

The Dynamics of Civil War Duration and Outcome*

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Civil wars have several outcomes: government victory, rebel victory, truce, or treaty. This analysis models state capacity as a theoretical starting point to underpin hypotheses on duration and outcome. To test these hypotheses, multinomial logit and competing risk survival analysis are utilized. These methods allow for the examination of each outcome and its respective duration dynamics. Logit tells us what shapes the probability of each outcome, and hazard analysis identifies the factors that determine the time to each outcome. The models examine the years 1944 to 1997 and find that state capacity is involved in outcome and duration in at least two important ways. An effective state bureaucracy undermines the rebels, but a strong government army does not necessarily enhance the government cause. UN intervention decreases the probability of both government and rebel victory, while increasing the likelihood of a treaty or truce. In addition, rebels have a decreased probability of winning ethnic wars. Forest cover hinders rebels and treaties, while mountain cover tends to help rebels. African wars are harder for governments to win. African wars and ethnic wars are longer.

Introduction

Civil wars fundamentally differ from interstate wars. Not only do the parties typically continue to exist within the same borders after the war concludes (Licklider, 1995), but defeat could mean the loss of existence. The

high stakes generally make compromise difficult (Licklider, 1995). Given these challenges, what goes into the calculations rebels and governments use when deciding to end or continue a civil war? Recent scholarship has focused intensively on the 'greed vs. creed' question (see Collier & Hoeffler, 1999; Collier & Hoeffler, 2002a; de Soysa, 2002). These studies attempt to explain the outbreak and duration of civil wars based on political, ethnic, and economic grievances, and typically theorize from the perspective of the non-state combatants.

In the past few years, attention has turned back to the role of the state in civil wars. One such line of inquiry probes the effect of

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domestic institutional structure on civil war (see Reynal-Querol, 2002). Mason, Weingarten & Fett (1999) examine how state capacity affects the rebel decision to keep fighting. Fearon & Laitin (2003: 75–76) take state capacity further, positing that ‘financially, organizationally, and politically weak central governments render insurgency more feasible and attractive due to weak local policing or inept and corrupt counterinsurgency practices’. Snyder (2001) observes that the incapacity of the state can enhance the opportunities of insurgents to benefit from resource extraction.

Following from these studies, this analysis further investigates the role of the state in civil war outcome. The interactions of rebels and government ultimately determine the course of events in a civil war. For instance, a strong government may force the rebels into hiding, paradoxically increasing the length of the war. Or it may inadvertently push people into the rebel’s camp by using its ‘power’ in an attempt to achieve a quick victory. In either case, the interactions between the insurgency and government critically impact the outcome and duration of civil wars.

This article also examines civil wars within a competing risks framework, that is, differentiating between the various outcomes. Civil wars generally have several conclusions: government victory, rebel victory, truce, or treaty (Mason, Weingarten & Fett, 1999). What factors lead to any given resolution? In addition, how long will it take to achieve a given end? These questions are intimately linked. For example, would a government be willing to fight towards a victory that would take 15 to 20 years to achieve, or would it seek a treaty that would end the fighting in a number of months. Governments and rebels make decisions with both the outcome and expected duration in mind. This method of investigation allows us to more clearly

differentiate the causes (or correlates) to any given outcome.

To link these concepts, a multinomial logit and competing risks survival analysis are used. The logit indicates what shapes the probability of each outcome, and hazard analysis identifies the factors that determine the time to each outcome. The alternative of placing all war terminations in one category may waste important information and ultimately be misleading, particularly if factors that increase the probability of one outcome decrease the probability of another.

Understanding the paths to various conclusions is also important because they lead to numerous postwar environments. Licklider (1995) found that negotiated settlements are less stable than military victories because military victories usually involve the elimination of one of the combatants, although genocide is more likely after military victory. Doyle & Sambanis (2000), on the other hand, found that treaties signed at the end of war lead to more successful peacebuilding. The relationship between outcome and postwar environment makes it important to understand the dynamics behind the various outcomes.

Linking the models should also reveal interesting facets of rebel and government decisionmaking. Here the key issue is whether actors will keep fighting or quit and seek a settlement. The following analyses adopt Mason & Fett’s (1996; see also Mason, Weingarten & Fett, 1999) general framework of exploring the decision to keep fighting or seek negotiated settlement (treaty). This approach is particularly useful as it captures the relevance of duration to the decision calculus. This analysis does not, however, adopt their assumption that the rebel goal is necessarily victory. As Collier, Hoeffler & Soderböm (2004) argue, the rebel decision to fight or quit could very well be tied to its ability to remain viable and avoid military defeat.

The next section examines the previous work on onset, duration, and termination of civil wars. From this literature, a number of rebel- and state-centric variables will be derived that should influence the outcome and duration of civil wars. The article concludes by looking at how these variables affect the outcome of civil wars.

Previous Research

The factors that lead to government victory in civil war may differ from those that lead to rebel victory, truce, or treaty. In general, military victories by either side are decisive outcomes, whereas a truce is simply a cease-fire and treaties carry guidelines for future action. Clearly, each outcome leads to a different postwar environment. For example, a rebel victory means a new government that is likely far removed from the old one, while a government victory may mean annihilation of the rebels with no effort to address the underlying causes of the war. Truces may leave rebel grievances simmering just below the surface likely to re-emerge, but treaties could produce a stable peace. Failing to consider how outcomes affect the postwar environment may lead scholars to miss important aspects of rebel and government decisionmaking. Our analyses look at four civil war outcomes (government victory, rebel victory, truce, and treaty). Leaders in both the rebel group and government choose their actions for the expected outcome.

Collier's rebellion-as-business, or greed/viability, model implies that revisionist actors start a war and/or maintain it as long as they are able to find forest or mountain cover and obtain adequate funding (see Collier, 1999b; Collier & Hoeffler, 1999). For these models, surviving rather than outright military victory might be the rebel goal, thus implying a long time-horizon. Several factors can add to the rebels' ability to prolong (and desire to start) the war (lootable resources,

forest cover, mountain cover, and number of borders: see Buhaug, Gates & Lujala, 2002; Collier, 1999b), but these same factors may ultimately limit their ability to win.

Aside from greed and viability, grievance models argue that rebels fight because of ethnic identity issues or economic shortcomings (Collier & Hoeffler, 1999). These grievances prolong wars as rebels continue to fight and attract new recruits. In addition, the indivisibility of the issues may limit the ability to seek a truce or treaty. The greed and grievance models are not mutually exclusive, but they point to differing rebel motivations for starting and continuing the war. Understanding what factors most influence outcomes and durations will point to possible solutions.

In addition to greed and grievance – two rebel-centric concepts – this article also considers the role of the state as a participant in civil war. Humphreys (2002: 17) observes that if rebel movements endure because of viability alone, then what is 'preventing these parties from doing equally well or better during peacetime?' The rebel-centric approach essentially underemphasizes the importance of state capacity and grievances by focusing on viability (see Snyder, 2001). One can expand their analyses by looking more closely at the role of state capacity. Skocpol's (1979) theory of the maladaptive state provides a good base to form expectations about the role of the state in civil war duration and outcome. This project uses state capacity not as a single concept, but as a label for a series of characteristics. This is useful because the effects of the various elements of state capacity on civil war outcomes may differ even though they are conceptually linked.

Goodwin & Skocpol (1989; see also Li, 2002; Schock, 1996) focus on democracy, bureaucratic effectiveness, and size of army. The Skocpol argument essentially centers on explanations of state disintegration (see also

Hobson, 2000; Li, 2002). When examining the onset of civil war, these 'state capacity' factors should prevent its outbreak and make it easier for the government to hold the state together. Democratic regimes are thought to make for fewer radicalized elements because they are, by definition, less exclusionary and provide an outlet for resolution of ethnic conflict (Gurr, 2000). A large army can better control borders and hinterlands, thus allowing rebels fewer safe havens. An effective bureaucracy is able to police rural areas, thereby controlling national territory, and provide services that make citizens less rebellious (Fearon & Laitin, 2003).

This concept of state capacity is less clearcut when applied to war outcome and duration. For example, democracy and military might represent two very different forms of dealing with civil conflict. It is still useful, however, as a theoretical starting point that can underpin hypotheses on duration and outcomes. In general, increases in democracy, bureaucratic effectiveness, and the size of the army will be linked to lower chances for military victory (rebel) and greater chances for negotiated settlements. The use of these three types of state capacity affords us a look beyond what 'balance of power' military capacity approaches can tell us (e.g. Balch-Lindsay & Enterline, 2000; Mason & Fett, 1996). Looking at military capacity alone in a non-competing risks setting ignores possible outcomes such as a democratic state, with a strong military, forgoing military victory in favor of a treaty.

In terms of outbreak, Collier & Hoeffler (1999; see also Collier & Hoeffler, 2002a), Goodwin & Skocpol (1989), and Elbadawi & Sambanis (2002) note that civil war may be less likely in a democratic state as grievances are better addressed and the government more efficient. Democracy could also lessen problems inherent in states with a multitude of ethnic groups. Of course, lack of democracy could just as readily be listed

as a grievance. But in terms of duration, authoritarian governments with large armies and effective bureaucracies could put down rebellions quite easily. For example, in Latin America authoritarian governments have often been quite harsh and willing to go some length to eradicate rebels (Goodwin & Skocpol, 1989: 497). Fearon (2004), however, finds that democracy has no impact on civil war duration.

Hypotheses are rather straightforward when considering the length of *all* civil wars. They become more complicated in a competing risk setting. Mason & Fett (1996) found that wars that end in settlement take longer than rebel or government victories; that is, military victories are more likely early on. There may be differences, however, between time to government and rebel victories. Rebels may be able to win a *fait accompli* before the government can mobilize its defenses. Further, rebels may not feel the need for a quick victory if they can prolong the fighting long enough for the government to agree to negotiations (Mason & Fett, 1996; see also Mason, Weingarten & Fett, 1999). For example, in 2003 Chechen rebels told Moscow that only negotiations would bring about peace in the province. The rebels seem to be indicating that a negotiated settlement outcome is preferred over the government's desired referendum (and, of course, over government victory).

The above discussion leads to some broad generalizations about the correlates of civil war outcomes and duration. Recall that Fearon & Laitin (2003) show civil wars to be less likely in states with capacity. This finding should be relevant to outcome and duration. In particular, state capacity should add to the time it takes for rebels to win and decrease their overall chance of victory (see Mason, Fett & Weingarten, 1999). In addition, democracies should be able to better address grievances and work towards negotiated settlement, increasing the likelihood of a

negotiated settlement. Bureaucratic effectiveness, which captures a government's effective penetration into all of its territory and its ability to provide goods and services even in times of regime change (Goodwin & Skocpol, 1989; Knack, 2001; Schock, 1996), should increase the probability of government victory (or at least decrease odds of a rebel triumph). Last, because a strong government army can spread out and make it hard for rebels to gain territory and a quick victory (Balch-Lindsay & Enterline, 2000), it follows that a strong government army should decrease chances for a quick rebel triumph.

The predictions from the literature may not tell the whole story, especially when dealing with state capacity. The Mason & Fett (1996: 549) model implies that when the likelihood of military victory is high for one side, the chances for treaty are low. If rebels are not necessarily interested in winning and have the ability to prolong the war, then probability of settlement may go up. Thus, while Mason & Fett (1996: 550) predict government army will reduce the chance of settlement because the government has a higher probability of winning, the rebels may simply go into hiding. In this case, the army might increase the chance of rebels quitting the active fight to seek a settlement. While this may decrease the odds of a rebel victory, it also serves to deny the government an outright victory and increase the length of the war. This rebel action will only be made possible with access to viability-enhancing factors such as rough terrain, lootables, access to arms, a diaspora, or friendly allies. In other words, viability may kick in when the rebels know their own military victory is a long shot. Paradoxically, then, a strong army, or state, may increase the chances that the rebels will decide to quit engaging in direct combat, which prolongs the war and limits the ability of the government to gain a decisive victory.

Put differently, the factors that make it

more difficult for the rebels to achieve victory and add to the time to rebel victory (e.g. democracy, ethnicity, effective bureaucracy, and government army) could increase the chances for a negotiated settlement rather than a military victory by the government. These are cases where government has not quickly won and the rebels have prolonged the war. As war gets longer, each side will estimate that it will keep going, and this reduces the expected utility of a potential victory because the costs will have gone up. Mason & Fett (1996: 552) note that

duration is a variable that can offset an imbalance of coercive capacity between [government] and [rebels] . . . even when one has an advantage in military capacity and therefore should have a greater likelihood of victory. Indeed, the effect of duration on the likelihood of a settlement is part of the classic guerrilla strategy: avoid losing for a long enough period of time so that the accumulated costs of conflict for the government undermine its level of popular support and its ability to wage war.

Fearon (2004) also offers an explanation for this paradox. He explains civil war duration using a game-theoretic model of credible commitments that suggests that settlement is more likely when the government's army is strong. He argues it is too simplistic to think in terms of only balance of capabilities when predicting rebels or government victory. He shows that negotiated settlements are more stable when the state is militarily strong. Specifically, a strong state military means that rebels value war less when expected duration is held constant. Strong governments then find it easier to abide by terms of a treaty in the long run if the state later becomes stronger and considers renegeing. When the government military is weaker, rebels value fighting more and will demand more from a deal. Governments then find it harder to abide by such a deal if it becomes stronger in the future.

This project approaches this research by

looking upon civil war as a pathology of the state. They are linked by the fact that the state has failed to prevent the war in each case. Subsequently, our three main hypotheses that follow attempt to theoretically link state capacity, outcome, and duration.

In general, a strong state limits the ability of the rebels to achieve an outright military victory. This forces them to either concede to fight, or retire and seek a negotiated settlement (assuming that the viability factors remain).

H1: State capacity decreases the probability of a rebel victory.

State capacity does not necessarily translate into a government victory. While it may increase the government's ability to militarily defeat the rebels, it also increases the probability that the rebels will quit the active fight. In addition, the use of a strong army may increase the grievance against the government, which increases the viability of the rebels. This translates into state capacity having a limited effect on the probability of government victory, while it increases the duration to that outcome. Furthermore, several studies have shown that democracies are less willing to take the drastic steps needed to wipe out less capable opponents (see e.g. Merom, 2003). This implies that the chances for government victory are higher early on and then decrease as duration increases. This ties together outcome and duration.

H2: The impact of state capacity on the probability of government victory is indeterminate and dependent on factors identified in grievance and rebellion-as-business arguments.

Based on Fearon (2004) and the above discussions, one can hypothesize that the impact of state capacity on negotiated settle-

ment is more clearcut. In particular, it increases the probability of a negotiated settlement, while decreasing the expected duration to this outcome. This would especially be the case if state capacity has little or no effect on government victory. In these situations, the government can limit the rebels' success, but not necessarily secure victory for itself. There is some evidence that democracies are more willing to accept negotiated settlements.

H3: State capacity increases the probability of a negotiated settlement.

Research Design

Data

This study uses data from Doyle & Sambanis (2000), and unless otherwise noted, variables are drawn directly from their research. The dataset contains 114 civil wars in 53 states. This analysis has complete data for 92 of these wars. Six of the wars are coded as ongoing and are right-censored. The cases identified by Doyle & Sambanis as questionable (coded as 7 in their data) are not included in the final sample. Variables are measured at the beginnings of wars, as is standard in most studies of duration (e.g. Collier, Hoeffler & Söderbom, 2004; Elbadawi & Sambanis, 2000). The time period covered is 1944 to 1997.

Doyle & Sambanis (2000) define a civil war as a conflict that (1) has caused more than 1,000 battle deaths; (2) has challenged the sovereignty of a state; (3) occurred within the boundaries of a state; (4) involved the state as a participant; and (5) involved rebels who launched a campaign that opposed the state and could inflict casualties.

This differs from the Correlates of War (CoW) coding (Sarkees, 2000) in two main ways. First, CoW requires that the battle-death threshold be maintained every

year, whereas Doyle & Sambanis count a civil war if it breaks the 1,000 battle-deaths barrier in one year. The second major difference is how Doyle & Sambanis code termination. Hostilities that occur within two years after the conclusion of peace are coded as a new civil war. Because of the coding differences, the Doyle & Sambanis dataset contains slightly more cases than the CoW.¹

In any given time period, a civil war can have one of four outcomes: victory by the government, victory by the rebels, a treaty, or a truce (ceasefire with no final settlement). The comparison category is ongoing war. Doyle & Sambanis (2000) code a civil war termination when there is a victory (government or rebels) or a settlement (truce or treaty). We use this to create our first dependent variable (*outcome*), specified as government victory, rebel victory, truce, treaty, or ongoing. Our second dependent variable – *duration* – is measured in months. Following Mason, Weingarten & Fett (1999), this research also controls for a possible curvilinear effect of duration on outcome by including the square of duration (*duration*²).

Fearon (2004) notes that prior theory provides only an incomplete guide and there is no consensus on which variables to use to model civil war duration. The key explanatory variables in our models of duration and outcome revolve around *state capacity*, examined using three individual measures (democracy, bureaucracy, and army). Balch-Lindsay & Enterline (2000) and Enterline & Balch-Lindsay (2003) stand out as some of the first studies to consider these variables in models of civil war duration.

The *democracy* variable is taken from the Polity III data and is the democracy minus autocracy values (see Collier & Hoeffler, 2002a).² Bureaucratic quality (*bureaucracy*)

is measured on a 0–6 scale by experts from Political Risk Services and is downloaded from the State Failure Task Force Data Page (2003).³ This measure has been used in other studies as a reliable indicator of state efficacy (see e.g. Knack, 2001; Simmons, 2000). A government has an effective bureaucracy when there is a regular process for recruiting and training bureaucrats; when the bureaucracy is protected from political pressure; and when it has the ability to provide services and expertise even in the face of government changes (Knack, 2001: Appendix). This last feature is most relevant when civil war is an issue in a country. Government army size (*army*) per 1,000 inhabitants is measured by dividing the size of the army by the total population (see Balch-Lindsay & Enterline, 2000; and Mason, Weingarten & Fett, 1999).

This study uses four control variables to account for the greed and viability arguments. These measures come largely from the work of World Bank researchers (e.g. Collier & Hoeffler, 2002a). Forest cover (*forest*) is the percentage of the country covered in forest. These data are from the UN's Food and Agriculture Organization (www.fao.org/forestry). Mountain cover (*mountain*) is the percentage of the country covered in mountains; the mountain data are from Gerrard (2000) as provided in Collier, Hoeffler & Söderbom (2004). To capture the ability of the rebels to exploit primary products for their benefit (i.e. viability), the analyses use a measure of the portion of exports based on primary commodities (*exports*) to proxy natural abundance (Collier, Hoeffler & Söderbom, 2004; see also Le Billon, 2001). This is the same variable used by Collier (see Collier, 1999b; Collier & Hoeffler, 1999) and others (see e.g. Buhaug, Gates & Lujala, 2002; Reynal-Querol, 2002). Last, income inequality (Gini

² Converted to a 1–21 scale.

³ These data are available only back to 1982. For those years in the dataset before then, we used the 1982 value.

¹ For example, Mason, Weingarten & Fett (1999) use the CoW data and examine 83 civil wars after 1945.

coefficient) is used as a rough measure of grievances (*Gini*) (see Collier, 1999b; Fearon & Laitin, 2003).

The literature points to additional control variables. In particular, the models include logged population (*log pop*) and income (*log income*) as controls. Civil wars appear to be shorter at higher income levels while countries with more people have longer wars (Collier, Hoeffler & Söderbom, 2004). These two variables are logged to account for decreasing marginal effects. Several studies have shown identity, ethnic, and religious wars to be exceptionally long and intractable (e.g. Licklider, 1995). As such, *war type* is coded as 1 in cases of ethnic, religious, or identity wars, and 0 otherwise. In addition, like Elbadawi & Sambanis (2000) and Collier (1999a), the analyses control for wars in *Africa* because it is unique as a region. First, it experiences the highest number of wars that are more violent (Elbadawi & Sambanis, 2000). Africa is also unique in terms of democracy levels and has the most ethnically diverse countries. Collier & Hoeffler's (2002b) study of the continent shows that Africa is the *only* region where armed conflict is on the rise. They note that the structure of risk of civil war differs from that in other regions. In terms of duration, social costs to rebellion coordination are higher for rebels in Africa because of religious and ethnic fractionalization.

The number of *borders* measures the number of states contiguous to the civil war state (see Regan, 1996). It is important to note that borders may also be indirectly considered a rebel viability factor (e.g. rebels might be able to cross a border and receive aid and shelter from a friendly regime). Regan (1996) finds that as the number of borders increases, the lower the likelihood for intervention. He posits (1996: 60) that this is because a collective action problem can result in an area where many borders converge, where states fear that intervention

can lead to deeper involvement, lower chance for consensus, and a lower likelihood of any one country being successful.

UN intervention has the potential to quickly end a war, but it is often associated with longer and more intractable wars. A dummy variable (*UN*) is specified to capture UN intervention. This variable is derived from Doyle & Sambanis (2000) and is coded as 1 for those civil wars in which the UN intervenes. The ethnic heterogeneity index (*ethnicity*) is based on racial, religious, and linguistic divisions and is taken from Doyle & Sambanis (2000) and Vanhanen (1999). The variable is an additive index that ranges from 0 (least heterogenous) to 144 (most heterogenous).

Methods

We employ two specific methods. First, we test a model specified with the dependent variable (outcome). Because the terminations contained in outcome are nominal (not ordered), we test a multinomial logit model. Long (1997) provides one of the seminal discussions of the treatment of nominal data with multiple outcomes and the interpretation of multinomial coefficients.⁴ Next, we test competing risks hazard models so that we can explore the temporal dynamics surrounding these outcomes.

An important consideration must be made of the potential for the type of selection effects that often hamper social science research (Regan, 2000; see also Fearon, 2004). In this case, there is a possibility of selection effects brought on by rebel actions. For instance, rebels may never initiate war against states with strong armies and effective government. This might lead to data that are biased towards strong rebel movements and therefore a greater likelihood of negotiated settlement

⁴ Huth & Allee (2002) provide a useful discussion of the use of multinomial logit in conflict research.

rather than government victory. This may not be a debilitating problem. First, there are clear examples of small-scale insurgencies rising up against notably stronger government armies, such as in Cuba, Burma, Northern Ireland, Chechnya, and Guatemala. Second, expected duration does not seem to matter to rebels (Collier, Hoeffler & Söderbom, 2004). It may be that rough terrain and revenue-raising opportunity can reduce the need to be able to face the government head-on militarily. Collier (1999b; cited in Elbadawi & Sambanis, 2002) notes that short-term viability can help rebels overcome the military 'entry threshold' problem.

Results

Table I presents the results of the multinomial logit analysis. The overall fit of the model is quite strong. The multinomial coefficients must be interpreted in the context of the base category (ongoing war) and the other coefficients for that variable (see Long, 1997). With this in mind, Table II presents more straightforward information in the form of the probability of each outcome for given values of the independent variables. Table II also uses the Clarify program to describe how changes in each variable influence the probabilities of the various outcomes of civil wars.⁵

The discussion is focused on the variables

that are significant in Table I. Both the state capacity and rebellion-as-business measures play roles in determining outcomes. Of the state-centric variables, bureaucracy and army appear most important. In particular, states with a strong and efficient bureaucracy have the ability to stave off rebel victory. A strong bureaucracy does not apparently translate into a government victory. In fact, a strong and efficient bureaucracy has a negative effect on government victory, although it is not statistically significant. Government army appears to increase the probability of each outcome over the probability of the base category of ongoing war. Further, Table II implies that an increase in army size from the 25th to the 75th percentile scarcely changes probabilities of outcomes, although it does decrease the probability of a civil war continuing by a factor of 10. Regime type does not appear to be statistically significant.

One of the strongest predictors of the outcome of civil wars is the intervention of the UN. When the UN intervenes in a civil war, it increases the probability of both truce and treaty. This may be because the UN is more likely to intervene in those civil wars that have become protracted. Rebels appear to have a decreased probability of winning ethnic, religious, or identity civil war, especially in extremely heterogeneous states. Rebels have an increased probability of winning civil wars in states with many borders. This may be because rebels are seeking shelter in other countries or because neighbors do not want to intervene due to collective action problems (see Regan, 1996).⁶

The geography variables appear to have disparate effects. In particular, a civil war in a highly forested state has a significantly decreased probability of ending in a government or rebel victory, truce, or treaty. In

⁵ The Clarify program 'uses stochastic simulation techniques to convert the raw output of statistical procedures into results that are of direct interest to researchers' (Tomz, Wittenberg & King, 2001: 1; see also King, Tomz & Wittenberg, 2000). After estimating an equation, Clarify saves 1,000 (default) simulated parameters based on the model's variables. These simulations are drawn from the asymptotic sampling distribution of the variables (Tomz, Wittenberg & King, 2001: 5–6). Variables can then be manipulated and quantities of interest generated. In this case, we use Clarify to generate the probability of each outcome. Dichotomous variables are changed from 0 to 1. Variables not changed are held at their means. Democracy and Gini are removed from Table II to simplify the presentation. Their inclusion generates essentially the same results (available from authors).

⁶ One reviewer pointed out that many borders often means a state that is large and therefore is forced to spread its military thinly.

Table I. Multinomial Logit: Civil War Terminations, 1944–97

Variable	Outcomes			
	Government	Rebel	Truce	Treaty
Bureaucracy	-.38	-7.09**	1.36	-.40
	.84	2.81	2.21	.65
Democracy	-.21	.13	-.17	.08
	.18	.27	.34	.13
Army	.26**	.31**	.57***	.29***
	.11	.14	.139	.10
Duration	-.12*	-.03	.06	-.14**
	.06	.11	.09	.06
Duration ²	.0002	-.0003	-.00008	.0004**
	.0002	.0006	.00028	.0002
Exports	53.75*	80.59	427.00***	59.31**
	31.04	35.90	118.65	30.33
Gini	.12	.25	-2.12***	.06
	.20	.22	.66	.18
Borders	1.17**	3.20***	3.86***	.93*
	.53	1.03	1.11	.48
Ethnicity	-.03	-.18***	-.15***	-.00
	.03	.06	.05	.02
War type	-3.58	-17.92***	46.55***	-2.45
	2.51	6.99	14.37	2.43
UN	1.88	-9.76	53.44***	6.23***
	2.49	6.56	15.21	2.18
Forest	-.12*	-.57**	-.77***	-.12*
	.07	.27	.24	.07
Mountain	-.18**	.26**	.69***	-.10
	.09	.11	.24	.07
Africa	-14.86***	3.08	-37.89***	-9.92***
	4.13	5.79	9.91	3.69
Log population	1.59	.37	6.09***	.83
	.98	1.52	1.83	1.03
Log income	-5.26***	-4.78*	-14.14***	-3.78*
	1.95	2.60	4.27	2.07
Constant	24.14	37.72	-50.31	17.73
	17.81	32.01	28.96	20.35
Number of observations	92			
Wald chi-squared (52)	354.79			
Prob. > chi-squared	0.0000			
Log likelihood	-47.14			
Pseudo R ²	0.65			

* $p < .10$, ** $p < .05$, *** $p < .01$.

Ongoing war is the comparison group.

Numbers below coefficients are robust standard errors.

Table II. Probabilities and Expected Durations Based on Reduced Model

<i>Effect</i>	<i>Ongoing</i>	<i>Government</i>	<i>Rebel</i>	<i>Truce</i>	<i>Treaty</i>	<i>Duration</i>
Baseline	.003(.00,.03)	.64(.30,.89)	.007(.00,.06)	.05(.00,.30)	.31(.07,.65)	65
Bureaucracy 25th	.003(.00,.02)	.69(.27,.92)	.04(0,.31)	.03(.00,.29)	.24(.05,.60)	56
Bureaucracy 75th	.004(.00,.04)	.56(.21,.86)	.003(0,.02)	.08(.00,.36)	.35(.07,.74)	73
Army 25th	.02(.00,.15)	.63(.29,.88)	.007(.00,.04)	.04(.00,.28)	.30(.07,.65)	63
Army 75th	.002(.00,.02)	.64(.29,.89)	.007(.00,.07)	.05(.00,.31)	.30(.07,.64)	65
Dur./dur. ² 25th	.002(.00,.01)	.64(.27,.89)	.01(.00,.09)	.04(.00,.38)	.31(.07,.67)	–
Dur./dur. ² 75th	.02(.00,.08)	.50(.16,.80)	.01(.00,.06)	.06(.00,.43)	.42(.14,.73)	–
Exports 25th	.015(.00,.10)	.68(.30,.92)	.01(.00,.05)	.02(.00,.16)	.28(.05,.66)	71
Exports 75th	.003(.00,.03)	.61(.27,.88)	.007(.00,.06)	.06(.00,.37)	.31(.08,.65)	64
Borders 25th	.008(.00,.06)	.52(.16,.85)	.006(.00,.04)	.05(.00,.32)	.41(.08,.82)	77
Borders 75th	.002(.00,.02)	.70(.33,.92)	.01(.00,.10)	.04(.00,.37)	.25(.06,.57)	61
Ethnicity 25th	.003(.00,.02)	.65(.25,.92)	.01(.00,.12)	.10(.00,.45)	.23(.02,.64)	59
Ethnicity 75th	.004(.00,.03)	.60(.26,.86)	.01(.00,.04)	.03(.00,.32)	.36(.11,.68)	69
No ethnic war	.003(.00,.02)	.51(.13,.85)	.23(.01,.76)	.004(.00,.04)	.26(.03,.66)	58
Ethnic war	.003(.00,.02)	.50(.16,.83)	.004(.00,.01)	.24(.02,.68)	.25(.04,.63)	70
No UN	.005(.00,.03)	.79(.38,.97)	.02(.00,.14)	.03(.00,.34)	.15(.02,.47)	64
UN	.002(.00,.01)	.25(.06,.57)	.004(.00,.02)	.18(.03,.48)	.57(.27,.83)	69
Forest 25th	.002(.00,.02)	.56(.26,.81)	.05(.00,.30)	.05(.00,.24)	.33(.10,.67)	60
Forest 75th	.006(.00,.04)	.65(.13,.94)	.01(.00,.01)	.07(.00,.70)	.26(.03,.70)	69
Mountain 25th	.002(.00,.01)	.73(.40,.93)	.002(.00,.01)	.03(.00,.17)	.24(.06,.58)	57
Mountain 75th	.008(.00,.06)	.47(.08,.86)	.05(.00,.50)	.09(.00,.70)	.38(.06,.83)	79
No Africa	.0007(.00,.01)	.74(.32,.95)	.004(.00,.02)	.07(.00,.48)	.18(.04,.48)	50
Africa	.17(.01,.66)	.20(.02,.62)	.14(.00,.69)	.01(.00,.08)	.47(.06,.91)	131
Log pop. 25th	.001(.00,.002)	.45(.00,.99)	.004(.00,.01)	.44(.00,.99)	.10(.00,.96)	56
Log pop. 75th	.02(0,.02)	.25(.00,1)	.01(0,.00)	.62(.00,1)	.09(0,.99)	70
Log income 25th	.001(.00,.01)	.68(.20,.93)	.005(.00,.03)	.08(.00,.59)	.23(.05,.50)	56
Log income 75th	.02(.00,.11)	.56(.11,.93)	.01(.00,.12)	.02(.00,.15)	.39(.04,.86)	102

First five columns are mean probabilities based on Clarify after multinomial logit; numbers in last column are predicted length of civil war in months after Weibull non-competing risk regression; 95% confidence intervals are in parentheses. Variables not being manipulated are set to mean; dummy variables (Africa, UN, war type) set to 0 in first instance and 1 in next. Duration effect is based on duration and square of mean duration being manipulated together. Probabilities may not add up to 100% due to rounding.

other words, forest cover increases probability, wars will continue (e.g. Colombia, Guatemala). Civil wars in mountainous states have a significantly decreased probability of ending in government victory and increased probability of ending with rebel victory or truce.

Primary commodity exports increase the probability of government victory, truce, or treaty. Interestingly, primary commodities do not seem to help rebel victory. Grievances appear to have a slight effect on the outcome of a civil war. States that have an exceptionally unequal distribution of income (large grievances) have civil wars that are less likely to end in truce. African civil wars appear less likely to end in government victory, truce, or treaty when compared to the ongoing category. Population increases likelihood of truce, while the log of income decreases all likelihoods. Duration decreases the probability of a government victory and treaty. The square of duration is significant only in the case of treaty but is not negative as would indicate a curvilinear relationship.

Table II contains a number of interesting results. The baseline probabilities (with all covariates set to mean) reveal that government victory (64%) and treaty (31%) are the most likely outcomes. The model predicts that rebel victory is a rare event. The values in the table provided the expected probability for each outcome given that all variables are set to their means and a given variable is set to an alternate value. This method provides a more intuitive method of analyzing multinomial regressions.

The state capacity variables have a number of interesting results. First, an effective bureaucracy provides a boon to the government. While it does not significantly change the probability of a government victory, moving from the 25th to the 75th percentile decreases the probability of rebel victory by over 80% (0.04 to 0.003).

The size of the army has an interesting

effect. Table II indicates that increasing the size of the army only seems to decrease the probability that a civil war will be ongoing. What explains the rather paradoxical finding that army size does not seem to help governments win? First, it remains possible that a selection effect is at work in that the only rebels who fight a government with a larger army are powerful rebels. If this happens, then army size acts as a deterrent and acts most strongly against the onset of civil wars. Once the civil war begins, the large army is in some ways doomed to fail. This argument, however, misses the point that civil wars differ fundamentally from interstate wars.

Governments with large armies certainly have a greater capacity to fight large, decisive engagements, but perhaps civil wars are not fought in this manner (see Merom, 2003). In civil wars, a large army capacity may act as a detriment in that its use incurs more grievances against the government. A powerful army that uses its superior firepower to beat up on a supposed 'weakling' rebel movement may simply push more people into the arms of the insurgents and send them into hiding.

Many of the other variables in Table II do not lead to major changes in the baseline probabilities upon first differencing. Borders, war type, Africa, UN intervention, forest cover, and mountain cover provide important exceptions. Increasing the number of borders increases the probability of government victory and undermines the treaty outcome. Ethnic wars are harder for rebels to win, and ethnic heterogeneity also works against the rebels. UN intervention increases the likelihood of both truce and especially treaties. Forest cover helps the government cause but undermines treaties. Mountains work against the government and help rebels. It is interesting to note that forests and mountains have very different impacts. This deserves further attention, as it is generally thought that these factors typically help rebels. If the war is in Africa, the probability of truce or

government victory lowers but that of treaty increases. State capacity might be a factor that hinders government victory in African civil wars. The duration of the civil war has two interesting effects on its outcome. Duration

decreases the probability of a government victory and increases the probability of treaty.

A competing risk hazard analysis more fully explores the effect of the covariates on civil war duration. Figures 1–3 highlight

Figure 1. Time to Rebel Victory

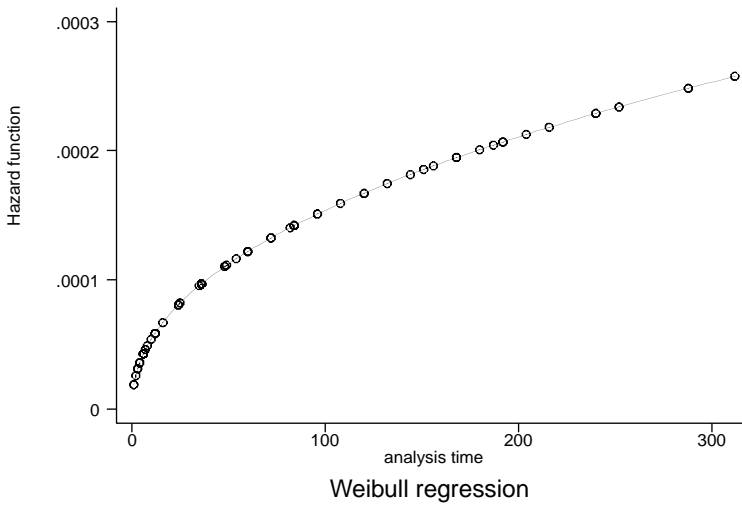


Figure 2. Time to Government Victory

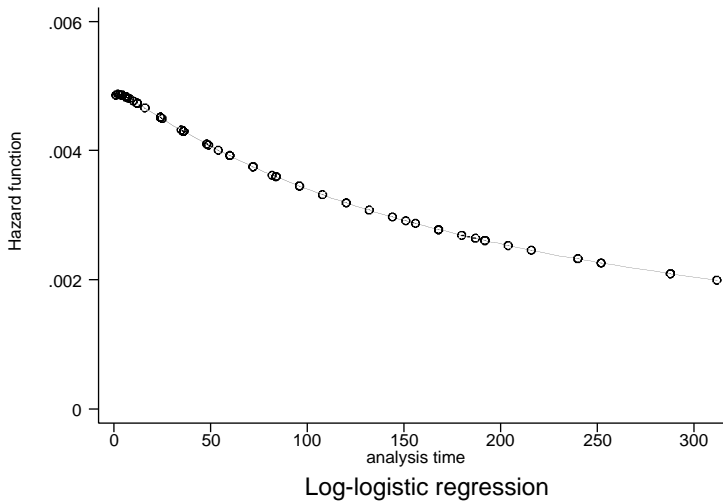
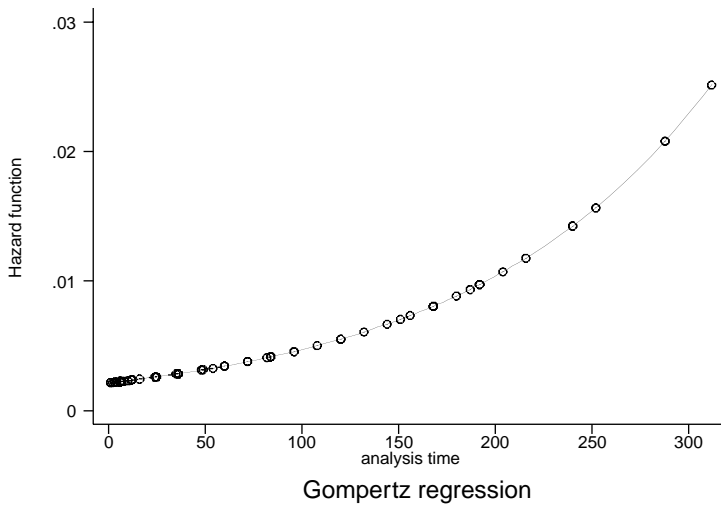


Figure 3. Time to Truce/Treaty



some of these findings.⁷ The plotted lines represent the probability of the war ending the next month, given that it has lasted to that point.

The shape of the hazard function in Figure 1 shows a unique aspect of rebel victories. The probability of rebel victory starts out low and rises quickly. If the rebels can survive the first few months, their chance of winning continues to rise. The probability is low at all points though. The hazard function for government victories (Figure 2)

predictably differs from the one for rebel victories. It is clear that the government has its highest probability of winning in the early stages. Failing this, the government's chances drop steadily over time. Rebels appear to be the beneficiaries of prolonged war.

The hazard function of truces/treaties (Figure 3) complements the two previous figures. In particular, as the probability of victory remains high (either rebel or government), the chance of a treaty or truce remains low. In those wars in which both the government and rebels fail to gain quick victories, the probability that the civil war will end in either a truce or treaty increases dramatically. Eventually, agreement becomes the most likely outcome as chances of military victory go down. These findings on duration are generally in accord with those of Mason & Fett (1996) and Mason, Weingarten & Fett (1999), who found that the longer duration is, the lower the probability of military victory and the greater the probability of a settlement.

The results of the models provide strong support for the contention that separating out the outcomes of civil wars is a useful

⁷ Results of competing risks hazard models are available in the online Appendix. Model distribution choice is based on minimizing AIC (see StataCorp, 2001: 358–359). We did not use the more flexible Cox regression because the proportionality assumption was violated (see StataCorp, 2001: 296–299). Because recurring civil wars within a state are not independent of each other (Walter, 2004), we also test the models using a setup for multiple events within the same country based on the Andersen–Gill design. Box-Steffensmeier & Zorn (2002) and Cleves (2002) provide detailed accounts of setting up recurring duration data. In the civil war data, all countries enter at time 0, and the duration increases for each month in which the civil war did not terminate. For states with multiple civil wars, the duration count resets to 0 at the recurrence of each additional civil war. The hazard ratios generated using Andersen–Gill (available in the online Appendix) are very similar, but different hazard distributions result for government (lognormal) and agreement (log-logistic) outcomes.

method of investigation. In addition, the examination of the aspects of state capacity has led to a number of interesting findings.

Conclusion

This study makes two contributions to the literature on civil wars. First, the competing risk framework provides some unique insights. Second, while many of the previous studies have concentrated on the role of the rebels (especially greed and viability factors), this research finds that state capacity plays a role.

Most previous studies of civil war duration and termination grouped all outcomes together. A civil war that ended in government victory counted the same as one that ended in rebel victory. Yet, when governments and rebels make their decisions, they do so with specific outcomes in mind (Mason, Weingarten & Fett, 1999). In addition, the expected time to a given outcome also matters, in that individuals will discount future gains for their realization today. This makes it critical to understand the paths and correlates to particular outcomes.

Our analyses generate several interesting findings. First, effective state bureaucracy undermines rebel victory (Hypothesis 1). Regime type and government army size do not appear as important to rebel victory. As previously entertained, government army size only very minimally increases the prospects of a government victory (Hypothesis 2). Regime type and bureaucracy do not seem to directly help the government. This may have to do with more democratic governments not being willing to take aggressive steps. State capacity does not appear related to negotiated settlement (Hypothesis 3).

Outside the state capacity effects, the intervention of the UN plays a crucial role in outcomes. In particular, the involvement of

the UN significantly increases the likelihood of a truce or treaty. In terms of duration, UN involvement increases the expected time needed for both government and rebel victories and decreases the time for a truce or treaty. Simply looking at duration outside the competing risk framework would miss this important role of the UN. Indeed, when all outcomes are lumped together, the UN variable is not significant.⁸ This UN effect might represent an indirect link between state capacity and settlement if it can be shown in future studies that states with greater capacity are more likely to seek UN intervention.

While some of the literature has examined civil wars in competing risk duration (e.g. Enterline & Balch-Lindsay, 2003) or multinomial outcome (Mason, Weingarten & Fett, 1999) frameworks, no one has linked the two approaches together with state capacity. The role of the state can be seen in the effects of the army and bureaucracy. While bureaucratic effectiveness has a detrimental effect on rebel victory, neither variable appears to help the government side. These results differ from the previous research of Mason, Weingarten & Fett (1999) and Enterline & Balch-Lindsay (2003). Democracy seems to have less impact on duration and outcome. Fearon (2004) similarly finds no link between polity and war onset.

These results indicate that the use of a strong army against an insurgency could exacerbate the civil war if the state cannot win an early victory. This places states in a 'catch-22', where the use of the army may win the battles, but lose the war. By not using the army, however, the government may signal weakness and encourage more resistance. Indeed, Figure 2 indicates that chances for government victory plummet if quick victory is not achieved. Relatedly, Figure 1 indicates

⁸ See online Appendix.

that time is potentially the rebel's friend. Indeed, Collier, Hoeffler & Söderbom (2004) show that expected duration does not appear to be a factor in initiating civil war. Rebels do not seem to mind waiting – particularly if military victory is not the primary goal. There is an important caveat: for time to truly help rebels seek settlement or at least remain intact long enough to build up their organization, there must be certain factors in place. Our findings demonstrate that these factors could include mountain cover, ineffective government, non-ethnic war, no UN intervention, and low levels of ethnic diversity. Ultimately, the rebels must survive the government's counter-offensive in the early stages of the civil war. This outcome may not necessarily be detrimental or unwelcomed by the rebels. More work is needed to link rebel motivations (see Walter, 2004) to duration and outcome. This study does not speak to whether rebels want to win militarily, survive and seek a favorable settlement, or simply survive for the profit to be had during war. At a minimum, rebels want to avoid military defeat.

This study of civil war proceeded from two assumptions: outcomes should be treated as competing risks, and rebel-centric approaches can be misleading. Results from models built around these assumptions generated conclusions that can be compared to extant findings. From the rebel perspectives, our findings are straightforward. It is hard for rebels to win at any time, but chances of victory rise quickly if the rebels can make it through the first months. Essentially, if the movement is viable, rebels might be expected to keep fighting in the presence of factors that prolong their victory (effective government, UN, forest cover, and ethnic wars). These analyses arrive at a bit of a paradox when considering government victory. On the one hand, if the state is led by an effective government, rebel victory is less likely.

However, increasing the state's military power advantage does not provide a great boost to its chances for success. Ultimately, this study shows that one needs to examine both sides of civil wars in order to develop a truer understanding of how they continue and end.

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