

Institutional Change We Can Believe In: Democratization, Commitment, and Civil War Recurrence*

Nils W. Metternich[†] and Julian Wucherpfennig[‡]

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Abstract

Why do some armed civil conflicts never recur, while others experience renewed fighting after only short spells of peace? The current literature assumes that all conflicts have the same underlying risk of recurrence, which is influenced by a set of covariates. This standard “one population” approach has revealed important insights about the recurrence of armed conflict. Moving beyond this conceptualization, we present a simple formal model that in equilibrium predicts a zero probability of recurrence when democratization and democratic institutions allow governments to make credible commitments to challengers. By contrast, in the absence of such institutional change, the model predicts a positive probability of recurrence because the government has incentives to renege. Consequently, peace spells are the consequence of two separate mechanisms: (1) fragile peace and (2) consolidated peace. Empirically, although observationally identical, two different, latent peace “populations” exist: Cases that will never experience another civil war and cases that are at risk of conflict but are subject to favorable circumstances that mitigate renewed confrontations. To mirror these theoretical predictions in our empirical analyses, we introduce a split-population estimator that allows for these two populations. The statistical technique distinguishes between factors that determine *whether* a civil war will recur (at all), and if so *when*. We demonstrate that conventional one-population estimates vastly underestimate the hazard of quick recurrences and overestimate the risk of another armed confrontation later in time.

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[†]nm86@duke.edu, Department of Political Science, Duke University, 330 Perkins Library, Durham, NC 27708, USA.

[‡]wucherpfennig@icr.gess.ethz.ch, Center for Comparative and International Studies, ETH Zurich, IFW D49.1, Haldeneggsteig 4, 8092 Zurich, Switzerland.

1 Introduction

Why do some armed civil conflicts never recur, while others experience renewed fighting after only short spells of peace? Countries like Iraq, Sri Lanka, or the Democratic Republic of Congo have experienced repeated violent outbreaks and after many conflicts there is an unsettling feeling that another confrontation is imminent. By contrast, some armed conflicts never recur and post-conflict peace advances to the point that future war becomes virtually “unthinkable”. Consider the American Civil War as an extreme example. Few would claim that there is any chance of another armed confrontation between Northern and Southern states. But also more recent cases fall into this category. For example, Romania or Chile are countries that experienced armed conflicts in recent times when their former dictatorships were overthrown. However, it is hard to believe that conflicts will resume in these countries in the foreseeable future.

Taking these empirical observations as an initial motivation, we explore both theoretically and empirically whether it is possible to distinguish between periods of fragile peace, in which recurrent conflict has a positive probability, and consolidated peace, in which the risk of recurrence is virtually zero. While such a distinction appears immediately intuitive and plausible, it turns out to be strongly at odds with existing studies on civil war recurrence (Walter 2004). Most, if not all, studies implicitly assume that every conflict will eventually recur. This is the case because standard estimation techniques cannot account for the fact that some cases are at risk of recurrence, but do not break out because of some favorable circumstances, and other cases that are not even in the risk set. Thus, different theoretical mechanisms can determine non-recurrence, which leads us to the distinction between two different types of peace after armed conflicts. (1) Fragile peace, where conflicts are at risk of recurring but favorable circumstances and prevention mitigate renewed confrontation. (2) Consolidated peace, where conflicts are no longer at risk of turning violent.

This theoretical distinction between fragile and consolidated peace is important because

it allows us to distinguish factors and mechanisms that impact the timing of recurrence from those that help to solve conflicts in the long-run. Our study is motivated by Svoboda's (2008) work on democratic consolidation, which identifies the determinants of two related yet distinct processes: the likelihood that a democracy consolidates, and the timing of authoritarian reversals in democracies that are not consolidated. We also employ his estimation approach by implementing a split-population log-logistic duration model.

The paper's theoretical argument highlights that the post-conflict government's ability to make credible commitments is key for consolidated peace (Walter 1999). Implementing democratic institutions is probably the most convincing commitment mechanism at the government's disposal (Acemoglu & Robinson 2006) because they guarantee the credibility of any (explicit or implicit) agreement reached between the government and the challenger. Democratic institutions also limit the amount of exclusionary policies that are argued to increase the probability of conflict (Cederman & Girardin 2007). Therefore, based on our theoretical model, we argue that if the government is able to make credible commitments after a civil war, the theoretical probability of armed conflict approaches zero. We call this state consolidated peace. Governments that cannot use institutions as commitment mechanisms might circumvent conflict recurrence by practicing good prevention or by being subject to favorable conditions but they are subject to a positive probability of conflict and are in a state of fragile peace.

This paper is organized as follows. We begin with a brief discussion of the existing research on civil war recurrence and highlight the role of informational and commitment problems. Next, we present a simple formal model which demonstrates the conditions under which we expect consolidated or fragile peace. Here we make the case for institutional change that allows to overcome problems of credible commitment, in particular democratization. We then show how the empirical implications of our theoretical model motivate a non-standard estimator, a split-population estimation approach. Our empirical analyses demonstrate that

although peace can be enforced by suppressing conflict temporarily, in order to achieve lasting peace following civil war, credible institutions are of utmost importance. We also subject these findings to various robustness checks. The concluding section discusses insights and limitations of this study.

2 What do we know?

Civil war recurrence is a frequent phenomenon (Walter 2009) and it is no surprise that scholars are increasingly interested in identifying the determinants of renewed fighting. In this section we highlight some of the key insights in the literature and demonstrate that all large-N studies of conflict recurrence adopt a, what we call, “one-population approach”. This one-population approach implicitly assumes that *all* cases in the sample will eventually recur and that the same causal mechanisms apply to every single peace spell.

2.1 Empirical insights from the one-population approach

An increasing number of studies investigate the relationship between conflict outcome and recurrence. Applying a broad brush, four categories of explanations have been suggested (Walter 2004, 372): While some authors stress (1) the role of intervention and peacekeeping, others focus on (2) the characteristics of the previous war including its termination, (3) post-war institutional design, or (4) the general country characteristics.

For example, some studies have argued that peace periods after military victories tend to be shorter than after negotiated settlements (Fortna 2004). In addition, recurrence appears to be more likely after settlements than after victories (Licklider 1995, Toft 2010). In a frequently cited study, (Walter 2004) finds that neither the characteristics of the previous war, such as its duration, severity or costs in terms of displaced persons, nor its resolution, be it through decisive victory, settled grievances, or partition, can account fully for civil

war recurrence. Instead, she argues, higher economic well-being and political freedoms make renewed conflict less likely.

As a common denominator, all of these studies have been concerned with the duration of post-war peace and employ either continuous or discrete event history estimators (e.g. Doyle & Sambanis 2000, Hartzell & Hoddie 2003, Fortna 2004, Walter 2004, Mukherjee 2006, Quinn, Mason & Gurses 2007, Collier, Hoeffler & Söderbom 2008, Fortna 2008b). These standard techniques rest on the implicit assumption that all peace spells have the same underlying baseline hazard or latent risk function that is shifted by a set of covariates. However, it is not entirely clear whether, for example, Fortna’s (2004) or Toft’s (2010) theoretical arguments actually imply a one-population estimation approach. Toft (2010), for example, argues that victories lead to enduring peace, while negotiated settlements lead to withering peace. Therefore, in her theory peace spells can have different qualities, which implies that there are two different peace populations in the sample.

Another important empirical finding is that longer armed conflicts are followed by longer peace spells (Doyle & Sambanis 2000, Walter 2004). Walter’s (2004) results, for example, are based on logit estimates with splines, which essentially model a base-line hazard (Beck, Katz & Tucker 1998). Again, this estimation approach implies that all peace spells are in the recurrence risk set. In this particular case, however, the one-population follows from the theoretical argument. One might disagree with the theoretical focus on the opportunity structure of individual fighters to explain conflict recurrence, but Walter’s (2004) cost argument demands a one-population estimation. This reveals an important aspect of this paper. We do not simply argue that one estimation approach is “better”. Rather, we suggest that there are important *theoretical* reasons that imply a split-population approach, which allow for an improved prediction of conflict recurrence.

2.2 Recurrence: Informational or Commitment Problem

Our study draws on the bargaining model of war (Fearon 1995). From this perspective, conflict recurrence poses a theoretical puzzle to the study of armed conflicts. From the viewpoint of private information, one would commonly assume that fighting has ended because the actors' beliefs about each others' probability of winning and the costs of fighting have sufficiently converged (Slantchev 2003, Smith & Stam 2004). Screening and signaling processes that caused the duration of armed confrontation should have revealed the belligerents' types and mitigated any opportunity to misrepresent information. Without any external informational shocks (e.g. a new leadership that could potentially have a different level of resolve) there is little reason why conflicts should ever recur. Moreover, if wars end because all information is revealed, it is theoretically unclear why the length of an armed confrontation (Fortna 2004) or the decisiveness of a victory (Toft 2010) should impact on the remaining amount of private information. Only if this information convergence is interrupted prematurely, for example by an external intervention, it seems possible that private information remains after an conflict.

The alternative explanation, commitment problems, faces a different set of problems. If commitment problems drive conflict recurrence, why did the belligerents stop fighting in the first place? Theoretically, they should have anticipated the threat of non-credible commitments and never have ended the armed confrontation. Thus to explain conflict recurrence, it is again necessary to "add" theoretical building blocks. For example, Werner & Yuen (2005) provide a theoretical argument that external interventions may enforce "unnatural" outcome equilibria that only last as long the third-party can suppress armed conflict. As soon as the intervener leaves, the stronger party has incentives to renege on previous settlement terms. This may lead to renewed fighting.

Given these apparent difficulties, it no surprise that existing work on conflict recurrence is unsatisfactorily. To be sure, our study cannot fully overcome the full set of problems. Rather,

we take conflict termination as given, and confine our analyses to the post-conflict environment. In the next section we lay out a simple formal model that details our approach. The model then generates testable implications, which in turn motivates our empirical estimator.

3 Theory

3.1 Intuition

The government's ability to make credible commitments to potential challengers is vital in guaranteeing stable and long lasting peace after armed conflicts. Institutions that increase the government's credibility are therefore crucial for consolidated peace. Consequently, implementing democratic institutions is perhaps the most convincing commitment mechanism governments have at disposal (Acemoglu & Robinson 2006). In general, democratic institutions guarantee the credibility of any agreement, whether implicitly reached on the battlefield or explicitly at the negotiation table. They also guarantee re-distributional policies in favor of the majority by making the government accountable through elections (Boix 2003) and limit the degree of exclusionary policies that are argued to increase the probability of conflict (Cederman & Girardin 2007).

Democratization, a related process, assures the challenger that the government is willing to make costly concessions by allowing for institutions that immediately limit its power. Governments that allow for institutional change towards fully democratic institutions therefore demonstrate that they take the challenger seriously, and that they are committed to lasting peace at the expense of limiting their own political power. In short, democratization is a costly decision that indicates the government's sincerity with regard to keeping the peace with the challenger.

For the challenger, the main risk is that once demobilization and disarmament has sufficiently progressed to the point where she is no longer a credible threat, the government has

incentives to renege on any previously reached agreement. Thus, challengers will generally be reluctant to dispose of her fighting capacities unless she has reason to credibly believe the government will not renege on its promises. It is easy to see how such conditions are present when the government commits to costly concessions by installing fully democratic institutions. In short, if the government is able to make credible commitments after a civil war, the theoretical probability of armed conflict approaches zero. We call this state *consolidated peace*.

However, not all governments are willing or able to implement democratic institutions after a civil war. For example, a government leader that is highly unpopular and destined to lose free and fair elections is likely to avoid democratic institutions, because such institutions would drastically decrease the chances of political survival. Democratic institutions might also be unattainable if the government's constituency fears to lose power to a group that could dominate the democratic process (e.g. large ethnic groups or strong political movements). While these are important concerns, our theoretical argument does not discuss the reasons why some governments do not implement more credible institutions. Rather, our focus lies on the consequences of not doing so. Put differently, in our empirical analyses we treat institutions and institutional change as exogenous, and study comparative statics.

It is also important to note that the failure of implementing credible institutions does not automatically lead to renewed conflict. Indeed, many countries manage to circumvent conflict recurrence by practicing good prevention or by being subject to favorable conditions. For example, a country might have an underlying risk of conflict but third-parties may increase the costs of fighting and mitigate conflict recurrence (Werner & Yuen 2005). In addition, economic growth might increase the overall well-being temporarily, decreasing incentives to fight, without tackling underlying redistributive conflicts that may surface again during a recession. Therefore, if the government does not implement institutions that allow for credible agreements, there is a latent positive probability of conflict recurrence. We call this

state *fragile peace*.

Finally, it is important to note that the type of institutions and institutional change we denote as credible, theoretically result as a conscious choice by the government, rather than the result of institutions imposed by third-parties, which may not have the government's full support. For example, although elections are an integral part of democracy, rushed post-conflict elections that are not guaranteed to be free and fair, and where the election's loser is not willing to accept political defeat do not constitute what we describe as credible institutions.

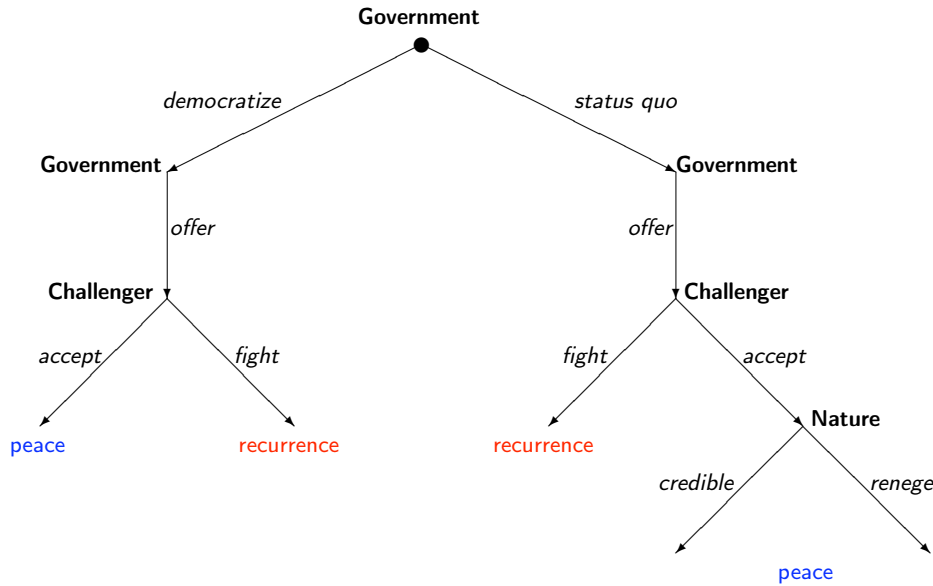
3.2 A reduced model of conflict recurrence

Having outlined the intuition of our argument, we analyze a simple model of civil war recurrence. The model is essentially a game of promises similar to the one found in Acemoglu & Robinson (2006). The model assumes that post-conflict bargaining takes place under complete information. We believe this to be a good assumption as fighting should have revealed crucial private information (Fearon 2004). We consider two actors: the government and the previous challenger. In the game, the post-conflict government moves first and decides whether to democratize the country or leave the institutions in their pre-conflict state¹. After the government's decision over the post-conflict institutions, it makes an offer $x \in (0, 1)$ on how to divide a contested political good $\Pi \in (0, 1)$. We assume that Π is infinitely divisible and transferable among the government and its challenger. The contested good Π can, for example, refer to economic redistribution, political representation, or disputed territory, and is thus compatible with a broad range of theoretical approaches. The challenger can subsequently either accept the government's offer or reject it. If the challenger rejects the offer, fighting recurs. With probability p the challenger will win against the government, receive all of Π but has to bear the costs of fighting c . If the challenger loses he/she also incurs the cost

¹For the moment, let us assume that the pre-war institutions are non-democratic.

of fighting but gains nothing from fighting. Therefore, the challenger's expected utility from fighting is simply $p\Pi - c$. The government's optimal strategy, to keep the challenger from fighting and keep as much of Π as possible, is to offer just enough x to keep the challenger indifferent between accepting and rejecting a proposed division of Π . Hence, the government offers $x_{optim} = p\Pi - c$.²

Figure 1: A simple model of post-conflict institutional choice and conflict recurrence



If the post-conflict government opts for democratic institutions, it is able to make credible offers to potential challengers. Therefore, the government's promise to share x with the challenger will always be fulfilled. More importantly, under democratic institutions there will always be an offer x that satisfies potential challengers. Because $p \in (0, 1)$, $x_{optim} = p\Pi - c \not\geq 1$ and hence $x_{optim} \not\geq x_{max} = 1 = \Pi$. This implies that the government can always make credible offers, which the challenger will always accept. In this case, the observable probability of conflict recurrence should approach zero. If $Pr(Recur) = 0$, we will speak of consolidated peace.

However, the postconflict government can also decide to keep the nondemocratic pre-

²This is true as long as $p\Pi - c > 0$. If $p\Pi - c \leq 0$, the government's optimal offer is $x = 0$.

conflict institutions. Non-democratic institutions might be favored by post-conflict leaders that have little popular support and fear to lose their office in free and fair elections. In the following, we are less much interested in why post-conflict leaders chose non-democratic institutions but more in the consequences of such behavior. In case the government does not democratize it runs the risk that its promises are not credible or only temporarily credible. This risk of not being credible can be modeled by a simple move of Nature, which decides whether the government's offer x is credible. Let us assume that the government can commit to its offer with probability q . Now the challenger's expected utility of accepting x is scaled by q and equals qx . Recall that in the case of consolidated peace fighting never takes place because the expected utility of the government's offer is x and $x_{max} \geq x_{optim}$. If, however, the government's offer becomes less credible the following inequality may hold and fighting recurs.

$$EU(accept) < EU(reject) \tag{1}$$

$$qx < p\Pi - c \tag{2}$$

$$x < \frac{p\Pi - c}{q} \tag{3}$$

As q decreases the right hand side of the $\frac{p\Pi - c}{q} \rightarrow \infty$ and potentially become larger than $x_{max} = 1$. Therefore, if the government does not implement institutions that can make their promises credible, there is a positive probability of conflict recurrence. We call this state fragile peace, which implies that the $Pr(Recur) > 0$.

4 Estimation

The main implication of our theoretical model is that consolidated peace occurs when governments introduce postconflict institutions that allow them to make credible commitments.

Hence, we theoretically derive that in these cases $Pr(recur) = 0$. With institutions that do not guarantee the same degree of credibility $Pr(recur) > 0$. This empirical implication poses a challenge to our estimation strategy. It is common practice to empirically model conflict recurrence by employing event history analyses that estimate the time until renewed fighting. However, the implicit assumption in these models is that in the long-run *all* conflicts will recur. This means that *all cases are in the risk set* and their base-line hazard is proportionally shifted. This becomes obvious when looking the hazard rate for the log-logistic model (Box-Steffensmeier & Jones 2004).

$$h(t) = \frac{\lambda p (\lambda t)^{p-1}}{1 + (\lambda t)^p} \quad (4)$$

In this specification, p is the shape parameter and the function is shifted by λ , where $\lambda = e^{\beta x}$. The explanatory variables can considerably decrease the probability of recurrence but $Pr(recur)$ is always > 0 . In many applications this is not problem, but our theoretical model predicts that we have two different populations in our sample. Cases that experience consolidated peace $Pr(recur) = 0$ and some where $Pr(recur) > 0$. Consequently, our theoretical approach motivates a different type of estimator: a split-population approach.

The split-population model relaxes the assumption that all cases will eventually fail ($Pr(recur) > 0$) by integrating the possibility that some conflicts will never recur ($Pr(recur) = 0$). To see this consider the joint likelihood function for a standard event history model (Box-Steffensmeier & Jones 2004, 34):

$$L = \prod_{i=1}^N \{f(t_i)\}^{\delta_i} \times \{S(t_i)\}^{1-\delta_i} \quad (5)$$

where $f(t)$ is the density of failure times, $S(t)$ is the survivor function, and δ is the censoring indicator denoted 0 if the duration is censored, and 1 if it is not. The split-population approach simply adds an additional parameter that distinguishes observations that eventually

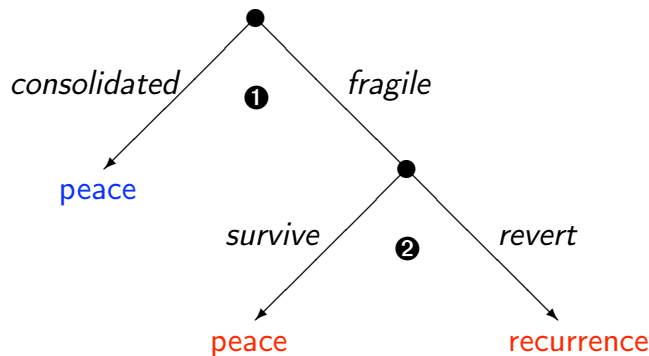
fail from those that will never fail:

$$L = \prod_{i=1}^N \{(1 - \pi)f(t_i)\}^{\delta_i} \times \{\pi + (1 - \pi)S(t_i)\}^{1-\delta_i} \quad (6)$$

This allows us to allow for the possibility that some cases will never fail, or how we call it, become consolidated. This is achieved through a mixing probability π , which we can parametrize with covariates using a logit link function. Thus, π is the probability of consolidation. Hence, the likelihood function consists of two parts, one part that estimates the the probability of consolidation, and another part that estimates the timing of recurrence. Each part allows for different covariates. We follow Svulik’s (2008) estimation approach of the split logit–log–logistic duration model.³

We emphasize that the empirical implications of our theoretical model fit seamlessly with the split-population estimation. To see this, compare the game tree in Figure 1 and the estimation tree in Figure 2. In the first part we estimate the split-parameter, that is whether a case is consolidated ($Pr(recur) = 0$) or experiences fragile peace ($Pr(recur) > 0$). In the second part, we estimate the hazard that a case will revert from fragile peace to armed conflict. Note, however, that split and timing are estimated simultaneously.

Figure 2: Illustration of the split-population estimation approach



³We also estimated a Weibull-version of the model, but found the log-logistic to fit the data better. Since the Weibull implies a monotonic hazard, whereas the log-logistic does not, this is not surprising (see figure 5.)

4.1 Dependent variable

Our dependent variable is the duration until conflict recurrence, which implies that we are measuring post-conflict peace episodes. We use data from Kreutz (2010) to construct this variable. The sample we employ includes 283 conflict episodes and 136 recurrences. The data spans from 1946-2005. This data uses the Uppsala/PRIO conflict definition (Gleditsch, Wallensteen, Eriksson, Sollenberg & Strand 2002) requiring at least 25 battle related deaths during a given year. Following (Kreutz 2010) recurrence is then defined as the continuation of violence over the same incompatibility after at least one year during which the threshold of 25 battledeaths was not crossed. We emphasize that this operational definition necessitates violence over the same incompatibility. The advantage of this strategy is that it ensures the same challenger, or at least the same objective on the side of the challenger. The alternative strategy, defining recurrence at the country- rather than at the conflict-level potentially conflates separate conflicts in different part of the country that are not necessarily related.

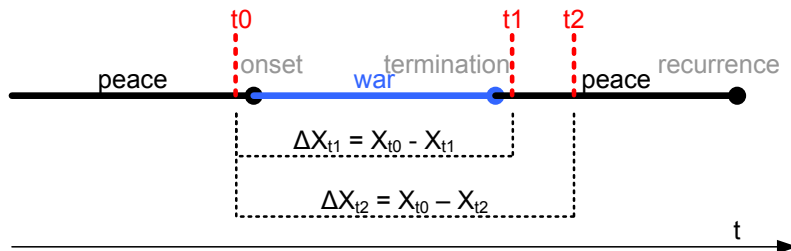
We exclude partitions because conflict recurrences after successful partitions are frequently coded as new conflicts (e.g. inter-state). Moreover, as will become in the next section, it is not clear how to construct our main independent variable, democratization, since this would involve democracy scores from different countries (the rump state and the secessionist state).

4.2 Explanatory variables

We employ two main explanatory variables to test our empirical implication. First, we construct a measure of post-conflict democratization. This is time-varying variable that measures the difference between the pre- and post-conflict Polity score for every post-conflict peace year. In other words, for every post-conflict year we subtract the current Polity score from the pre-war score. Figure 3 illustrates this procedure for every t_i post-conflict peace

period. In addition, to allow for potentially different functional forms, we distinguish between democratization $\Delta X_{t_i} > 0$ and autocratization $\Delta X_{t_i} < 0$, which results in two scales ranging between 0 and 20.

Figure 3: Operationalization of post-conflict democratization



Second, we measure the actual post-conflict Polity level for every post-conflict peace year t_i .

We also introduce a number of controls that are commonly associated with the recurrence of conflict. Even though the empirical evidence is disputed (Fortna 2004, Gilligan & Sergenti 2008), peacekeeping operations are thought to have conflict mitigating effects. Therefore, we control whether peace-keeping troops are deployed during a given year. The initial conflict duration and outcome is also thought to impact on peace duration. There is evidence that shorter and decisively decided conflict decrease the risk of recurrence (Walter 2009). Hence, we control for victories and the initial conflict duration. Since democratization and the level of democracy might simply be an indicator for economic development we control for GDP per capita and additionally the country's population size. Finally, we control for the cold-war period as some conflict might have been prevented from recurring in the cold-war by pressures and incentives from the super-powers Russia and the United States.

5 Results

To test our main empirical implications we estimate a split-population log-logistic hazards model. The estimated results can be found in Table 1. Model related summary statistics

can be found at the bottom of the table. We proceed by first estimating a simple log-logistic hazards model to establish a baseline against the split-population model (Model 1). The estimates are presented in accelerated failure time (AFT) format. Thus, positive coefficients imply that an explanatory variable increases the post-conflict peace duration. Models 2 and 3 present the split-population estimates. Similar to the basic model, the timing coefficients are in the AFT format. The split estimates for the consolidation part come from the logit link function. Hence, positive coefficients imply that increasing values of an explanatory variable make consolidated peace more likely.

Before turning to the main results, let us consider the estimates of our control variables. Peace-keeping operations increase the duration of post-conflict peace across all of our models. In addition, our results show that peace-keeping also contributes to consolidated peace. In line with our initial expectations, the cold-war seems to have suppressed conflict recurrence but had no effect on consolidating peace. While higher levels of GDP per capita are associated with longer post-conflict peace periods in the base-line model, this effect disappears in the split-population model. In the later set of models GDP per capita has a consolidating effect. Finally, we want to highlight the estimates for conflict duration and victories. Analyzing the Schoenfeld residuals in the base-line model implied a model specification, which includes the interacted terms of conflict durations and victory types. Some interesting results follow from this estimation. While government victories are generally related to longer peace spells and even contribute to consolidated peace, this is not the case for rebel victories. Rebel victories only lead to long peace periods if the victory was achieved after a short conflict. Rebel victories after long periods of fighting, however, are associated with a high risk of recurrence. In addition, rebel victories do not seem to contribute to consolidated peace as government victories do. This finding yields potential future research as it casts doubt on general statements that victories mitigate conflict recurrence.

Turning to the main results in Table 1, Model 1 displays the estimates for the simple log-

logistic hazards model. Post-conflict peace periods tend to be significantly longer in countries with higher Polity scores. Autocratization after an armed conflict is associated with longer peace spells, while democratization decreases the hazard of recurrence. However, the effect of democratization is not significant at conventional levels.

How do these base-line results compare to the split-population estimates? Model 2 presents the results for the split-population log-logistic hazards estimation. We first consider the estimates of the timing of conflict recurrence in the left column. All of our main explanatory variables are no longer significant at conventional levels in the timing equation. In addition, the point estimates are considerably smaller in the base-line model and even switch signs in the case of democratization. However, we are mainly interested in the estimates for the consolidation of peace. Thus, we turn our attention to the right column of Model 2. First, we find that post-conflict democratization is significantly associated with consolidated peace. Consider the first panel in Figure 4 for an interpretation of the effect post-conflict democratization has on the probability of consolidated peace. For example, a change from no democratization to a democratization by 5 points on the Polity score, increases the probability of consolidated peace by 20 percent. This result is robust to the inclusion of all our control variables in Model 3.

Similar, we find that more democratic post-conflict institutions are related to consolidated peace, even though this finding is not significant across all estimated models. The second panel in Figure 4 visualizes the impact of the post-conflict Polity level on the probability of consolidated peace. For example, consolidated peace is 10 percent more likely in fully democratic countries (Polity=20) than in anocracies (Polity=10).

Overall, the results of the split population log-logistic model provide considerable support for the notion that the process of democratization and the Polity level play an important role in the consolidation of peace. But does the more complex estimation make a difference in practice? We believe the answer is yes. Following recent trends in conflict research, we

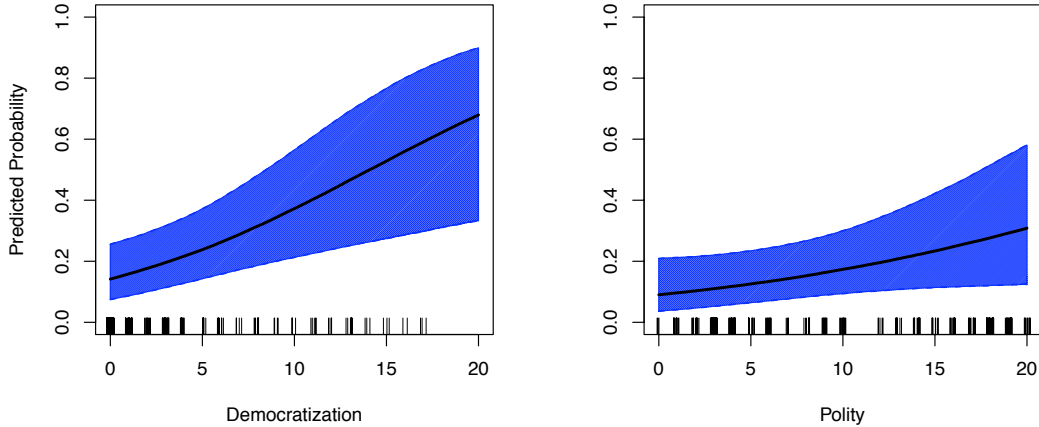
Table 1: Estimation results

Variables	Model 1	Model 2		Model 3	
	Log-logistic	Split Log-logistic		Split Log-logistic	
	Timing	Timing	Consolidated	Timing	Consolidated
Democratization	0.010 (0.022)	-0.016 (0.016)	0.128** (0.050)	-0.012 (0.015)	0.109* (0.059)
Autocratization	-0.032* (0.017)	-0.009 (0.013)	-0.109* (0.057)	-0.009 (0.012)	-0.191*** (0.070)
Polity	0.033** (0.015)	0.015 (0.012)	0.076 (0.048)	0.013 (0.011)	0.111** (0.056)
Peacekeeping	0.729*** (0.274)	0.474** (0.240)		0.404* (0.238)	1.435* (0.864)
Coldwar	0.470*** (0.171)	0.579*** (0.148)		0.703*** (0.133)	-24.176 (2,512)
ln(Conflict Duration)	0.028 (0.060)	0.017 (0.045)		0.013 (0.043)	0.019 (0.186)
Gov. Vic.	1.781*** (0.265)	1.309*** (0.277)		0.716*** (0.253)	3.147*** (0.815)
Reb. Vic.	-0.214 (0.307)	-0.222 (0.220)		-0.351* (0.209)	2.081 (1.411)
Gov. Vic. × ln(Confl. Dur.)	0.287** (0.136)	0.352** (0.143)		0.154 (0.136)	0.118 (0.371)
Reb. Vic. × ln(Confl. Dur.)	-0.513*** (0.141)	-0.359*** (0.101)		-0.330*** (0.093)	-0.763 (0.705)
ln(GDPpc)	0.153* (0.085)	-0.013 (0.072)	0.812*** (0.297)	0.003 (0.064)	0.834*** (0.278)
ln(Pop)	-0.067 (0.049)	-0.037 (0.040)	-0.142 (0.143)	-0.038 (0.036)	-0.044 (0.167)
Constant	0.889 (0.830)	1.795*** (0.655)	-7.380** (2.934)	1.667*** (0.581)	-9.584*** (3.287)
$1/\gamma$	-0.58*** (0.072)	-1.04*** (0.088)		-1.12*** (0.079)	
Observations	3181	3181		3181	
Log-Likelihood	-498.2	-468.6		-436.2	
χ^2	105.4	97.09		97.63	
<i>AIC</i>	1024	977		926	

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

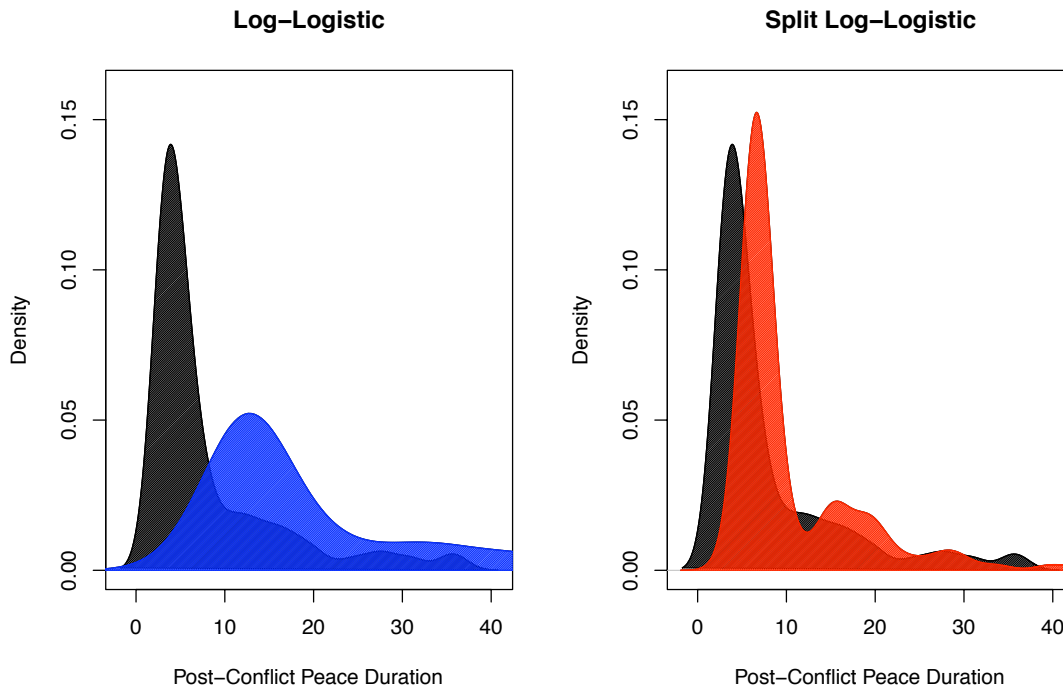
Figure 4: Predicted Probabilities of consolidated peace. Post-conflict democratization left panel. Post-conflict Polity level right panel. Blue area represents 95 percent confidence interval. Distribution of actual values above the x-axis. Plots refer to Model 2.



use prediction as an additional source of model evaluation (Ward, Greenhill & Bakke 2010). In general, we have argued that the conventional duration model ignores the theoretically implied heterogeneity among post-conflict (consolidated vs. fragile peace). If we correctly model this heterogeneity with a split-population approach, we should arrive at an improved prediction of the conflict recurrence risk. Comparing the predicted shape parameters of Model 1 and 2 in Table 1 already suggests that the hazard dynamics considerably differ. The plots in Figure 5 reaffirm this initial insight. The left panel compares the predicted recurrence hazard of the simple log-logistic duration model (blue) with the actual hazard (grey) as the post-conflict peace duration increases. The right panel illustrates the same comparison but between predicted recurrence hazard of the split-population log-logistic duration model (blue) with the actual hazard (grey). In our sample the hazard of recurrence peaks after roughly 4 years. However, the simple model estimates this peak after 12 years and overestimates the hazard of recurrence as the peace duration increases. In contrast, the split-population approach leads us to estimate hazard dynamics that are much closer to the empirical distribution. Even though the estimated hazard is delayed by 4 years, it comes

extremely close to the actual hazard in the sample. This insight provides further support for our theoretical argument that we should distinguish between cases that experience fragile ($Pr(recur) > 0$) and consolidated peace ($Pr(recur)=0$).

Figure 5: Hazard of conflict recurrence. Predicted recurrence hazard of the simple log-logistic model (blue), predicted recurrence hazard of the split-population log-logistic model, and actual recurrence hazard in the sample (grey). Estimates based on Model 1 and 2.



6 Conclusion

This paper provided a theoretical argument and statistical evidence that substantiate a distinction between consolidated and fragile post-conflict peace periods. We provided analytical evidence that if governments can make credible commitment to challengers, the probability of recurrence is virtually zero. We argued that governments are more likely to be credible if their promises are guaranteed by democratic institutions. Governments which cannot rely on institutions that increase their credibility might also circumvent conflict recurrence, but

they face a positive probability of conflict. Therefore, our theoretical framework implied two different peace dynamics; (1) consolidated peace were $Pr(recur) = 0$ and (2) fragile peace were $Pr(recur) > 0$.

To explicitly model the theoretical implication of heterogeneity within the peace duration sample, we implemented a split-population estimation approach. This allowed us to model whether a given case belongs into the risk set (fragile peace), and if it does, simultaneously assess the factors that impact on the timing of recurrence. We find strong support for our hypotheses that democratization and democratic institutions increase the probability of consolidated peace. In addition, we demonstrate that one-population estimates underestimate the hazard of quick recurrences and overestimate the risk of another armed confrontation later in time.

Having outlined some of the key findings of this paper, there are also important limitations of this study that should be addressed in future versions. The next step of this project is to theoretically and empirically endogenize the decision of the post-conflict government to democratize. In this version of the paper we focused on the consequences of an institutional choice and “black-boxed” the actual decision. We admit that this is a weakness of this study, which we will address in future versions of this paper.

In addition, while we argue that democratic institutions are most likely to support the credibility of the government, some authors have argued that autocratic regimes are also able to implement mechanisms that allow the government to make credible promises (Magaloni 2008). Hence, we would like to distinguish between different autocratic regimes to explore whether we find evidence for such arguments. One way of addressing this challenge is to parse the Polity measure into its individual components, which will also allow us to further validate the robustness of our findings (see Vreeland 2008).

Finally, we want to allude to some more general implications of this paper. It seems reasonable to assume that not only recurrence, but also civil war onset and even inter-state

conflicts are driven by theoretically distinguishable and separable mechanisms. Based on our results there is reason to believe that we should differentiate between factors that impact on *when* and *whether* conflict occurs. We also highlighted that some existing theories already imply split-populations but that they have not been estimated according to their empirical implications. Therefore, our paper may contribute to a new avenue of research in peace and conflict research that theoretically and empirically takes into account separate mechanisms for (1) being at risk of experiencing conflict and (2) the timing of conflict if this risk exists.

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