\mu(0) = 1$  then state  $A$  never makes the belligerent offer.  $\square$

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