Militarized Disputes, Uncertainty, and Leader Tenure*

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Abstract

How do new leaders impact crisis negotiations? We argue that opposing states know less about such a leader's resolve over the issues at stake. To fully appreciate the consequences, we develop a multi-period bargaining model of negotiations. In equilibrium, as a proposer becomes close to certain of its opponent's type, the duration and intensity of war goes to 0. We then test whether increases to leader tenure decrease the duration of Militarized Interstate Disputes. Our estimates indicate that crises involving new leaders are 25.3% more likely to last one month than crises involving leaders with four years of tenure. Moreover, such conflicts are more likely to result in higher fatality levels. These results further indicate that leader tenure is a useful proxy for uncertainty.

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1 Introduction

On September 22, 1980, Iraq invaded Iran, hoping to expand its borders. The war lasted years, with casualty counts only surpassed by World War I and World War II. Conflict between the countries was nothing new—disputes between these countries were frequent in the decades prior. Iraq had long sought control of the Khuzestan Province, an oil-rich region in southwest Iran (Shermirani, 1993), while Iran disputed access to waterways near their shared border (Karsh, 2002). Those previous conflicts ended comparatively quickly; the Iran-Iraq War was unique in its length and intensity.

One potential explanation for the duration discrepancy is turnover in leadership in Iran. During those previous conflicts, Iraq had dealt with a known entity—Shah Mohammad Reza Pahlavi reigned from 1941 to 1979. By 1980, though, Ayatollah Khomeini had replaced the Shah. Thus, throughout the war, all the accumulated knowledge about the Shah's preferences and tolerance to run risks were rendered irrelevant. History was no longer as powerful a guide. Iraq in turn spent the better part of a decade learning that the Islamic Republic would not easily concede its territorial possessions.

Of course, by only looking at one case, it is not possible to draw general conclusions about the relationship between the length of a leader's tenure and the duration of disputes.[1] It nevertheless suggests that newer leaders bring greater uncertainty to a dyad, causing wars to last longer as their opponents filter out potentially less resolved types. We ask whether this mechanism holds on a larger scale.

Our strategy is two-fold. While many scholars have previously theorized about leader tenure and the initiation of conflict (Gaubatz, 1991; Gelpi and Grieco, 2001; Chiozza and Goemans, 2003; Potter, 2007; Bak and Palmer, 2010), discussion of tenure and duration of conflict is notably absent. We therefore develop a model of bargaining and fighting, which borrows from the literature on wartime convergence.[2] Comparative static analysis shows that as uncertainty about a leader's resolve disappears, the expected duration of war goes to 0. This theoretical result suggests that the case might not be unique but rather is reflective of an underlying trend.

Second, we investigate the relationship between leader tenure and duration with a large-n

[1]Indeed, Weisiger (2013, 152-158) and Hiro (1989, 36-37) argue that Iraq sought to exploit a temporary weakness in Iranian military power following the revolution.

[2]These models investigate how proposers might screen out less powerful adversaries over the course of fighting and bargaining. Our setup is closest to Filson and Werner's (2002) model, though our interest is in uncertainty over resolve, something intrinsic to leaders rather that a country's military power. Only Powell's (2004) model allows for uncertainty over resolve in his model. Wolford, Reiter and Carrubba (2011) also feature uncertainty over costs (which implicity covers resolve due to utility standardizations) but in a more complex environment with shifting power.

empirical analysis of all militarized interstate disputes between 1816 and 2007. Drawing from the comparative static, we hypothesize that more uncertainty leads to longer and more violent conflicts. However, measurement of uncertainty is often a barrier to empirical research on international conflict. To overcome this difficulty, borrowing from Thyne (2012), Rider (2013), Spaniel and Smith (2015) and Uzonyi and Wells (2016), we proxy for uncertainty using leader tenure. The results are striking, statistically significant, substantively important, and robust to multiple alternative specifications. We estimate that disputes involving new leadership are 25.3% more likely to last longer than a month than a crisis involving leaders with four years of tenure. Further, though there are many cases of long disputes involving newer leaders, dyads with long-serving leaders virtually never initiate disputes against one another.

Overall, our paper contributes to a growing literature on leaders, uncertainty, and inefficient conflict. Specifically, we use the theoretical results from the model to clarify the causal mechanism linking leader tenure to international conflict. Led by Wolford (2007), this literature argues that leadership change acts as an exogenous shock to the geopolitical information structure.[3] Faced with greater uncertainty, an opposing party is more likely to miscalculate its optimal offer, leading to war. As such, newer leaders are more likely to experience militarized disputes.

Although this informational mechanism has strong theoretical support, a number of other mechanisms that tie leadership turnover to international conflict have been proposed in the literature. These alternative causal mechanisms all lead to the same conclusion: leaders who have recently entered office are more likely to be involved in the initiation of a conflict than longer-tenured leaders (Gelpi and Grieco, 2001; Chiozza and Goemans, 2003; Bak and Palmer, 2010). We therefore choose to look for empirical evidence of a connection between leader tenure and uncertainty by investigating the duration of conflict. Commitment issues or diversionary incentives have ambiguous effects on conflict duration. In contrast, our model has a crisp implication: as uncertainty disappears, the expected duration of conflict goes to 0.

Focusing on conflict duration also allows us to draw theoretical expectations about the destructiveness of conflict. Our theoretical results indicate that as uncertainty disappears, the number of costly battles also diminishes. Drawing from this, we expect a negative relationship between leader tenure and the number of fatalities resulting from an interstate dispute. If our focus were on the initiation of disputes, rather than their duration, we could not draw this implication about conflict intensity from our theoretical framework. We believe this provides an additional justification for our focus on conflict duration as an outcome of interest. By

[3] Origins of theoretical mechanism date back further to connections between new leaders and incentives to build reputations for toughness (Dallek, 2003, 413-414).

focusing on this outcome rather than initiation, we both allow ourselves to distinguish among proposed causal mechanisms as well as draw additional empirical expectations related to duration.

On this front, we find that newer leaders correlate with higher casualty rates. This empirical finding is what we would expect in environments with greater uncertainty, as opposing states have greater incentive to screen out less resolved opponents under such circumstances. Our paper thus contributes by providing further evidence indicating that uncertainty has a substantively important effect by testing a hypothesis that would hold for the uncertainty mechanism but might not hold for others.

We also indirectly contribute to the civil war literature. Uzonyi and Wells (2016) show that longer-tenured leaders correlate with shorter civil wars but only when the state features constraining domestic institutions.[4] They theorize that long-tenured leaders in unconstrained environments have solidified reputations and thus are more likely to face the post-war commitment problems that cause civil conflicts to drag on (Walter, 1997). But long-tenured leaders in constrained environments can more easily make credible commitments, thereby allowing the informational mechanism to properly work. The issues of post-civil war commitment do not apply to interstate wars. Therefore, if Uzonyi and Wells' theory is correct, the length of interstate wars should decrease in leader tenure, and this effect should *not* be conditional on institutional constraints. We find evidence for this in the data.

The remainder of the paper proceeds as follows. In section 2, we develop a simple game-theoretic model that ties leader tenure to the duration of disputes. The purpose of the model is to develop a transparent empirical implication: as disputants become more certain about their opponents, the expected duration and intensity of conflict diminishes to nothing. With this hypothesis obtained from our formal theoretical results, we turn to statistical analysis in section 3. Using leader tenure as a proxy for uncertainty, we evaluate the implication of our theoretical model. The findings are consistent with our expectation that leaders with shorter tenures, because they introduce greater uncertainty, beget lengthy disputes. In the remainder of section 3, we discuss the robustness of the results. Finally, in section 4, we conclude with a discussion of the results in the context of the broader literature, considering the implications of our results for both academic and policy communities.

[4] Thyne (2012) finds this effect for tenure but does not check for interactive effects with institutional constraints.

2 Theory

A common source of bargaining tensions in international relations is uncertainty over how an actor values a good at stake relative to the cost of war, also known as an actor's "resolve." Although resolve is often associated with unitary actor states (Fearon, 1995), levels of resolve differ by leader. This can be for a variety of reasons. At the most basic level, leaders may simply value the same slice of territory or policy issue at hand differently from one another. Similarly, they may just view violence as a more useful alternative to diplomacy than others (Goemans, 2000; Chiozza and Goemans, 2003; Horowitz and Stam, 2014) or as a means to establish a tough reputation (Wolford, 2007).

However, because resolve also incorporates a leader's sensitivity to costs, it also incorporates a number of domestic political factors. For example, one type of leader could serve a constituency that is more insulated from the costs of war than another. (Bueno De Mesquita et al., 2005). Leaders may be more of less susceptible to challenges from domestic opposition groups (Koch, 2009). Alternatively, some leaders may fear the consequences of a foreign policy failure to a greater extent (Arena, 2008; Goemans, 2008; Debs and Goemans, 2010; Croco, 2011; Weeks, 2012). More bluntly, a leader could place greater value on the good at stake due to private benefits from war (Chiozza and Goemans, 2011).

For intelligence agencies, knowing an opposing leader's level of resolve is a challenge for two reasons. First, resolve is manifestation of an individual's personal preferences. Although publicly observable actions can reveal these types of preferences to some degree, quantifying an exact figure is a difficult task. Second, a leader's willingness to fight depends on his or her domestic coalition and internal political challenges. In turn, to obtain certainty, intelligence agencies must understand a large number of individuals' personal preferences and also predict how those preferences will influence the leader's policy.

To understand how that uncertainty affects multi-period crisis negotiations, consider the following game. Two states, A and B, are in a dispute over an object worth 1. Failure to reach an agreement leads to a series of costly battles that randomly awards the object to one of the parties. Nature begins by drawing B's type as "unresolved" with probability q and "resolved" with probability $1 - q$. One can think of these draws as being possible preferences for war that the leader of B may have. B sees its own type but A only observes the common prior distribution. State A then demands a portion of the good $x_1 \in [0, 1]$. State B chooses whether to accept or reject that amount. Accepting ends the game and implements the division, with A receiving x_1 and B receiving $1 - x_1$. If B rejects, the parties fight a battle. The battle costs A $c_A > 0$ and B $c_B > 0$.

To model the uncertainty over resolve, the two types of B internalize this cost differently.

Explicitly, the resolved type functionally pays $\frac{c_B}{r'}$ and the unresolved type pays $\frac{c_B}{r}$, where $r' > r$. Dividing B's cost for war in this manner means that the resolved type is more willing to spend blood and treasure to win the good at stake. As such, the resolve term parameterizes a leader's sensitivity to the costs of war.

Whereas standard bargaining models of war treat combat as a game-ending costly lottery, we consider a more complex scenario where military victory requires multiple successful battles for state B.[5] In particular, state A wins the battle with probability p_A, eliminating state B, and securing the good for itself. With probability $1 - p_A$, state B wins the battle, and both parties survive to a second round of bargaining. Here, state A offers a division $x_2 \in [0, 1]$. If state B accepts, the parties implement that division. If state B rejects, they fight one more battle. This time, the battle ends the game. State A prevails with probability p_A, state B wins with complementary probability, and the both states pay the costs as before.

2.1 Equilibrium

Because this is an extensive form game of incomplete information, we search for perfect Bayesian equilibria. Before addressing A's demand strategy in the first stage, it is useful to understand the incentives both parties face in the second stage. If B prevails in the first battle, all payoffs associated with it are irrelevant for the second stage; each party has suffered the costs of that battle and cannot recoup them later. Each party must therefore maximize its payoff purely for the second round of bargaining.

The fact that the first battle's payoffs are sunk pins down all possible resolutions for the second stage. Indeed, A faces a straightforward risk-return tradeoff at that point. A's belief about B's type depends on the probability each type accepted or rejected the first stage's offer. The unresolved type any demand x_2 that leaves at least as much as its war payoff for the remainder of the game (excluding the sunk costs), $1 - p_A - \frac{c_B}{r}$. Analogously, the resolved type's war payoff for the remainder of the game is $1 - p_A - \frac{c_B}{r'}$.

This leaves A with only one of two possible optimal offers. First, it could demand $p_A + \frac{c_B}{r'}$. Both types accept—this amount is just barely enough for the resolved type to accept, and so the unresolved type accepts as well because its costs to fight is larger. Second, A could demand $p_A + \frac{c_B}{r}$, which is just barely enough for the unresolved type to accept. The resolved type therefore rejects, as its cost of war is lower. An amount less than either of those is not optimal because it induces war against both types, preventing A from capturing any of

[5] This is most similar to Filson and Werner (2002). One could interpret this setup as state A having two military divisions that state B must defeat whereas state B only owns one. Like Filson and Werner, we choose the two stage because it is sophisticated enough to allow us to draw comparative statics on war duration but simple enough to solve with an explicit solution. See Slantchev (2003) and Powell (2004) for similar models.

the surplus. An amount greater than either of those is not optimal because it gives away a needless concession. And an amount between those cannot be optimal because it provides a needless concession to the unresolved type while not changing the resolved type's decision to fight.

Whether A chooses the smaller or larger demand depends on its posterior belief that B is unresolved. If A thinks that B is very likely resolved, then demanding the larger amount yields leads to war too often. A instead demands the smaller amount to avoid suffering the costs of fighting. Meanwhile, if A thinks that B is very likely unresolved, then it is worth demanding the larger amount. This leads the resolved type to reject, but A is willing to run that risk so that it does not have to pay more to the unresolved type than what is necessary.

The central strategic tension of the game is that the posterior belief in the second stage depends on the accept/reject decisions in the first stage. For example, if the unresolved types all accept the initial offer, then A knows it is facing the resolved type in the second stage and accordingly demands the smaller amount. This gives the unresolved type a strong incentive to misrepresent, which limits A's ability to screen types in the first stage.

Nevertheless, A has substantial control over the first round of bargaining. In fact, A can easily elicit two types of behaviors if it wishes. First, suppose that A demands an amount that gives B a share at least as large as the resolved type's payoff if a war was fought to the finish. Doing so induces the resolved type to accept. This is because A's demands in the second stage—regardless of its posterior belief—either force the resolved type to reject or gives the resolved type a peaceful settlement equivalent to its war payoff. Such a demand also must induce the unresolved type to accept. Like the logic governing the second stage, this is because the unresolved type's war payoff is worse than the resolved type's. Thus, if the resolved type wants to accept an offer, the unresolved type must as well.

If A does not want to induce both types to accept immediately, it has a second option at its disposal. The main challenge A faces in screening types is that the unresolved type might want to bluff resolve by rejecting in the first stage, anticipating a demand geared toward appeasing the resolved type in the second stage. However, the resolved type and unresolved type pay differential price for war. Consequently, A can find a demand that induces the resolved type to reject and the unresolved type to accept in the first stage.[6] That demand hits a middle ground. It is smaller than the demand that induced both types to reject, as it now leads the resolved type to reject. But to convince the unresolved type to accept, it must be larger than the unresolved type's war payoff; if it were not, the unresolved type would reject and obtain the concessions geared toward the resolved type. The resolved type

[6] Without such a differential cost or risk of fighting, separating equilibria do not exist (Spaniel and Bils, 2018).

continues to reject because the demand is just small enough to convince the unresolved type to accept; with lower costs of war, the resolved type finds a strictly greater payoff in fighting.

Some minor formalization may help clarify the intuition. Recall from above that the largest settlement B can expect to receive in the second stage is $1 - p_A - \frac{c_B}{r'}$. If the unresolved type rejects the initial proposal, it reaches the second stage with probability $1 - p_A$ and pays $\frac{c_B}{r}$ as the cost of the first battle. Therefore, the most the unresolved type can expect to receive by fighting in the first stage is:

$$(1 - p_A)\left(1 - p_A - \frac{c_B}{r'}\right) - \frac{c_B}{r}$$

Thus, if the remainder of A's initial proposal $(1 - x_1)$ is larger than that quantity, the unresolved type must accept; even a successful bluff pays less than the amount B receives in that case.

These options set the stage for Proposition 1. The equilibrium of the game is generically unique, but the bargaining strategies adopted depend on A's prior belief that B is unresolved. As a result, the course of war can follow one of three paths:

Proposition 1. *The duration of war depends on A's prior belief:*

1. *If B is sufficiently unlikely to be the unresolved type, A demands a small amount in the first stage. Both types accept with certainty, and they fight no battles.*

2. *If the probability B is the unresolved type falls in a middle range, A demands a moderate amount in the first stage. The unresolved type accepts with certainty, but the resolved type rejects with certainty. Updating its belief, A knows B is the resolved type in the second stage. A then demands a small amount, and the resolved type accepts accepts with certainty. The states fight only one battle and only if A is facing the resolved type.*

3. *If B is sufficiently likely to be the unresolved type, A demands a large amount in the first stage. The unresolved type sometimes accepts and sometimes rejects, while the resolved type always rejects. Updating its belief, A know thinks it is more likely facing the resolved type. Despite this, A demands a large amount in the second stage. Only the unresolved type accepts. The states fight two battles if B is the resolved type and one battle with positive probability if B is the unresolved type.*

The appendix contains a full proof, description of equilibrium strategies, and derivation of the cutpoints on q.[7] However, the intuition is as follows. Consider the first outcome possible. If the probability A is facing a resolved type is high, going through any screening process looks unattractive. Indeed, suppose A demanded an amount in the first stage that left B with less than the resolved type's payoff for war. Then the resolved type must reject. But the resolved type is relatively likely, meaning that A suffers the costs of war with a high degree of probability. Screening out the unresolved type may yield a greater share of the settlement for A, but the odds of obtaining that outcome are too low to justify the risk.

Nevertheless, as the likelihood of the unresolved type grows, the risk declines and the incentive to screen increases. The second case correspondingly refers to a parameter space where the following strategies unfold. In the first period, A demands the previously described screening quantity. The unresolved type accepts, and the resolved type rejects. Updating its belief in the second stage, A knows that it must be facing the resolved type and therefore lowers its demand. The resolved type accepts at this point. Despite giving more generous settlement terms to B in the second stage, the unresolved type still accept because of its higher functional cost of war.[8]

Note, however, that even this type of screening demand overpays the unresolved type. Again, this is because A must leave the unresolved type enough in the first stage to disincentivize bluffing via rejection. Thus, if A believes B is very likely the unresolved type, a third parameter space exists. Here, A demands an amount in the first stage that gives the unresolved type its war payoff. Obviously, this is not good enough for the resolved type, which rejects. But it also does not induce the unresolved type to accept with certainty either; if it did, A would demand an amount to appease the resolved type in the second stage, and so the unresolved type could profitably bluff.

Instead, the unresolved type mixes between accepting and rejecting in the first stage. Upon reaching the second stage, A believes it is more likely facing an resolved type than at the game's outset. However, the percentage of unresolved types that accept in the first stage is relatively small. Consequently, in the second stage, A again tailors its demand to appease only the unresolved type. The resolved type rejects throughout. Although A suffers its war costs against that resolved type, it willingly accepts that inefficiency because the likelihood it is facing the resolved type is sufficiently low. Overall, these strategies imply some war in the first stage and less war in the second.

[7] Proposition 1's first case applies when $q < \frac{c_A + \frac{c_B}{r'}}{c_A + \frac{c_B}{r}}$. The second case applies when $q \in \left(\frac{c_A + \frac{c_B}{r'}}{c_A + \frac{c_B}{r}}, \frac{\left(c_A + \frac{c_B}{r'}\right)\left(c_A + \frac{2c_B}{r} - \frac{c_B}{r'}\right)}{\left(c_A + \frac{c_B}{r}\right)^2} \right)$. The third case applies when $q > \frac{\left(c_A + \frac{c_B}{r'}\right)\left(c_A + \frac{2c_B}{r} - \frac{c_B}{r'}\right)}{\left(c_A + \frac{c_B}{r}\right)^2}$.

[8] As the appendix details further, the unresolved type has a greater overall war payoff than the resolved type because each battle costs $\frac{c_B}{r}$ for it rather than $\frac{c_B}{r'}$.

2.2 Empirical Implications

While Proposition 1 explains the outcome of the game, it lacks empirical clarity. Being explicit about this is critical given the challenges of empirically interpreting incomplete information crisis bargaining games. Consequently, we turn to Proposition 2, which generates a straightforward comparative static with empirical implications:

Proposition 2. *As state A becomes certain about state B's type (i.e., as q goes to 0 or 1), the expected duration of war goes to 0.*

Note that q is a measure of uncertainty. One can observe this in a couple different ways. First, A's uncertainty over B forms Bernoulli distribution. The variance of Bernoulli distribution minimizes at $q = 0$ and $q = 1$. Second, as q approaches 0, state A becomes increasingly certain that it is facing the resolved type; and as q approaches 1, state A becomes increasingly certain that it is facing the unresolved type. Indeed, when $q = 0$ or $q = 1$, the game converges to the *complete* information case. Thus, Proposition 2 states that if state A can accurately identify whether it is facing the resolved or unresolved type, the expected duration of war eventually reaches 0.

To see how Proposition 2's claim works, consider two cases. First, suppose q is approaching 0 from the right side. Then we must investigate the duration of war for when q falls in the first range from Proposition 1. But under such conditions, state A demands the safe amount and avoids war entirely. Consequently, the duration of war equals 0.

Second, suppose q is approaching 1 from the left side. This case falls in the third range from Proposition 1. Discussions of convergence models often overlook this type of semi-separating equilibrium, which actually features *greater* conflict than the more commonly-known separating equilibrium in which the proposer skims the various types. Nevertheless, we can still obtain a relationship between uncertainty and length of war. The appendix shows that the unresolved type fights a battle with probability $\frac{(1-q)(c_A+\frac{c_B}{r'})}{qc_B(\frac{1}{r}-\frac{1}{r'})}$ here, while the resolved type fights both battles. Multiplying each of these probabilities by the prior distribution of types, the overall expectation of one battle fought equals:

$$q\left(\frac{(1-q)(c_A+\frac{c_B}{r'})}{qc_B(\frac{1}{r}-\frac{1}{r'})}\right)+1-q$$

$$(1-q)\left(\frac{c_A+\frac{c_B}{r}}{c_B(\frac{1}{r}-\frac{1}{r'})}\right)$$

Note that this value is strictly decreasing in q. Indeed, as q goes to 1, the probability of observing one battle goes to 0.

Meanwhile, note that the probability of observing two battles in this case is simply the probability of drawing the resolved type, or $1-q$. This value is strictly less than the probability of observing one battle and is also strictly decreasing in q and goes to 0 as q goes to 1.[9]

Although our focus thus far has been on the duration of conflict, a corollary of Proposition 2 gives us empirical leverage on the expected costs suffered:

Corollary 1. *As state A becomes certain about state B's type (i.e., as q goes to 0 or 1), the expected costs of war paid go to 0.*

This is a straightforward implication Proposition 2. As the probability of war goes to 0, so must the expected costs paid—if the states are fighting vanishingly few battles, then the costs suffered must be correspondingly small.

All told, the key takeaways from Proposition 2 and Corollary 1 is that we ought to expect the duration of fighting and the associated negative effects to decrease when uncertainty about a state's resolve disappears. We test two empirical implications of this comparative static below.

3 Empirical Analysis

Before turning to the data, we must translate Proposition 2's comparative static into a testable hypotheses. The model shows that great amounts of uncertainty over resolve should not only lead to dispute initiation but longer conflict as well. This result translates naturally to a discussion of leader tenure. Although an individual leader's characteristics do not alter the determinants of military strength, she can influence when the state wields that power. Further, opposing states cannot easily identify a leader's bottom line in crisis bargaining because less resolved leaders have incentives to misrepresent themselves as resolved (Fearon, 1995).

However, as Wolford (2007) argues, uncertainty is not static over time, with information growing as days in office pass. This is for a variety of reasons. Intelligence is a primary issue: whenever a new leader enters office, opposing intelligence organizations must discard their files on the previous leadership and begin their research process again. Similarly, a fresh leader creates a gap in the heads-of-state network, increasing the transaction costs of obtaining new information. Meanwhile, as a leader progresses in tenure, she cannot help but make publicly observable actions. Put together, these factors indicate that opposing states should

[9] Beyond Proposition 2's limit result, it is also true that decreasing the difference in type space (that is, reducing the variance of types by decreasing $\frac{1}{r} - \frac{1}{r'}$) monotonically reduces the size of the parameter space under which long wars occur (that is, wars in which the parties fight two battles). This is an alternative conceptualization reducing uncertainty because shrinking $\frac{1}{r} - \frac{1}{r'}$ to 0 converges to the complete information case and monotonically reduces the variance of the reservation values (Reed (2003, 637); Spaniel and Smith (2015, 740)).

have stronger beliefs about a leader's preferences as tenure progresses. Stated differently, leader tenure is an effective proxy for uncertainty. Previous studies have uncovered such a relationship in arms races (Rider, 2013) and sanctions (Spaniel and Smith, 2015).

We can now directly translate this to Proposition 2's comparative static. As tenure increases, the belief regarding an opposing leader's resolve should converge to a particular expectation. In turn, the expected duration of conflict ought to decrease, either because the proposer demands a safe amount and guarantees the peace or because the proposer demands an aggressive amount but chances of guessing incorrectly goes to 0. Regardless, this provides us with our first hypothesis:

Hypothesis 1. *The expected duration of conflict is decreasing in a leader's tenure at the beginning of the dispute.*

Although duration is our primary outcome of interest, our theoretical results also carry testable implications with respect to combat fatalities. In the context of our theoretical model, as uncertainty vanishes, the number of rounds of fighting diminishes to 0. From this, we draw a second testable implication from the comparative static in Proposition 2. Specifically, more rounds of fighting should be associated with higher fatality levels. This can be seen in Proposition 2 by considering how, as uncertainty vanishes, so too does the number of times that each state pays the cost of war in equilibrium. Interpreting the cost of war as the loss of both material resources and human lives as the result of combat, this means that as uncertainty is resolved, the number of fatalities resulting from a militarized dispute should decrease. Thus, as leader tenure increases, we also expect the number of fatalities resulting from extended periods of destructive conflict to decrease.

An alternative way to think of this is as follows. Cheap talk signaling does not work under normal circumstances because less resolved types have incentive to bluff strength.[10] In contrast, the war mechanism we study in the model above permits meaningful communication because the two types pay differential costs for fighting. Because the more resolved type suffers a smaller cost, it is willing to fight under a larger set of circumstances than the unresolved type. As a result, the costliness of war screens types. However, when little uncertainty exists, there is less of a need to pay costs to credibly reveal information. Operationalizing these costs as casualties from war gives us the following hypothesis:

Hypothesis 2. *The expected number of fatalities resulting from conflict is decreasing in leader tenure.*

We find support for these hypotheses below. However, before developing our statistical model, it is worth briefly discussing a couple research design issues. First, note that the

[10] See Ramsay (2011), Sartori (2002), and Trager (2010) for exceptions.

statistical results do not imply that leader tenure only affects conflict through the hypothesized mechanism. Indeed, once in a conflict, many scholars argue that leader persistence contributes to both the duration and intensity of fighting (Goemans (2000); Stanley (2009); Croco (2015)). This is because leaders have incentive to stay in disastrous conflicts in hope of turning the tide, which then would allow the culpable leaders to stay in power. In these cases, newer leadership facilitates dispute termination. We view this theory as consistent with ours for two reasons. First, our focus is on leader tenure at the start of disputes. And second, although a new leader brought in during a conflict adds uncertainty, it also changes the leadership's overall preferences for war and peace. Consequently, it is not surprising that peace results *despite* the spike in uncertainty.

Second, we do not claim that all uncertainty about all leaders is equal. Some leaders come into office as virtual blank slates to foreign intelligence agencies, while others enter having held their rival's eye for many years. Coding these differences is a challenge because it would require knowing how clandestine agencies predict leadership turnover and whether they can do so successfully. Instead, we view this problem as stacking the deck against finding a statistically significant relationship. For known entities, the additional information accrued over time is rather small. We would thus expect the correlation between such leaders' tenures and conflict to be negative but small. In contrast, learning would be much more significant for unknown leaders, generating negative and large correlation. Mixing these cases together therefore suppresses the true effect of learning and information acquisition. It will therefore be harder to find evidence for the mechanism using leader tenure. The only real problem we would encounter is if uncertainty systematically increased for some subset of leaders as time in office progressed, and it is difficult to come up with a reason that would be the case.

3.1 Data

To test our hypotheses, we investigate the duration of militarized interstate disputes (MIDs). Thus, our units of observation are all dyadic MIDs from 1816 to 2010. We draw the bulk of our data from two sources: the Correlates of War (COW) for conflict data and Archigos (Goemans, Gleditsch and Chiozza, 2009) for data on leader tenure. In the following sections, we first describe the data used in this study.[11] Next, we detail our use of an appropriate statistical model, the well-known Cox proportional hazards estimator for duration analysis, and ordinary least-squares regression for our analysis of fatality levels. Then we report the results and provide some substantive interpretation to demonstrate the relevance of our findings. Finally, we describe various checks on the robustness of these results before concluding.

[11] We utilize the EUGene data generating software to obtain all relevant COW data (Bennett and Stam, 2000)

3.1.1 Dependent Variables

Our first dependent variable of interest is the duration of conflict. To measure this, we turn to the Correlates of War data. The specific dataset that we use is the Militarized Interstate Dispute data, which collects information at the conflict and participant level. Fortunately for us, these data contain the start and end date of each conflict included. From this, we calculate the number of weeks that a given conflict lasted and utilize this measure as our dependent variable.[12]

The second dependent variable in our analysis is battle deaths resulting from militarized conflict. For a measure of fatalities, we again turn to the Correlates of War data. We use the fatality level variable for our main analysis, which is an ordinal measure of fatalities taking on values of 1 through 6. Because of issues with missing data, we defer use of the Correlates of War's precise measure of fatalities for the main analysis. While the precise value would provide an ideal measure for present purposes, of the 447 militarized interstate disputes with a positive fatality level in our sample, 403 have missing values for the precise fatality measure. In contrast, there is no missingness in the precise measure among disputes that involved zero fatalities. Thus, we avoid use of this measure due to the clearly non-random missingness. We believe that the ordinal measure, while not ideal, is the best among all available alternatives.

3.1.2 Independent Variables

Tenure. Our independent variable of interest in this analysis is leader tenure. We measure this by taking the minimum tenure among the conflict's originators in each observation. To maximize the precision of the measurement, we calculate this tenure as the number of days that leader has been in office at the time the dispute was initiated and then take the common logarithm of this value.

We use a logged variable for theoretical reasons. Specifically, we expect that there are decreasing returns to information acquisition. In this way, the marginal influence of each additional day of a leader's behavior decreases over time. Put differently, the first day in office provides more information than the second, the second provides more information than the third, and so forth. Logging the number of days in office ensures that our measure has this property.[13]

Because the unit of observation in this study is a militarized interstate dispute, it is necessary to make choices about how to measure tenure among many possible alternatives.

[12] We also performed the analysis with days and months and the substantive results are unchanged. We opt for weeks because it is the most fine-grained measure that we can use without having to discard too many observations due to missingness in the days variable.

[13] For another use of this approach, see Spaniel and Smith (2015).

The primary difficulty arises because conflicts often include multiple participants. As such, we must incorporate leader tenure into our empirical analyses with care. In the absence of strong theoretical priors, a number of these measures appear valid. However, our theoretical argument from section 2 provides us with a compass with which to navigate these competing options. We allow theory to be our guide here given the notion that more theoretically grounded statistical models fare better at uncovering existing relationships in the data (Arena and Joyce, 2011).

The informational logic of our theory precludes many alternative measures. Two such options are to simply sum the tenure of the leaders of the originators of a conflict or average the tenure across all leaders involved. We believe that these are theoretically inappropriate for a number of reasons. First, per Proposition 2, militarized conflict is a costly form of information transmission; it ends when beliefs about the actors converge to the realized type. Consequently, even if one side has converged its beliefs about the second, conflict might continue until the second converges its beliefs about the first. This indicates that the *least* tenured leader is the critical case and that the sum of leader tenure is not. As such, we use the *minimum* tenure among all leaders coded as originators of a given conflict by the COW coding rules.

Second, summing tenure leads the model to treat highly unrelated cases as statistically identical. For example, with unlogged data, two leaders with 10 years of experience each would be identical to a dyad with a fresh leader and a leader with 20 years experience. Our theoretical model leads us to expect the second dyad to be far more fragile and require substantially more learning than the first dyad. All told, these two points indicate that we should opt for the minimum tenure length in the dyad.

Controls. The analysis also includes a number of control variables to account for other factors that are likely also related to the duration of conflict. We describe these control variables below:

- **Polity.** Many previous studies link democracy to duration and escalation of conflicts. The mechanisms are manifold: governments responsive to their people are sensitive to casualties (Gelpi, Feaver and Reifler, 2005), democracies accrue audience costs more quickly and therefore can signal faster (Fearon, 1994), backing down has differential risks for autocrats than democratic leaders (Debs and Goemans, 2010), and democracies are generally more transparent (Schultz, 1998). Meanwhile, due to their accountability and term limits in some cases, democratic leaders generally serve shorter terms, and researchers have previously used democracy as a proxy for leader tenure (Gelpi and Grieco, 2001). Finally, and perhaps most relevant for our study, Eyerman and Hart Jr

(1996) find a robust negative relationship between joint democracy and the duration of conflict. These factors all point to some measure of democracy being a necessary control in our study. We therefore include the POLITY score of the leader corresponding to our measure of minimum tenure. As anticipated, Logged Tenure and Polity are negatively correlated (-0.208).

- **Capability Ratio.** Following existing work on power preponderance and the duration of conflict, we expect that the distribution of capabilities among each side in a militarized interstate dispute should be related to its duration (Slantchev, 2004; Reed, 2003). To control for this, we include a capability ratio measure that indicates whether there is relative parity or a preponderance of power between each side in a conflict. We use the Correlates of War's Composite Index of National Capability (CINC) scores to construct this measure. To deal with the prevalence of multilateralism, we sum these scores within each side of a dispute as identified by the MID data. Then, the measure is constructed by taking the maximum of these scores and dividing by the sum. As such, this variable takes on values between 0.5 and 1, with lower values indicating power parity and higher values indicating a preponderance of power on one side.

- **Issue Dummies.** Perhaps the issue under dispute is related to the willingness of states to incur the costs of conflict. If this is true, then our estimation must account for these differences. Accordingly, we include a set of dummy variables indicating the primary issue under dispute in each militarized interstate dispute contained in our data. The base case that we omit are the set of disputes classified as "other" by the Correlates of War coding rules. The indicators we include are as follows:
  - **Territory.** Indicator for territorial disputes.
  - **Policy.** Indicator for international policy disputes.
  - **Regime.** Indicator for disputes over issues related to a target's regime.

To establish the plausibility of our results, Figure 1 presents a scatterplot of leader tenure measured in days against the duration of conflict as measured in weeks. The plot colors points by the Polity score of the leader with minimum tenure. We include this to obtain a first-pass idea of whether the influence of leader tenure might be distributed differently for various regime types.

Looking to Figure 1, we find initial support for our theoretical expectation. This scatterplot demonstrates that the relationship that we expect is plausible. In particular, no data points lie in the upper-right quadrant (long tenure/long length) of the graph. This is consistent with our expectation that the duration of conflicts should be decreasing in leader tenure.

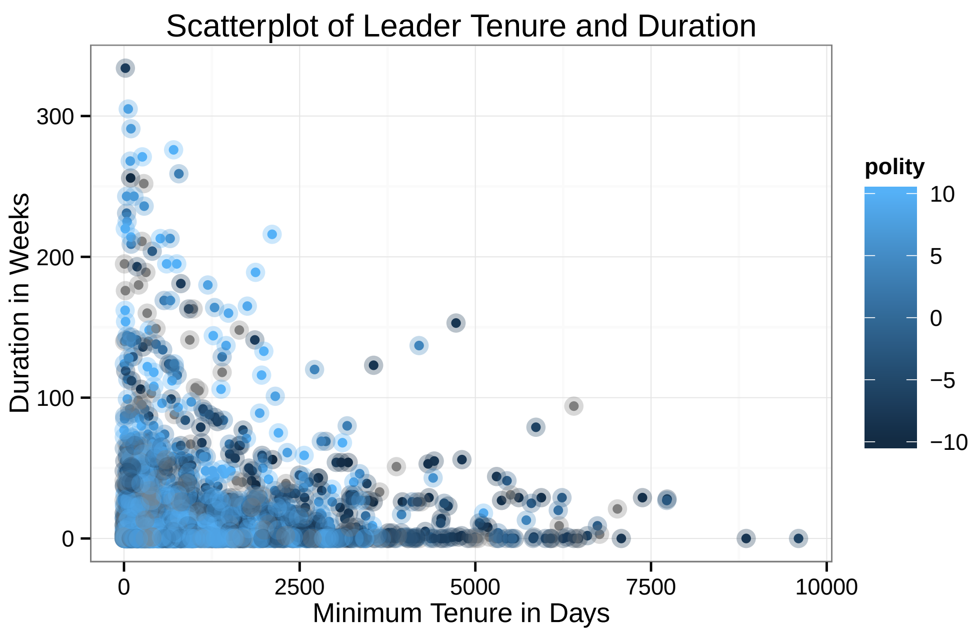

Figure 1: Scatterplot of leader tenure and conflict duration. This plot provides initial evidence in favor of our theoretical expectations. In particular, no points inhabit the upper-right area of the plot, indicating that the duration of conflicts initiated against leaders who have been in office for a long period of time tends to be shorter than conflicts involving new leaders.

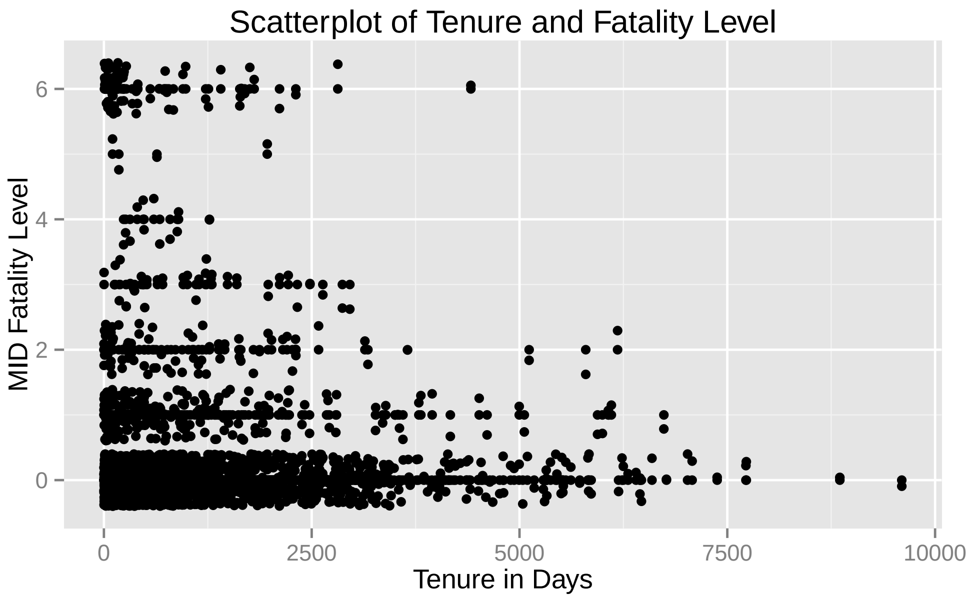

Figure 2: Scatterplot of leader tenure and fatality level. No points inhabit the upper-right quadrant. This is suggestive of a negative relationship between tenure and fatality level. Note that the y-axis is jittered to aid in visual interpretation of the data.

Further, the scatterplot does not reveal any clear relationship between regime type and this influence. With the exception of extremely long tenures, regime types appear to be distributed throughout the observations fairly evenly. Nevertheless, this only provides initial evidence in favor of our claims, and so we will turn to regression analysis to further solidify our empirical findings.

Next, we perform a similar exercise for our fatality variable. Figure 2 presents a scatterplot of leader tenure and fatality. The distribution appears similar to that of duration: the upper-right quadrant (long tenure/high fatalities) is empty. Again, at first pass, this gives us confidence that the expected relationship exists.

Before moving on to any analysis, we also present scatterplots of our control variables against duration to get a better feel for the relationships in the data. These graphics are presented in Figure 3. As the figure demonstrates, neither Polity nor capability ratios appear to have a strong relationship with duration. Additionally, each of these scatterplots demonstrate that our controls are well distributed across the range of possible values.

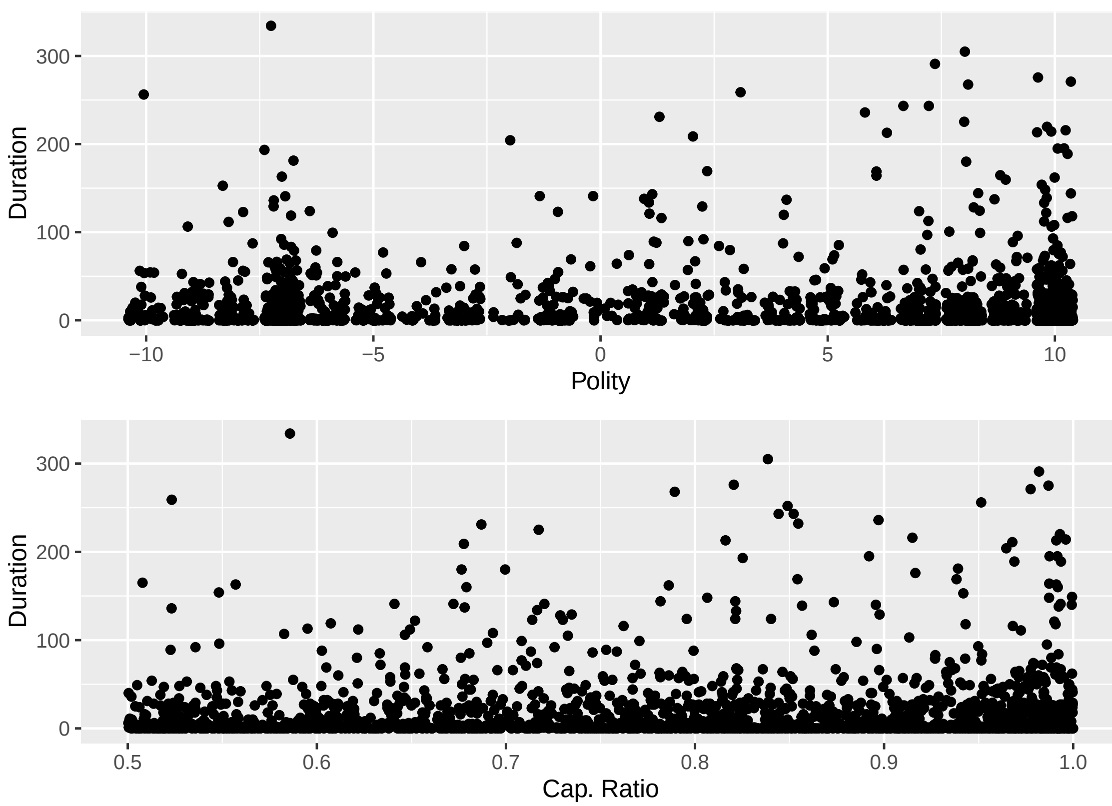

Figure 3: Scatterplot of control variables and conflict duration.

3.2 Results

The first of our hypotheses relates to the duration of interstate crises. As such, we require a statistical model designed to handle duration data. To avoid distortions of the underlying hazard rate that may arise from parametric assumptions, we take a semiparametric approach, utilizing a Cox proportional hazards model.[14]

In Table 1, we report the results of our duration analysis. Note that across each of the model specifications, the coefficient on our measure of leader tenure indicates that an increase in tenure corresponds to an increase in the hazard. Furthermore, in all of the models, this coefficient obtains statistical significance at at least the 95% level. Thus, the results of our estimation provide evidence in favor of our hypothesis that leader tenure should be associated with shorter conflict durations.

In Figure 4, we graphically represent the influence of shifts in leader tenure on the estimated hazard ratio. As this graphic demonstrates, our model predicts that an increase in leader tenure is associated with an increase in the estimated hazard ratio. Substantively, this means that the probability of conflict termination at any given point is greater for conflicts involving longer-tenured leaders versus leaders who have only recently entered office. As the plot indicates, shifting across the interquartile range results in a ten percentage-point shift in the estimated hazard ratio.

Alternatively, we can interpret the results using predicted survival probabilities given substantively interesting values of our independent variables. Holding all other variables at their medians, we calculate the probability that a conflict lasts at least one month for a leader that has only spent one day in office versus a leader that has held office for four full years. We find that this probability is 0.475 for the new leader, while it is only 0.355 for the leader that has been in office for four years. Thus, conflicts involving a new leader are 25.3% more likely to sustain past one month than a conflict in a dyad with the leader having held office for four years. This indicates that the influence of leader tenure on the duration of conflict is not only statistically significant, but that it also holds substantive weight.

Next, we turn to our analysis of leader tenure's influence on the fatality level of disputes.

[14]The validity of the Cox model depends upon assuming that the effect of coefficients on the underlying hazard are proportional across time. As Box-Steffensmeier, Reiter and Zorn (2003) point out, a failure to check for and correct violations of this assumption may lead to invalid inferences. To guard against this possibility, we implement a standard check for non-proportionality by inspecting the Schoenfeld residuals produced from the model. These tests fail to detect a non-proportional effect of leader tenure on the hazard, and so we present standard Cox results throughout. Sample selection is another relevant concern in our setting. Unfortunately, the nature of our independent variable of interest, which is measured in days, renders existing approaches, e.g. Boehmke, Morey and Shannon (2006) difficult to implement. Fortunately, our theoretical model indicates that, even given the selection process resulting from the decision to intiate conflict, the relationship between leader tenure and duration still holds. As such, the formal results indicate that the expected relationship should hold, even in the presence of selection into conflict.

	Dependent variable:				
	Conflict Duration (Weeks)				
	(1)	(2)	(3)	(4)	(5)
Tenure (Logged)	0.177***	0.196***	0.176***	0.146***	0.153***
	(0.034)	(0.038)	(0.035)	(0.035)	(0.039)
Polity		0.005			0.004
		(0.003)			(0.003)
Cap. Ratio			−0.098		−0.264*
			(0.145)		(0.157)
Territory				−0.660***	−0.742***
				(0.064)	(0.071)
Policy				−0.255***	−0.299***
				(0.055)	(0.062)
Regime				−0.829***	−0.861***
				(0.112)	(0.125)
Observations	2,101	1,823	2,034	2,101	1,766
Log Likelihood	−13,962.930	−11,855.150	−13,451.850	−13,893.150	−11,362.810
Note:					*p<0.1; **p<0.05; ***p<0.01

Table 1: Cox Proportional Hazards Model Results

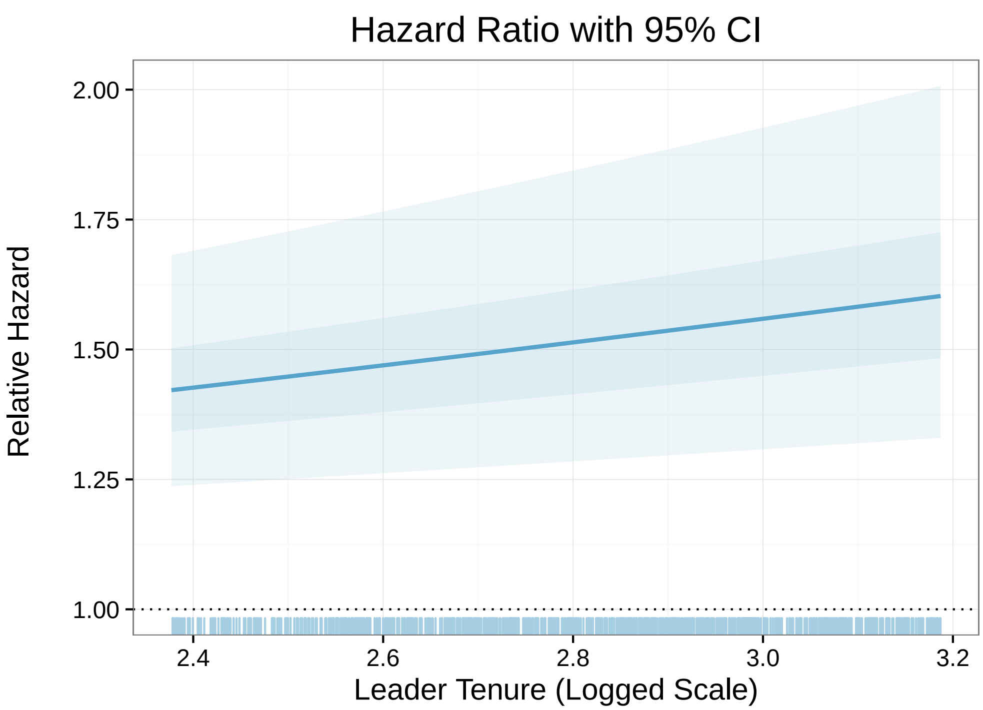

Figure 4: Estimated hazard ratios obtained by varying leader tenure across its interquartile range. The lower bound of this range is 7 months and the upper bound is 4 years and 3 months.

	Dependent variable:				
	Fatality				
	(1)	(2)	(3)	(4)	(5)
Tenure (Logged)	−0.222***	−0.252***	−0.222***	−0.181***	−0.206***
	(0.044)	(0.047)	(0.045)	(0.042)	(0.047)
Polity		−0.015***			−0.010**
		(0.004)			(0.004)
Cap. Ratio			−0.577***		−0.395**
			(0.185)		(0.191)
Territory				0.780***	0.678***
				(0.077)	(0.086)
Policy				0.017	0.012
				(0.067)	(0.074)
Regime				0.896***	0.921***
				(0.148)	(0.168)
Constant	1.077***	1.186***	1.541***	0.736***	1.161***
	(0.122)	(0.134)	(0.196)	(0.127)	(0.212)
Observations	1,978	1,733	1,911	1,978	1,676
R^2	0.013	0.021	0.017	0.092	0.089
Adjusted R^2	0.012	0.020	0.016	0.090	0.086
Note:	*p<0.1; **p<0.05; ***p<0.01				

Table 2: OLS Results for Fatality Level

As discussed in the previous section, our measure of fatality level is an ordinal value of the estimated number of fatalities according to the COW project's coding rule. While this is not a precise measure, it does allow us to sidestep the problematic non-random missingness present in the precise fatality measure included in the COW data.

The statistical model we use for this analysis is standard OLS regression. A potential concern here is that OLS may not be appropriate given the nature of our outcome variable. In particular, the different categories in the COW fatality level variable correspond to different magnitudes of observed fatalities, such that a jump from a 0 to 1 occurs with a single casualty, while a jump from 1 to 2 requires many more casualties. Because we observe precise casualty numbers for a small percentage of observations and must rely on the ordered category, a concern is that the nature of the uneven spacing between categories may result in a nonlinear relationship. To account for this, as a robustness check we implement an ordered probit, which accounts for the uneven spacing in the latent level of fatilities to vary flexibly. The findings of this model are substantively and statistically similar to those of our OLS results. Because OLS coefficients are much easier to interpret, we opt for presentation of the OLS results in the paper.

Turning to the results presented in Table 2, we see that across all models, our measure of leader tenure has a negative and statistically significant relationship with fatality level. This finding is consistent with Hypothesis 2. We also note that this finding carries substantive weight. In particular, holding all other variables at their median values, a shift from a brand-new leader to one that has held office for four years is sufficient to move the expected number of fatalities down a full category under the MID coding scheme.

In addition to our results on leader tenure, the results on the control variables across the models deserve some attention. First, consistent with previous work, conflicts centered on issues related to territory are longer and bloodier than those fought over other issues (Hensel (1996); Walter (2003); Huth (2009)). The ratio of hazards between territorial conflicts and the omitted "other" base category is 0.47, indicating that territorial conflicts are roughly twice as likely to continue at any point in time than conflicts in the reference category. Next, our duration results suggest that democracy does not have a significant effect on the duration of conflict. However, consistent with Valentino, Huth and Croco (2010), we find that democratic states incur fewer casualties during periods of interstate conflict. In terms of substnative significance, the influence of democracy is relatively small. A shift of 10 points in POLITY corresponds to a move across the full range of one of the COW fatality categories. The effect of democracy therefore depends upon whether the outcome variable is conflict duration or fatality level. Further, these results point to a pattern anticipated by Gelpi and Grieco (2001), that Democracy may be a proxy for short leader tenure. Including both leader tenure and democracy in our statistical analyses allows us to account for the effect of both democracy and tenure simultaneously. The results indicate that leader tenure carries more substantive weight in terms of predicting the duration and destruction of conflict. A similar pattern emerges with respect to the relative capability of states. We find that asymmetric wars tend to be longer, with our estimates indicating that asymmetric conflicts are 18% less likely to end at any point in time than symmetric conflicts. However, our fatality model indicates that asymmetric conflicts result in fewer fatalities. Depending upon whether the outcome variable is duration or fatality level, we find disparate effects. In contrast, the influence of leader tenure is consistent across the two outcome measures. This provides a further justification for our focus on both duration and fatality level. Consistent with our theory, the influence of tenure holds across the two outcome measures.

3.3 Robustness

While the results presented above provide evidence in favor of our hypothesis, it is still important to consider how sensitive these results are to alternative specifications of the model. In this section, we describe the findings obtained from various robustness checks.

In each of our main models, we control for the issue under dispute using dummy variables. However, this scheme only allows us to determine how these issue areas compare to the base category of uncategorized disputes. One concern arising from this is that the relationship between leader tenure and conflict duration might only be relevant to some types of conflicts. Accordingly, we dig deeper into how the issue under dispute influences the relationship between leader tenure and conflict duration by subsetting the data by issue, then running separate regressions with all other controls included. We find that in each of these regressions, our findings are consistent with the informational theory.

Bueno De Mesquita (2005), Goemans and Fey (2009), and Sirin and Koch (2015) argue that the wartime preferences of leaders are induced by domestic political institutions. Thus, it is possible that regime change, in addition to leader turnover, introduces uncertainty about the preferences of leaders. To address this, we include a measurement of regime durability from the POLITY data. This variable counts the time in years since a change of at least three points in a state's POLITY score. When this measure is included, our findings with respect to leader tenure remain unchanged. Additionally, the effect of regime change on the duration of conflict is not statistically significant. Thus, although regime change may introduce uncertainty, we find no systematic evidence that this uncertainty results in lengthy conflicts. Rather, our evidence is consistent with the role of leader-specific factors in shaping conflict outcomes.

Weisiger (2013) argues that particularly chaotic leader turnovers lead to a shifting power commitment problem (Fearon, 1995; Powell, 2006) in which rivals fight wars to capture bargaining goods before the new leader can reestablish their military posture. Because these commitment problems are not easily solved short of complete military defeat of one side, this mechanism would generate the same empirical implication. We thus ran two series of subsetted models to differentiate the mechanism. First, the commitment problem suggests that such wars must start particularly early in a leader's tenure to forestall the power shift. We thus ran models subsetting out leaders with up to 90, up to 180, and up to 365 days in office. Consistent with the informational story, longer tenures are associated with shorter fights. Second, because democratic turnovers ought to have comparatively smooth bureaucratic transitions, we looked at conflicts where the new leader's country has a Polity score of at least 1, 6, and 8. Again, in each of these subsetted models, the informational mechanism held up.

Alternatively, leaders who have obtained office through irregular means may have diversionary incentives. This incentive to divert attention may cause newer leaders who have obtained office through irregular means to initiate longer, costlier wars when compared to other leaders. To account for this alternative mechanism, we include an indicator of irregular entry drawn from Archigos. When we include this variable, the results are substantively and statistically identical to those in the main model.

Dixon (1994) argues that democratic states are less likely to escalate disputes with fellow democracies. To account for this, we estimated a model including a measure of the minimum polity score among originators of the dispute. Our findings persist with this alternative measure of regime type. Additionally, our measure of joint democracy has no statistically significant relationship with either duration or fatality level. This is consistent with Reed's (2000) finding that joint democracy renders dispute initiation less likely, but has no effect on the escalation of an existing dispute.

Perhaps disputes that escalate to war are systematically different from those that do not. In particular, if non-war disputes are more likely to be the result of uncertainty about resolve, while war disputes are more likely to result from uncertainty about capabilities, the impact of leader tenure may differ across these kinds of conflicts. This is likely to be the case if leader turnover introduces uncertainty about resolve, as in our model, but not about capabilities. To assess this expectation, we subset the data into war and non-war disputes, using the COW data's HiAct variable as a measure of escalation. When we do this, we find a consistent relationship between leader tenure and duration across each type of conflict.[15]

Another potential concern is that outliers in the data—specifically observations with leaders of autocratic states who are involved in very short, low-level conflicts— might be driving the results. To account for this possibility, we discard all observations for which either the duration of the conflict or our measurement of leader tenure is an outlier.[16] When we remove these observations, the results remain unchanged.

Uzonyi and Wells (2016) find that the effect of leader tenure on civil wars depends on constraining institutions of the executive. In particular, they theorize that constrained leaders can overcome commitment problems that plague civil wars (Walter (1997)), allowing the

[15] We are grateful to an anonymous reviewer for suggesting this robustness exercise.

[16] Here, we deem any observation that lies more than three times the distance spanned by the interquartile range above the 75th percentile as an outlier.

informational mechanism to work. Because these domestic commitment issues do not affect interstate conflicts, we would not expect a conditional effect here. To test this, we interacted tenure with the W score of that state (Bueno De Mesquita et al. (2005)).[17] Both duration and fatalities models fail to reject the null hypothesis. Even though our paper is on interstate wars, these results increase our confidence in Uzonyi and Wells' mechanism regarding civil wars, as their theory would predict the null findings here.

Finally, in studying sanctions, Spaniel and Smith (2015) find an interaction effect between tenure and democracy. We tested this by interacting our a leader's tenure with the polity score of his or her state and found null results. However, this is not surprising given the differences between the cases. Whereas sanctions often target specific leaders and their supporters, states cannot target regimes in this manner as easily during wars. As such, uncertainty about a winning coalition's tolerance to bear costs—which Spaniel and Smith argue is critical to explain sanctions—does not apply as strongly here. Indeed, for many wars, individuals outside the coalition suffer the costs of fighting while those inside enjoy the benefits of victory (Bueno De Mesquita et al., 2005; Goemans, 2000).

4 Discussion and Conclusion

Our main contribution connects leader tenure to the duration of interstate crises. If a state is relatively certain of an opponent's resolve, we formally showed that the duration of a crisis should be short; the proposer ought to make conservative demands or will rarely be wrong when it chooses an aggressive amount. The paper then investigated whether this connection held broadly. Sure enough, we estimated that going from a newly entered leader to a leader with four years of tenure leads to a 25.3% decrease in the chances that a conflict sustains past one month.

Additionally, we drew upon our theoretical expectations about duration to derive an additional empirical implication: as uncertainty vanishes, so too should the number of casualties resulting from conflict. Our use of leader tenure as a proxy for uncertainty again allowed us to evaluate this finding. We find broad support for this expectation, noting that a shift from one to four years in office can result in a substantial reduction in the expected number of fatalities.

A key difficulty in empirically assessing bargaining theories of conflict lies in measuring uncertainty. Our results suggest that leader tenure provides such a measure. Multiple mechanisms explain why states are more likely to enter conflict earlier in a leader's tenure. The

[17] W is a five-point scale coded from Polity that increases when the state has a non-military regime, competitive and open executive recruitment, competitive political participation, and competitive party systems.

information hypothesis predicts that uncertainty will linger through fighting, causing wars to last longer and be more deadly for newer leaders. This matches the empirical results. In contrast, the other mechanisms are ambiguous about duration expectations or imply the opposite result. Our results provide further confidence that leader tenure is an effective proxy for uncertainty.

We conclude with several implications of our results. First, longer tenured leaders provide positive externalities to other states; because it is easier to understand their motivations, rivals can more easily make the correct demands and avoid war. In contrast, long-term leaders may find themselves in a tougher situation. With more publicly known about them, their ability to bluff diminishes. In turn, it becomes harder for them to secure concessions exceeding what they would expect to win through conflict.

From a policy perspective, our results indicate that states ought to be especially careful when negotiating with newer leaders. Greater uncertainty implies that proposing states must spend more time sorting through their opposition. Given that war is costly, they may wish to instead buy off their opposition immediately or decrease their demands to accelerate the negotiation process. This implication is especially important in light of our findings on fatalities. By ignoring the informational consequences of leader tenure, policymakers risk not only engaging in wasteful and lengthy diplomatic disputes, but also in the loss of human life.

5 Appendix

5.1 Proof of Proposition 1

Consider the game in its two stages. Let s be state A's posterior belief at the beginning of stage 2 that B is the unresolved type. Further, let $s^* = \frac{c_A + \frac{c_B}{r'}}{c_A + \frac{c_B}{r}}$. The following lemma about stage 2 will prove useful throughout:

Lemma 1. *In stage 2, state A's optimal demand strategy is:*

$$x_2^* = \begin{cases} p_A + \frac{c_B}{r} & \textit{if } s \geq s^* \\ p_A + \frac{c_B}{r'} & \textit{if } s \leq s^* \end{cases}$$

Afterward, the unresolved type accepts iff $x_2 \leq p_A + \frac{c_B}{r}$ *and the resolved type accepts iff* $x \leq p_A + \frac{c_B}{r'}$.

We proceed backward. Consider the accept/reject decision of state 2 in the second stage. This is the terminal node of the game regardless of its decision. Thus, it simply maximizes its payoff. If the resolved type rejects, it earns $1 - p_A - \frac{c_B}{r'}$. Therefore, it is willing to accept any demand such that $1 - x \geq 1 - p_A - \frac{c_B}{r'}$, or $x \leq p_A + \frac{c_B}{r'}$. Analogously, the unresolved type earns $1 - p_A - \frac{c_B}{r}$ if it rejects. As such, it is willing to accept any demand such that $1 - x \geq 1 - p_A - \frac{c_B}{r}$, or $x \leq p_A + \frac{c_B}{r}$.[18]

Now consider state A's decision. State A strictly prefers demanding $p_A + \frac{c_B}{r}$ if:

$$s\left(p_A + \frac{c_B}{r}\right) + (1-s)(p_A - c_A) > p_A + \frac{c_B}{r'}$$

$$s > \frac{c_A + \frac{c_B}{r'}}{c_A + \frac{c_B}{r}}$$

By analogous argument, state A strictly prefers demanding $p_A + \frac{c_B}{r'}$ if $s < \frac{c_A + \frac{c_B}{r'}}{c_A + \frac{c_B}{r}}$ and is indifferent between the two when $s = \frac{c_A + \frac{c_B}{r'}}{c_A + \frac{c_B}{r}}$. This proves Lemma 1.

Next, consider stage 1. Note that regardless of the posterior, the resolved type earns a payoff of $1 - p_A - \frac{c_B}{r'}$ in the second stage.[19] Further, the resolved type will only reach that second stage with probability $1 - p_A$ if it fights, which also costs the resolved type $\frac{c_B}{r'}$.[20] All told, the resolved type accepts x_1 if:

$$1 - x_1 \geq (1 - p_A)\left(1 - p_A - \frac{c_B}{r'}\right) - \frac{c_B}{r'}$$

$$x_1 \leq \underline{x} \equiv 2p_A - p_A^2 - \frac{p_A c_B}{r'} + \frac{2c_B}{r'}$$

By analogous argument, the unresolved type rejects if $x_1 < 2p_A - p_A^2 - p_A\frac{c_B}{r} + \frac{2c_B}{r}$.

Meanwhile, if the unresolved type rejects x_1, the analysis of the second stage subgame established that the best it can possibly hope for in that second stage is that state A demands $p_A + \frac{c_B}{r'}$, leaving the unresolved type with $1 - p_A - \frac{c_B}{r'}$. After factoring in the probability of losing a battle and the cost to fight, the resolved type therefore accepts the initial demand if:

$$1 - x_1 \geq (1 - p_A)\left(1 - p_A - \frac{c_B}{r'}\right) - \frac{c_B}{r}$$

$$x_1 \leq \bar{x} \equiv 2p_A - p_A^2 - \frac{p_A c_B}{r'} + \frac{c_B}{r'} + \frac{c_B}{r}$$

There are two cases. First, suppose $q < s^*$. In words, this condition implies that state A will offer the larger amount in the second stage if any or all of the unresolved types reject

[18] For convenience, we assume that state 2 accepts when indifferent here. Due to the standard reasons, no other equilibria exist here if we permit rejection in the case of indifference.

[19] This is either because state A makes an offer of that size or the resolved type rejects an insufficient offer and initiates a war instead.

[20] With probability p_A, it loses the battle and receives none of the good.

a demand. Consequently, the unresolved type accepts here if $x_1 \leq \underline{x}$ and rejects if $x_1 > \underline{x}$. Under these conditions, only two demands could possibly be optimal: $\underline{x}$ and $\bar{x}$. All others either make an unnecessary bargaining concession or result in unproductive war against all types. Demanding $\underline{x}$ induces immediate acceptance from both types. Demanding $\bar{x}$ means the unresolved type accepts immediately while the resolved type rejects initially. State A pays the battle cost and wins the whole prize if it emerges victorious from the battle. If it loses, the parties settle according to Lemma 1 in the second stage. Therefore, state A demands $\underline{x}$ if:

$$\underline{x} > q(\bar{x}) + (1-q)[p_A(1-p_A)\left(p_A + \frac{c_B}{r'}\right) - c_A]$$

$$q < \frac{c_A + \frac{c_B}{r'}}{c_A + \frac{c_B}{r}}$$

This holds. Thus, if the probability state B is unresolved is low, state A makes the conservative demand guaranteed to be accepted.

Second, suppose $q > s^*$. Now if the unresolved type pools on rejecting with the resolved type, state A's posterior is greater than s^* and thus it demands $p_A + \frac{c_B}{r}$. In turn, the unresolved type ultimately receives its absolute war payoff of $1 - 2p_A + p_A^2 + \frac{p_A c_B}{r} - \frac{2c_B}{r}$. Thus, because the unresolved type's best response remains the same in all other cases, it now cannot reject as a pure strategy if state A demands an amount between $\bar{x}$ and $2p_A - p_A^2 - \frac{p_A c_B}{r'} + \frac{2c_B}{r}$. It also cannot accept as a pure strategy. If it did, state A's posterior belief in the second stage would be that it is facing the resolved type with probability 1. As such, state A would demand $p_A + \frac{c_B}{r'}$ in the second stage, which in turn means that the unresolved type could profitably deviate to rejecting in the first stage.

Thus, the equilibrium requires the unresolved type to semi-separate in response to such an offer. Rather than solve for the equilibrium of this subgame fully, we instead show that any demand in that range cannot be optimal for A. To see this, note that the indifference conditions for the unresolved type mean that A must mix between demanding $p_A + \frac{c_B}{r}$ and $p_A + \frac{c_B}{r'}$ in the second stage. Lemma 1 states that this is only possible if $s = s^*$. Let σ_R represent the unresolved type's probability of rejecting a demand between $\bar{x}_1$ and $2p_A - p_A^2 - p_A \frac{c_B}{r'} + \frac{2c_B}{r}$. Then A's posterior belief equals s^* if:

$$\frac{q\sigma_R(1-p_A)}{q\sigma_R(1-p_A) + (1-q)(1-p_A)} = \frac{c_A + \frac{c_B}{r'}}{c_A + \frac{c_B}{r}}$$

$$\sigma_s^* = \frac{(1-q)\left(c_A + \frac{c_B}{r'}\right)}{q\left(\frac{c_B}{r} - \frac{c_B}{r'}\right)}$$

Consequently, if state A makes such an offer, the expected probability of acceptance equals $q(1-\sigma_s^*)$. State A keeps x_1 in this case. With the remaining probability, A pays the cost of a battle c_A, captures the good with probability p_A, and advances to the second stage with probability $1-p_A$, where it is indifferent between its two demands. Noting that demanding $p_A + \frac{c_B}{r'}$ guarantees A that exact value, we can write A's payoff as:

$$q(1-\sigma_s^*)x_1 + [1 - q(1-\sigma_s^*)][p_A + (1-p_A)\left(p_A + \frac{c_B}{r'}\right) - c_A]$$

Note that σ_s^* is not a function of x_1. As such, A's payoff is strictly increasing in x_1. Thus, if making a demand in this range is optimal, A must demand $2p_A - p_A^2 - \frac{p_A c_B}{r'} + \frac{2c_B}{r}$. State A's best alternative is to demand $\bar{x}$, have the unresolved type accept with certainty, and demand $x_2 = p_A + \frac{c_B}{r'}$ if the resolved type survives into the second period.[21] Demanding $2p_A - p_A^2 - \frac{p_A c_B}{r'} + \frac{2c_B}{r}$ is preferable if:

$$q(1-\sigma_s^*)(2p_A - p_A^2 - \frac{p_A c_B}{r'} + \frac{2c_B}{r}) + [1 - q(1-\sigma_s^*)][p_A + (1-p_A)\left(p_A + \frac{c_B}{r'}\right) - c_A]$$

$$> q(\bar{x}) + (1-q)[p_A + (1-p_A)\left(p_A + \frac{c_B}{r'}\right) - c_A]$$

Substantial algebraic manipulation yields:

$$q > \frac{\left(c_A + \frac{c_B}{r'}\right)\left(c_A + \frac{2c_B}{r} - \frac{c_B}{r'}\right)}{\left(c_A + \frac{c_B}{r}\right)^2}$$

Therefore, state A demands $\bar{x}$ if $q \in \left(\frac{c_A + \frac{c_B}{r'}}{c_A + \frac{c_B}{r}}, \frac{\left(c_A + \frac{c_B}{r'}\right)\left(c_A + \frac{2c_B}{r} - \frac{c_B}{r'}\right)}{\left(c_A + \frac{c_B}{r}\right)^2}\right)$. The resolved type rejects and the unresolved type accepts. If $q > \frac{\left(c_A + \frac{c_B}{r'}\right)\left(c_A + \frac{2c_B}{r} - \frac{c_B}{r'}\right)}{\left(c_A + \frac{c_B}{r}\right)^2}$, state A demands $2p_A - p_A^2 - \frac{p_A c_B}{r'} + \frac{2c_B}{r}$. The resolved type rejects and the unresolved type semi-separates as described above. □

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[21] Demanding any amount smaller than that in the first period is an unnecessary concession. The unresolved type must accept with certainty at that point, meaning that A could profitably deviate to a demand between that amount and $\bar{x}$.

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