Why Do Some Civil Wars Last So Much Longer Than Others?*

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1   Questions

At the highwater mark in 1994, there were 44 on-going civil wars in almost one-quarter of the states in the international system.[1] This peak did *not*, however, represent the sudden appearance of civil war as a major international political problem with the end of the Cold War. The number of ongoing civil wars had been steadily, almost linearly increasing from 1945 up to 1991 (see Figure 1). The collapse of the Soviet Union was associated with a slight upsurge in civil wars in the early 90s, but it was an upsurge from an already very high level.

What accounts for this steady upward trend? Have violent civil conflicts broken out and ended at higher and higher rates over time? Or is the rate of onset significantly higher than the rate of settlement, leading to an accumulation of unresolved wars? Using the list of civil wars provided in the appendix, I find that civil wars have been breaking out in this

[1]See the data in Fearon and Laitin (2002). The criteria defining "civil war" for this study are discussed below.

period at a rate of about 2.2 per year, and ending at a rate of about 1.8 per year. Another way to put this is that the average duration of civil wars in progress has been steadily increasing throughout the post-war period, reaching 15.1 years in 1999 (see Figure 1). These observations suggest that the prevalence of civil war as an international blight is due in a major part to the difficulty of ending such conflicts.

Why, then, are so many civil wars so difficult to end? A natural place to look for an answer is at variation in the duration of civil wars, which is remarkably large. According to the data in the appendix, a quarter of the 122 civil wars starting since 1945 lasted two years or less, and a quarter of all civil wars have lasted at least 15 years. Thirteen wars in the sample are coded as having lasted at least 20 years.

To understand why some (and so many) civil wars drag on it makes sense to compare these in a systematic fashion to civil wars that end more quickly. This paper represents a first cut effort at such a comparison.

The question might have a simple and straightforward answer, as follows: *Civil wars tend to last a long time when neither side can disarm the other, causing a military stalemate. They are relatively quick when conditions favor a decisive victory.*

Though this answer verges on tautology, it is at least a productive tautology in that it provokes some interesting theoretical and empirical puzzles. First, what exactly *are* the conditions that favor a military stalemate in a civil war, or conversely, a quick military victory? Second, if conditions favor a decisive victory by one side in a civil war, why is a war fought at all? Why doesn't the disadvantaged side not even contest the issue? Third, if conditions favor a stalemate, then wouldn't the parties have a strong incentive to cut a deal (Zartman 1989), tending to neutralize the effect of military conditions on the duration of the war? So why shouldn't civil war duration be independent of the military and political conditions that bear on the likelihood that one side can disarm the other?

In pursuing answers to these questions, I work back and forth between empirical evidence and theoretical arguments. The second section introduces the data set used and

considers some questions about how civil war duration should be defined and coded.

In the third section, I identify five classes of civil wars that have tended to end either more quickly or more slowly than most others. In particular: (1) civil wars arising out of *coup attempts* and *popular revolutions* are usually quite brief. (2) Civil wars involving attempted secession by a region that is *not* territorially contiguous with the area around the state's capitol have also been relatively brief, though somewhat less so than the first category.[2] Cases of what I will call *peripheral insurgencies* – civil wars involving rural guerrilla bands operating typically near the state's borders – have, with a few interesting exceptions, been remarkably difficult to end. (3) One interesting class of exceptions are the wars arising out the break-ups of the Soviet Union and Yugoslavia, which have been relatively short-lived. (4) Among the peripheral insurgencies, cases involving "sons of the soil" dynamics – land or natural resource conflicts between a peripheral ethnic minority and state-supported migrants of a dominant ethnic group – are on average quite long-lived. (5) So, it appears, are conflicts in which the rebel group has access to funds from contraband such as opium, diamonds, or coca. Section 3 closes with a demonstration that standard candidates for predicting civil war duration (ethnic diversity, per capita income, level of democracy, and "ethnic" vs. "ideological" war) have little or no independent power once we control for the above factors.

In the fourth section, I propose some theoretical arguments to try to make sense of these diverse empirical regularities. I argue that coups and popular revolutions favor decisive victories because they tend to be initiated at the center in the hope of triggering a tipping process, whose outcome is a lottery. Potential coup leaders can't negotiate deals in preference to the coup lottery because the offer to do so would immediately lower their odds in the lottery to practically nil, eliminating their bargaining power (and possibly their lives as well).

Peripheral insurgencies, by contrast, are military contests where the main aims are to render the other side unable to continue to fight or to impose costs that motivate the other

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[2]As discussed below, these are overwhelming cases linked to decolonization.

side to negotiate a settlement on favorable terms. An imbalance of military capabilities ought to predict a higher chance of a decisive victory and thus shorter duration; but conceptualizing and measuring the "balance" between guerrillas and a state, independent of the outcome, is quite difficult. In the fifth section I develop a game model that does not resolve this question, but does elaborate an answer to the question above about the prospects for negotiated settlements. In the model, under some circumstances mutually beneficial regional autonomy agreements are rendered impossible by regional rebels' reasonable suspicion that the government would renege on the deal when it regains enough strength. The results explain how it is possible to have a very long-running, costly civil war in which it is implausible to argue that the main obstacle to a settlement is over-optimistic military expectations on both sides (cf. Blainey (1973), Wagner (2000)).

In addition, the results yield hypotheses about factors that make negotiated settlements harder or easier to construct that help explain some of the empirical patterns described in section 3. The model suggests that pressure at the center for pro-migration policies makes sons-of-the-soil wars harder to resolve by negotiation by making it clearer to both sides that the government will be under strong pressure to renege on any regional autonomy arrangements in the future.

2 Data on civil war duration

One way to approach the question "What explains variation in the duration of civil wars?" would be to pose general hypotheses about factors that might be imagined to affect civil war duration (e.g., ethnic heterogeneity, ethnic versus ideological war, per capita income); next compile a list of civil wars and their durations; and then finally to run duration analyses to see if the hypothesized factors affect duration as expected.

Appendix 2 provides a list of civil wars that meet fairly standard criteria in the literature for designation as a "civil war" (discussed below). Casual inspection indicates, however, that they form a quite heterogeneous lot. The list includes, for example, 1789-style

social revolutions (e.g., Iran 1978, Nicaragua 1979); bloody coups and the violent shuffling of juntas (Bolivia 1952); big "classical" civil wars in which relatively well-defined and well-armed adversaries vie for control of a recognized central state apparatus (China 1945, Angola 1975, Afghanistan 1978); many secessionist wars, some big and destructive (Nigeria 1967 or Ethiopia 1974), others highly persistent but so small as to verge on "banditry" (India 1952, some cases in Burma); some "ethnic" wars (Sri Lanka 1983), some "ideological" civil wars (El Salvador 1979), and some wars of decolonization (France/Algeria 1954).

Rather than just start throwing independent variables at such a diverse list, it may make better sense to proceed by sorting the cases by duration and looking to see if any striking patterns emerge. In the next section, I report the results of my efforts to induce patterns by this procedure. The remainder of this section introduces the data set and discusses the question of what "civil war duration" means.

The cases in Appendix 2 represent the 122 civil wars occuring between 1945 and 1999 that satisfy the following primary criteria.[3] (1) They involved fighting between agents of (or claimants to) a state and organized, non-state groups who sought either to take control of a government, take power in a region, or use violence to bring about a change in government policies. (2) The conflict killed or has killed at least 1000 over its course, with a yearly average of at least 100. (3) At least 100 of the dead are on the side of the government (including civilians attacked by rebels). The last condition is intended to rule out state-led massacres where there is no organized or effective rebel opposition.

Though they differ slightly in their details, these criteria are similar to those employed by most other researchers who have compiled civil war lists (Singer and Small 1994, IISS 2000, Licklider 1995, Sivard 1996, Doyle and Sambanis 2000, Esty et al. 1998, Gleditsch et al. 2001, Valentino 2002).[4] For present purposes, an important point is that by themselves

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[3]Or rather, that at present I *believe* to satisfy these criteria. The list is taken from a joint research project with David Laitin and represents work in progress (Fearon and Laitin 2002). It is subject to almost continuous minor revisions.

[4]One significant difference is that whereas most others do not code wars of decolonization such as France

these standard criteria are inadequate for identifying the start and end dates of a civil war, which is what we need in order to study determinants of duration.

Naively, we would like to say that a civil war begins when the killing begins and ends when the killing ends. For most cases, start and end years are readily coded using this simple specification. But problems arise for others. If the killing stops and then restarts after a period of time, how long does the period have to be to say that the first sequence represented a completed "civil war"? How low does the amount of killing have to fall to say the war is over? If the killing begins very gradually and sporadically, exactly when does the war "start"?

Inspection of various civil war lists (including Appendix 2 here) suggests that researchers have handled these questions inconsistently, even if they sometimes specify an arbitrary period like two or five years. The problem is that for a great many conflicts we lack annual figures for numbers killed, so that in a case like the Muslim insurgency in the Southern Philippines it is difficult to say whether two or even five years may have passed in the 1980s during which killing remained at very low levels. Given this lack, it seems that the standard civil war lists often rely implicitly on the presence of a formal peace agreement or truce to indicate the end year of many conflicts. That is, a formal agreement or truce followed by a significant reduction in killing that lasts for some period of time (two or five years) is considered a war end.

This is a defensible rule, since surely a peace agreement that results in a nontrivial reduction in killing for a sufficient length of time is a sufficient condition for most people to say that a civil war has ended. But it leaves open the question of what to do about cases like the Southern Philippines or the very long-running rebellions in the North East of India. In these it may be that periods of several years pass with very little killing, but no peace treaty or official cease fire. Beyond the problem of lacking data, there is a conceptual question: has

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in Algeria or Portugal in Angola at all, we code them as civil wars under the juridiction of the metropole. See the discussion below.

a civil war ended if one or both sides merely take a breather to recoup strength, preparing for new campaigns? Most would probably say that it depends on how strong is the intention to renew violence and how long the breather is intended to last. So for at least some cases the question of deciding when and whether a civil war has ended will be eternally contestable.

Similar problems can arise in deciding on the start date of a civil war. Did the Somali civil war begin in 1981 when armed bands of Isaaqs started small-scale operations against Siad Barre's regime and Isaaq collaborators, or in 1988 when Barre razed the Isaaq town of Hargeisa (killing thousands), or in 1991 when Barre's government collapsed and anarchic interclan warfare took over? Here the question is not spells of "peace" but what to consider a continuous sequence of events that belong to one war. My inclination is to separate this into two wars, one against the Barre regime, and the second among allies in the first war for control of Mogadishu. The case parallels Afghanistan, where most lists code two distinct wars, the first beginning in 1978 against the Soviet supported government in Kabul and the second in 1991 among the victorious allies for control of Kabul. The additional criterion is: (4) If one of the main parties in the conflict was defeated or otherwise drops out, we code a new war start if the fighting continues (e.g., Somalia gets a new civil war after Siad Barre is defeated in 1991).

In the end, *any* parsimonious rule will generate some start and end date codings that are contestable or that seem intuitively "off" (Fearon and Laitin 2000a). Probably the best course is to flag dubious codings and then check to see if results are robust to changing them. In addition to (4) above, the rules for coding start and end that we have tried to follow for this case list are: (5) The start year is the first year in which 100 were killed or in which a violent event occurred that was followed by a sequence of actions that came to satisfy the primary criteria. (6) War ends are coded by observation of either a victory, wholesale demobilization, truce or peace agreement followed at least two years of peace.[5]

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[5]Two additional criteria are needed for two other issues that arise in a few cases: (7) Involvement by foreign troops does not disqualify a case as a civil war for us, provided that the other criteria are satisfied.

3 Empirical patterns

Using the above formulations for coding, the simple median and mean civil war durations are 6 and 9 years respectively. These are misleading numbers, however, since so many cases in the sample are ongoing wars (24). Dropping them before computing the mean and median would not be a good solution, because the five longest wars in the whole period are coded as ongoing. A better approach is to use maximum likelihood to fit a Weibull distribution to the data (including the censored observations), and then use the estimated parameters to produce estimates of median and mean duration. This yields estimates of 7.4 and 11.4 years for median and mean civil war duration, respectively.[6] The difference between the median and mean reflects a highly skewed distribution.

3.1 Coups and popular revolutions make for short civil wars

A surprising number of the cases in the Appendix refer to violence during or in the aftermath of coup attempts or popular revolutions in capitol cities. For example, five of the less-than-one-year cases refer to the bloody aftermaths or onsets of coups in Latin America during the early Cold War (Argentina 1955, Costa Rica 1948, Bolivia 1952, Dominican Republic 1965, and Paraguay 1947), and there are similar cases outside of Latin America (e.g., Iraq 1959, Yemen Arab Republic 1948). Several other very brief civil conflicts refer to popular revolutions involving mass uprisings and demonstrations in the capitol city in support of efforts to unseat a dictatorial regime (Cuba 1958, Iran 1978, and Nicaragua 1978).

So let's define, for our purposes here, a *coup-related civil war* as a civil war between groups that aim to take control of a state, and that are led by individuals who were recently members of the state's central government, including the armed forces. Likewise, define for

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(8) We code multiple wars within a country when distinct rebel groups with distinct objectives are fighting a coherent central state on distinct fronts with little or no explicit coordination.

[6]Henceforth, reported means and medians are produced in this way unless noted otherwise. Using an exponential distribution produces very similar results. Non-parametric estimates for means tend to be extremely similar, while those (i.e., Kaplan-Meier) for the median are typically a bit smaller.

our purposes a *popular revolution* as a civil war (according to the definition above) that, at its outset, involved mass demonstrations in the capitol city in favor of deposing the regime in power.[7]

A rough coding by these criteria yields 22 cases that are either coup-related (19) or popular revolutions (3). The median war duration for these cases is just 2.1 years, with the mean at three years. By contrast, the estimated median and mean duration for the non-coup-related and non-revolutionary wars are 9.4 and 13.3, respectively. Substantively these are very large differences, and they are highly statistically significant as shown in the multivariate analysis below. There is also a marked difference in lethality. Among completed wars, the median number killed in coup-related and revolutionary civil wars is 4,000, compared to 29,000 for the rest.

3.2 Post-1991 civil wars in Eastern Europe tended to be brief

The cases in Appendix 2 are sorted by region and then within region by duration. Inspection suggests that the Eastern European cases, all of which follow and are related to the fall of communism, stand out for being briefer than typical cases in other regions. This is confirmed in Table 1, which shows estimates for mean and median civil war duration by region. The *average* duration of the nine post-Soviet and Eastern European cases was shorter than the *median* duration for any other region. The difference proves statistically significant in a multivariate model, as shown below, which cannot be said for any other region except possibly Asia, where civil wars seem to last somewhat longer on average (more on which below).

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[7]Note that the definition does not select all civil wars whose origins are related to a coup d'etat. For instance, the El Salvadoran war in 1979 begins with a right-wing coup that mobilizes the government against insurgents and vice-versa, but this is not a "coup" case by this definition because it does not have the leaders of the fighting parties on *both* sides as members of the government.

Table 1:

Estimated median and mean civil war duration by region

Region	Median	Mean	N
E. Europe/F.S.U.	2.7	3.9	9
N. Africa/M. East	4.6	6.7	17
W. Europe + US/Canada/Japan*	5.6	8.1	15
Latin America	7.0	10.1	14
Sub-Saharan Africa	9.2	13.4	33
Asia	11.7	17.0	34

*13 anticolonial wars + N. Ireland & Greece 1945-49

3.3 Wars over discontiguous territory tended to be relatively brief

Wars against colonial regimes, such as that in French Algeria or the Mau Mau rebellion in Kenya, clearly satisfy the definition of civil war used above, which as noted is quite standard. Nonetheless, lists of civil wars routinely exclude these cases, mark them off from civil wars proper, or assign them to (say) "Algeria" rather than France even though Algeria was a department of France in the 1950s.[8]

Perhaps the rationale is that a civil war is a war between parties within a single state, and the colonial regimes were not *proper states*. We know this because the colonial territories were separated from the metropoles by water, and these were wars of "national liberation" that succeeded in setting up independent countries.

But this is an ex post assessment of what is a proper state. We can't make the definition of "civil war" depend on whether secession is successful or on territorial contiguity. If Chechnya succeeds in gaining independence from the Russian Federation, should we change change our coding so that the fighting in Chechnya in the 1990s is no longer a civil war but a war of decolonization, or national liberation, or some other category? Was the war over East Pakistan in 1971 not a civil war because pre-1971 Pakistan was not really a "state" for lack of territorial contiguity?

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[8]Exclude: Licklider (1995), Esty et al. 2000, Doyle and Sambanis (2000). Mark off: Singer and Small (1994). Treat as if independent states: Sivard (1996), Collier and Hoeffler (2001) (in some cases).

Certainly the wars of decolonization in the 50s and 60s are distinct in many respects from the other cases in Appendix 2. But they meet commonly applied criteria for civil war-hood and may contain information useful for helping to answer questions about civil war. For example, their average duration was shorter than that for all other cases. The (estimated) median and mean duration of the 13 wars of decolonization in the sample are 4.4 and 6.7 years, respectively, as compared to 7.9 and 12.1 for the rest of the cases.

A natural conjecture is that the duration of the anti-colonial wars was limited by the great distances at which the colonial powers had to fight, for two reasons. First, it is materially costly to carry a war effort far across the ocean. Second, the widely shared norm holding that a proper state is territorially contiguous might cut against a government's efforts to gain domestic and international support for such a war. If these reasons help explain the relative brevity of the anticolonial wars, then we should find similar results for other civil wars involving noncontiguous territories in the sample. Unfortunately, there are only two such cases – the one-year war that led to the creation of Bangladesh in 1971, and (roughly) nine years of ongoing secessionist efforts of FLEC in Cabinda (Angola). Including these brief wars in a category of *noncontiguous* cases does not alter the results above.

3.4   "Sons of the soil" dynamics may make for longer civil wars

As noted, civil wars in Asia have lasted longer on average than those in any other region. Quite a few of these wars display a similar dynamic. The state is dominated and often named for a majority ethnic group whose members face population pressure in their traditional farming areas. As a result, many migrate into less populous and less developed peripheral regions of the country, often with the support of state development schemes. These peripheral regions, however, are inhabited by ethnic minorities – the "sons of the soil" (Weiner 1978) – who sometimes take up arms and support insurgencies against the migrants and the state backing them.[9] In a variant, the sons of the soil are less concerned with in-migration by

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[9]For a more detailed discussion of this pattern, see Fearon and Laitin (2000b).

the ethnic majority than with the state's monopoly exploitation of natural resources in their traditional areas.

These sons-of-the-soil mechanisms can be observed in the rebellions by Chakma peoples in the Chittagong Hills of Bangladesh (17 years to date); Nagas and other "tribal" peoples in North East India (49 years to date); the muslim Moros in the southern Philippines (30 years); Tamils in the North and East of Sri Lanka (17 years to date); some of the many peripheral ethnic minorities in Burma that have fought on and off against the Burman-dominated state for at least 50 years; Uighurs in Xinjiang province in China (9 years to date); Sindhis against Mohajirs around Karachi in Pakistan (9 years to date); Bougainvilleans in Papua New Guinea (10 years, perhaps continuing); and both Achenese (9 years to date) and the West Papuans (35 years to date) against the Javanese-dominated state in Indonesia. Sons-of-the-soil dynamics appear much less common outside of Asia, although it might be argued for the Southerners in Sudan (17 years to date) and Chad (in the south, 1994 to 1998), Tuaregs in Mali (just 6 years most recently), and Abkhazis in Georgia (just 3 years).

I have produced a rough-and-ready coding of sons-of-the-soil cases according the following criteria: the civil war involves an insurgent band fighting on behalf of an ethnic minority on the periphery of a state dominated by another ethnic group; against the state's military or paramilitary formations, and/or members of the majority group who have settled as farmers in the minority groups' declared home area; and involves either land conflict with migrants from the dominant group or conflict over profits and control of natural resources in the minority's home area.

My research to date suggests that 17 cases meet these criteria, 11 of which are in Asia. The estimated median and mean durations for these sons-of-the-soil cases are 27.2 and 39.1 years, respectively, as compared to 6 and 8.7 for the rest of the civil wars. These are large differences![10]

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[10]If one considers the 98 completed wars that are coded for sons-of-the-soil, one finds a median and mean duration of the eight completed sons-of-the-soil cases to be 9 and 13.5, compared to 4.5 and 6.7 years for the rest. This is a particularly misleading estimate, though, since the nine "SoS" wars that have not yet ended

3.5 Valuable contraband may make for longer civil wars

A second factor that may help systematically differentiate the longer running civil wars in this period is the availability and use by rebel groups of finances from contraband such as cocaine, precious gems, or opium. For rebels to sustain a long-running war, it helps to have a dependable source of finance and weapons. Contraband is not the only possible source – support from foreign states or ethnic diasporas are others. But where it can be exploited it is not suprising that it can enable longer civil wars.

Contraband has played a significant role in several of the longest running civil wars since 1945, such as Colombia (cocaine; 37 years to date as coded here), Angola (diamonds; 25 years to date), Burma (opium; off and on for many years, especially in Shan state), Cambodia after the Vietnamese invasion (opium; 15 years), and Sierra Leone (diamonds; 9 years to date). Reviewing secondary literature on the 122 cases for evidence of major reliance by the rebels on income from production or trafficking in contraband, I coded 17 such cases. The estimated median and mean civil war duration for these 17 are 32.0 and 46.6, respectively, as compared to 6.1 and 8.9 for the rest. These high numbers result in part because 11 of the 17 are coded as on-going, and are thus right-censored.[11]

3.6 A multivariate analysis and some other "usual suspects"

Table 2, Model 1 displays a multivariate Weibull analysis using the five variables discussed above.[12] Since the variables were selected with an eye to their apparent relationship to civil

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have a mean duration of 23 years to date.

[11]This evidence should be viewed as tentative, since it is obviously hard to estimate the extent of a rebel group's reliance on contraband for revenues. For instance, I do not include the I.R.A. in Northern Ireland, the P.K.K. in southeastern Turkey, or the L.T.T.E. in Sri Lanka, although in each case drug trafficking is sometimes mentioned as a source of rebel finance. It may be that the business synergies between rebel groups and drug traffickers are so strong that *any* rebel group that can avoid destruction long enough will eventually move into this area.

[12]The estimated coefficients show how the presence of the factor in question modifies the annual hazard rate of civil war termination; coefficients greater than 1 imply that the factor makes termination more likely each year, and coefficients less than 1 imply the opposite. The results using the Cox proportional hazards

war duration it is not surprising that the coefficient estimates are both substantively large and "statistically significant." Nonetheless, the multivariate analysis is useful for assessing the relative strength of the several bivariate relationships reported above, for checking whether the effects of these factors are independent of each other (they appear to be), and for checking to see whether these factors explain the apparent impact of more commonly used variables such as ethnic fractionalization.

Table 3 gives the predicted median and mean war durations for a conflict that has one (and no other) of each of these five factors.[13] The biggest estimated impact is associated with wars that originated as a coup or popular revolution, whose estimated mean duration is 3.2 times shorter than that for a conflict with none of these attributes. Sons-of-the-soil and contraband case follow, by this metric, with mean durations about three times longer. Civil wars in Eastern Europe or the Former Soviet Union after the fall of the communist regimes come next – their estimated mean duration is 2.4 times shorter than a case with none of these attributes. Finally, the mean duration of noncontiguous/decolonization cases is estimated as about 1.6 times shorter than the median case. Note also, from Table 2, that after accounting for these factors, the estimated base-line hazard rate is slightly increasing, which means that after conditioning on these five factors, wars are increasingly likely to end in the next year as each year passes.

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approach (which does not assume a particular form for the baseline hazard rate) are close to identical, with the estimated coefficients moving very slightly towards 1 for all variables. The disadvantage of the Cox method for my purposes is that it does not allow estimates of mean and median duration for different sorts of cases.

[13]These estimates were produced by simulation using the parameters for Model 1 in Table 2.

Table 3:
Multivariate Median and Mean Duration Estimates (in years)

Category	Median	95% c.i.	Mean	95% c.i.
Coup/Revolution	2.5	[1.6, 3.5]	3.2	[2.2, 4.3]
Post-Soviet E.Eur.	3.2	[1.7, 5.6]	4.1	[2.2, 7.3]
Not contiguous/decolonization	4.8	[3.0, 7.0]	6.1	[4.0, 8.9]
Sons of the Soil	22.2	[11.0, 40.2]	28.2	[14.0, 51.6]
Contraband finances	22.8	[12.4, 37.6]	29.0	[15.9, 47.7]
Cases that have none of these attributes	7.7	[5.6, 9.8]	9.8	[7.9, 11.9]

Before proceeding to try to develop a coherent theoretical account of these findings, it makes sense to check additional covariates that might plausibly be related to civil war duration, and whether they disturb or undermine the results above. Given that there is little prior theory in this area, it is not immediately clear what these covariates should be. Still, we can "round up the usual suspects."

Ethnic heterogeneity

Mainly using data from the Correlates of War civil wars list, some authors have looked for a relationship between ethnic fractionalization and civil war duration, most often on the hypothesis that the relationship should be positive. Collier, Hoeffler and Söderbom (1999) and Eldabawi and Sambanis (2000) found a nonmonotonic relationship in the COW civil war data (from 1960 on), with countries at intermediate levels of ethnic diversity having longer civil wars. Lindsay and Enterline (1999) find no relationship, though they use a different measure of fractionalization.

In these data, a bivariate Weibull or Cox regression of duration on ethnic fractionalization shows that ethnic diversity is marginally related to longer civil wars in the full sample, though more strongly so if the (relatively short) anticolonial wars are dropped. For the full sample, the estimate implies that a civil war in a country with the median level of diversity should be expected to last on average about 40% longer than one in a country at the tenth

percentile. Adding the square of ethnic fractionalization shows no sign of nonmonotonicity.[14]

As shown in Table 2 (model 2), after controlling for the factors introduced above, the effect estimate for ethnic fractionalization remains tenuous. Its coefficient is not significant at the 10% level, and corresponds to a substantive effect of a 27% increase in expected duration when moving from the 10th to the 50th percentile on fractionalization (other variables set to zero). Dropping the "not contiguous" variable – that mainly marks the relatively short duration anticolonial wars that occured in highly heterogeneous "states" – weakens the estimate for ethnic diversity considerably more. If we drop the anticolonial cases from the sample, the estimate for ethnic fractionalization is about the same as shown in Table 2, Model 2. Adding the square of fractionalization again reveals no sign of an inverted "U." In sum, there is some indication that more ethnically diverse countries tend to have systematically longer civil wars, but the relationship is uncertain and appears to be small.

Not surprisingly, ethnic fractionalization is positively correlated with the variable marking sons-of-the-soil cases ($r = .18$, dropping the anticolonial wars). Omitting the latter from the Model 2 in Table 2 increases and sharpens the estimated impact of fractionalization. Thus the sons-of-the-soil variable may indicate a pathway or mechanism by which ethnic diversity influences civil war dynamics.

Per capita income

A bivariate Weibull or Cox regression shows per capita income (in the year prior to the war's start) to be negatively associated civil war duration, though the estimate is statistically insignificant. Plotting duration against income reveals an outlier, the 31-year conflict in the richest country in the sample (Britain's Northern Irish "Troubles"). This case just barely makes the 100 deaths-per-year average required here for inclusion as a "civil war,"

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[14]For the anticolonial wars I estimate the ethnic fractionalization for the whole empire in the year the war starts, using data on ethnic diversity for the former colonies at the time of independence. See Fearon and Laitin (2002) for details. In all cases "ethnic fractionalization" refers to the often-employed measure based on the 1960 Soviet ethnographic atlas, which gives the probability that two randomly selected individuals are from different ethnolinguistic groups. Results are the same if I use the alternative measures of ethnic diversity discussed in Fearon and Laitin (2002).

and dropping it yields a much stronger bivariate relationship. The estimated coefficient now implies that going from the 10th percentile on income (345 1985 dollars) to the 90th ($3,427) reduces expected duration by about a half, from 14.6 to 7.6 years.[15]

As seen in Table 2 (model 3), per capita income ceases to matter statistically when we control for the other factors.[16] The bivariate impact of income has been picked up by contraband and sons-of-the-soil dynamics, which are both much more common in poor countries, and the Eastern Europe dummy, which marks countries that are all in the top quarter of the sample's income distribution. Possibly, then, higher income helps "explain" why the Eastern European cases are relatively short. But we cannot say that the data display a strong and regular connection between level of economic development and civil war duration.

Country population

Larger countries tend to have longer civil wars. Using the estimate from a bivariate Weibull regression, moving from the 10th to 90th percentile on population associates with a doubling of expected civil war duration, from 8.1 to 16.3 years. As seen in Table 2 (model 4), however, the log of country population ceases to matter substantively or statistically when we control for the factors discussed above. Larger states, it turns out, have been more prone to sons-of-the-soil dynamics, and have tended not to have coup or revolutionary wars and the short durations associated with them.

Ethnic wars and secessionist war

Many researchers have drawn distinctions between "ethnic" and non-ethnic or "ideological" civil wars, with some arguing that ethnic wars are likely to be harder to resolve

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[15]The main source for the income data is Penn World Tables version 5.6. Where possible, these were extended forward and backwards using growth rate estimates from the World Bank, or estimated using a country-specific time trend and information on per capita energy consumption from COW. Income estimates for the 13 colonial empires in the sample are constructed using the income and population estimates for the former colonies that composed them at the time of independence. This makes for some upward bias in the income estimates for the empires. For details see Fearon and Laitin (2002).

[16]The British outlier has been dropped in this model.

(Kaufmann 1996; Licklider 1995; Sambanis 2001). Testing the hypothesis requires that we code ethnic civil wars as distinct from other civil wars, a more problematic task than it may first appear. For any given rule, there is always a set of cases that are ambiguous or difficult to code (e.g., the wars in Guatemala, Mozambique, Sierra Leone). Nevertheless, designating as "ethnic" conflicts in which the fighting was in the name of or carried out primarily by groups organized along ethnic lines, I created a variable that takes a value of 1 for non-ethnic cases, 2 for cases that are mixed or ambiguous, and 3 for "ethnic" cases. These form, respectively, 30% (36), 16% (20), and 54% (66) of the sample.

In a bivariate Weibull regression, more "ethnic wars" appear to last somewhat longer; going from 1 to 3 on the variable associates with about a 70% increase in expected duration ($p = .04$). The estimated effect diminishes and loses statistical significance when we control for the other factors, as seen in Table 2, model 5. In this case, the factor responsible for "killing" the bivariate relationship between ethnic wars and longer duration is sons-of-the-soil dynamics. All sons-of-the-soil wars are "ethnic," but not all ethnic wars have sons-of-the-soil dynamics, and it appears that the presence of these dynamics rather than ethnic organization of the combatants is the better predictor of long civil war duration.[17]

A related hypothesis holds that wars of secession are more intractable than civil wars in which the parties aim at capturing the government at the center of the state (Lindsay and Enterline 1999). To assess this I coded a variable **aim**, which equals 1 for civil wars in which the parties aim at capturing the center, equals 3 for civil wars where one of the parties is fighting for secession or greater autonomy, and equals 2 for cases that are ambiguous or involved both aims at different times. I find that outside of Eastern Europe and controlling for the decolonization/noncontiguous cases, secessionist and autonomy seeking wars tend to last significantly longer on average than other cases. This relationship evaporates, however, when we control for either coups/revolutions (which associate with aiming at the center) or

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[17]These results do not change when I drop the anticolonial wars from the sample, which are coded as here as "ethnic."

the sons-of-the-soil dynamic (which occur exclusively in secessionist/autonomy related wars but is a better predictor of long duration).

Democracy

Some have argued that political democracy should reduce the incidence of civil war because democracies enable aggrieved groups to work for redress through institutional means.[18] This argument might further imply that if a democracy does have a civil war, it should be easier to resolve (Lindsay and Enterline 1999). Democratic institutions might facilitate bargaining and credible commitments to an agreement. On the other hand, a selection effect might work in the opposite direction: it might be that if a democracy gets a civil war it probably faces an obdurate rebel group, militating against the finding of a bivariate relation between quick settlement and democracy.

As seen in Table 2 (model 6), in these data a measure of democracy in the year prior to the start year of the conflict bears no systematic relationship with civil war duration, in either a bivariate or a multivariate analysis.[19]

Costs (lethality)

One might initially expect more costly civil wars to end more quickly, and indeed the log of average deaths per year is strongly associated with shorter duration in a bivariate Weibull or Cox regression. Expected duration drops from 15.2 to 8.1 years as one moves from the 10th percentile (500 dead per year) to the 90th (39,000 per year). However, as shown in Table 2, Model 7, the effect disappears when we control for the other factors. In this case, the culprit is almost entirely sons-of-the-soil rebellions, which are usually of very low intensity. So one reason that these cases tend to last a long time may be that they can be conducted at fairly low cost.

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[18]Fearon and Laitin (2000) find no support for this common claim in analysis of the determinants of civil war onsets and magnitudes (after controlling for per capita income).

[19]The measure is the difference between the Polity IV democracy and autocracy scores, which makes a scale from -10 to 10. "Interregnums" and "transitional periods" are treated as suggested by the Polity coders, and civil wars in the colonial empires have been dropped from the sample.

4 Explaining the empirical patterns

Simply observing that post-1991 civil wars in Eastern Europe tended to be brief, or that sons-of-soil dynamics associate with longer civil wars, is of course not an explanation. In this section I return to the theoretical questions posed in the introduction, developing answers that show how the diverse empirical patterns described above may be explicable in terms of common theoretical principles.

Both coups and peripheral insurgencies (i.e., rural guerrilla warfare) are strategies for using violence to take power in a state or region. The leaders of would-be coups and popular revolutions hope that a rapid strike or public protest will initiate a tipping process that produces wholesale defections within the regime (especially the military) or mass popular demonstrations in the capitol that have the same effect. This technology, a tipping process, is basically all or nothing.[20] Either the coup leaders succeed or they are crushed when the hoped-for tip fails to develop. This is why civil wars that originate in coups or popular revolutions tend to be brief.

The strategy of violence in peripheral insurgencies is radically different. Rebel leaders rarely expect to win quickly by means of a tipping process that causes the government to collapse. Instead, peripheral insurgencies are *wars*, proper, in the sense that the parties hope to prevail in one of two general ways: either by gaining a position of military dominance that allows the imposition of terms, or by using violence to inflict costs that will induce the other side to negotiate a favorable settlement.[21] The longer duration of insurgencies versus coups and revolutions is thus a function of rebel strategy.

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[20] "It was a win-big, lose-big gamble for [Senator Juan Ponce] Enrile and company, and it looks they lost big," said a Philippine political commentator speaking on Enrile's involvement in mass demonstrations against President Gloria Arroyo that failed to bring the military to the side of Enrile and jailed former President Estrada. Enrile was arrested. "'State of Rebellion' Declared After Siege at Manila Palace," Mark Lander, *New York Times* 2 May 2001, A9 (National Edition).

[21] This isn't exactly right since, as I show below in the model, one can have a situation where both the rebels and the government fight despite having zero expectation of military victory or a negotiated settlement and despite the presence of deals both sides would prefer to the hopeless war.

Though promising, this argument does not explain why the participants in these violent and risky events can't do better by negotiating a deal with the government, whether in preference to a coup attempt or a peripheral insurgency. Nor does it explain why some peripheral insurgencies last longer than others. The two questions are related. If bargaining is possible, then it is not clear how or why the relative military capabilities of rebels and the government would affect the duration of peripheral insurgencies. Roughly equal capabilities (a "hurting stalemate") should incline the parties towards deal, while unequal capabilities should lead to a quick loss or to concessions by the weaker side. Put differently, if we have no explanation for why the parties are fighting at all (rather than settling), it is not clear how we can "explain" variations in war duration.

From a rationalist perspective, there are basically two approaches to explaining what prevents an implicit or explicit deal in preference to a coup attempt or an insurgency. Either some party has private information about the value of the deal (or the military alternative to it) but can't reveal this credibly, or some party can't credibly commit to stick by any deal that both would prefer to a fight.[22]

The literature on coups d'etat often notes that rulers pay militaries with an eye to forestalling coup attempts, thus recognizing the incentives for coup-avoiding deals. But this same literature, so far as I know, does not ask what explains failures of this or other possible coup-avoiding strategies.[23] By contrast, the more dramatic and extended violence of many insurgencies *has* provoked efforts at explanation, often in "rationalist" terms. Indeed, a common informal story views insurgencies as wars of attrition driven by private information. Government and rebels use violence as a costly signal of resolve or capability, which is privately known by each side in the contest. The combatants fight rather than settling in order to credibly reveal that they are more determined or stronger than the enemy realizes,

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[22]These possibilities are not mutually exclusive. See Fearon (1995) for a general discussion.

[23]For example, Galetovic and Sanhueza's (2000) model of coups d'etat does not allow the autocrat to pay off the coup plotter, and does not raise the issue of efficiency.

and so must be given better terms. The war of attrition is expected to end when the true balance of resolve or capabilities is publicly revealed.[24]

This story about insurgencies is supported by much anecdotal evidence and seems intuitively plausible, at least regarding the early phases of such conflicts. One might also propose a private-information-based explanation for why coups occur. For example, perhaps the possibility of ex ante bargaining is undermined by coup plotters' inability to credibly reveal private information about the likelihood of a "tip"? Nonetheless, while I would not discount the role of this mechanism, a private-information-based story runs into significant obstacles for both coups and insurgencies.

For peripheral insurgencies, it strains credulity to imagine that the parties to a war that has been going on for many years, and that looks very much the same from year to year, can hold any significant private information about their capabilities or resolve. Rather, after a few years of war, fighters on both sides of an insurgency typically develop accurate understandings of the other side's capabilities, tactics, and resolve. Certainly both sides in Sri Lanka (for instance) fight on in the *hope* that by luck and effort they will prevail militarily. But it is hard to imagine that they do so because they have some private information that makes it reasonable for them to be more optimistic about the odds than the other side is. In the absence of significant private information, why can't they cut a deal on the basis of a more-or-less common understanding of the terms of the military stalemate?

Below, I present a game-theoretic argument that can explain the inefficient occurence of both *both* coup attempts and peripheral insurgencies as a result of a commitment problem. The main idea is that a temporary shock to government capabilities or legitimacy gives coup plotters or rebels a window of opportunity. During such moments the ruler might want to commit to paying the junior officers more, or giving more autonomy to a region, but

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[24]Blainey (1973) is associated with this view in the literature on interstate wars, although he saw the source of disagreements about odds as irrationality rather than private information. Attempts at more rationalist versions have been advanced by Goemans (2000) and Wagner (2000).

such commitments are rendered incredible by the knowledge that the shock is likely to be temporary.

The model shows how a commitment problem could prevent an insurgency from being ended in any way except by a military defeat. This is so despite the ability of the parties to bargain over the extent of regional autonomy or control by a regional leadership/rebels, and the lack of any private information about military capabilities or resolve. In the model's equilibrium, it can happen that both government and rebels fight on, year after year, with a slim hope that luck and effort will find them someday in a position to impose terms militarily, and despite the presence of bargains that both sides would prefer to the situation of constant war. The problem is that these are unenforceable due to random fluctuations in the government's capabilities.[25]

Regarding the duration of peripheral insurgencies, the model suggests hypotheses about the circumstances in which it is easier or harder to construct a stable settlement.

5 Secessionist war as a commitment problem

To save space I describe the extensive form for the model applied to peripheral insurgencies where the goal is secession or greater regional autonomy. Minor modifications of the extensive form and payoffs make it a model of the coup problem or a rebellion aimed at the center; these are mentioned in footnotes.

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[25]The model is related to that of Acemoglu and Robinson (2001), who try to explain democracy as commitment strategy by elites. It can also be viewed as a repeated game version of Fearon (1994, 1998), who showed how civil wars could begin when a minority group anticipates a shift in military power towards the state, which would make promises by the center to construct and maintain regional autonomy or other measures incredible. Walter (1997) argues that the central obstacle to ending civil wars by negotiation is that mutual disarmament by government and rebel forces is a Prisoners' Dilemma in which neither can tolerate any risk of being "suckered." Although it is not clear why thorough-going disarmament is a necessary condition for ending a civil war (why not an agreement where the rebels keep their guns but agree not to use them?), there are many cases where such provisions were included in peace settlements and did pose major obstacles to implementation.

5.1 The game form

Two players, a central government G and a rebel group (or the leadership of the rebel group) R interact in successive periods $t = 0, 1, 2, 3, \ldots$. We will speak of two kinds of periods, war periods during which the parties are fighting, and peace periods when they are not. The extensive forms for the two stage games are illustrated in Figure 2.

A peace period begins with Nature choosing whether the government is in a strong position with respect to potential rebels, or a weak position. This could refer to the government's (and the country's) economic health, or to weakness related to a coup or political in-fighting at the center, for example. Weakness results from some kind of economic or political shock to government capabilities, such as a sharp economic downturn, the cessation of foreign military or development aid, or a political collapse at the center (e.g., the collapse of communist regimes or the death of a dictator). The government starts a peace period strong with probability $1 - \epsilon$ and is weak with probability $\epsilon \in (0, 1)$.

In either event, after Nature's move the government chooses how to share control of a region of the country between itself and regional political elites (who are also the potential rebels). The government chooses a share $c_t \in [0, 1]$ that indicates how much control of regional tax revenues and other political matters that it retains for itself. For instance, $c_t = 1$ means that the center assumes full control; $c_t = .5$ indicates an agreement on regional autonomy that shares control 50-50 between the center and regional powers.

If the government is strong, then following the government's choice of c_t, the game simply proceeds to another peace period. However, if the government has suffered some political or economic shock and is in a weak position, then the rebels can initiate a civil war. If they choose not to start a fight, the game moves to the next period, which is again a peace period. If the rebels choose to begin a war, a war period follows.

At the start of a war period, Nature decides whether the fighting results in the rebels achieving a position of military dominance, which has probability $\alpha \in [0, 1]$; the government

gains military dominance, with probability $\beta \in [0, 1]$; or neither does, with probability $\gamma \in [0, 1]$ ($\alpha + \beta + \gamma = 1$). If the rebels achieve military dominance in a period, I assume that this means that they can set up a de facto autonomous region and the game ends. If the government achieves military dominance, the game continues, but the next period is a peace period. If a stalemate obtains, then the government and the rebels choose in sequence whether to continue their fight. If the government stops fighting, then the rebels can set up a de facto autonomous region and the game ends. If the rebels stop fighting, the game continues with the next period as a peace period. If both continue fighting, the next period is a war period.[26]

5.2 Preferences, payoffs

Each side prefers more control of the region to less; for convenience suppose that these payoffs are linear in c_t, the government's share of control in a peace period t. Thus in a peace period payoffs are c_t for the government and $1 - c_t$ for the rebels/regional leadership. During a war period, let the government's payoff be k_G and the rebel's k_R. These incorporate whatever benefits each side can obtain from the region while fighting – such as war taxation imposed by the rebels or plunder by government forces – minus the costs they incur from the war effort. I allow for the possibility that $k_G > 0$, which means that the government prefers the net benefits it can obtain while fighting to letting the region go entirely. Likewise, I allow that k_R can be greater than zero, which means that the rebel leaders can do better day-to-day during war than they could if they were shut out of regional control ($c = 1$) during peace. However, I assume that $k_G + k_R < 1$, which ensures that there are always regional autonomy deals on $c \in [0, 1]$ such that both sides prefer these to continued fighting.

If the rebels prevail militarily, they can set up a de facto autonomous region and the

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[26]In the "coup" variant, R is a group of putchists who can choose to strike if the government is weak. In this case either the "tip" occurs and the rebels assume control of the government in the next period with probability α, or it fails and they are killed or jailed with probability β, where $\alpha + \beta = 1$. The losing side in a coup attempt exits the game, and new potential putchists enter in the next period.

game ends. In this event, the rebels receive their value for full control, 1, in every subsequent period, so their continuation payoff is $\delta/(1 - \delta)$. $\delta \in (0, 1)$ is the common discount factor applied to all per-period payoffs. The government, on the other hand, gets 0 in every subsequent period for losing the region, so its payoff here is just 0.[27]

To give an informal summary of the model, a government periodically suffers random shocks to its capabilities, at which times dissatisfied regional actors have the opportunity to initiate an insurgency. If they start an insurgency, the war continues until one side quits or one side prevails militarily. When the government is strong, it chooses how much to share control of the region with regional elites. We could easily add an option for the government to make offers on the division of powers *during* war periods, but as we will see below this is unnecessary, since the whole question for the rebels is whether any such deal would be observed once the government is in a strong position again.

5.3   Equilibrium results

So much for the specification of the game. What happens?[28]

> *Proposition 1.* When conditions (1) and (2) below hold, the following strategies – call these the *Fight Equilibrium* – form a subgame perfect equilibrium in the game: In all peace periods, the government does not share any power in the region (i.e., chooses $c = 1$), and the rebels always choose to fight if the government is weak. In all war periods, both government and rebels always choose to keep fighting.
>
> The conditions are:

$$\begin{align}
k_G &\geq -\beta\delta/(1 - (1 - \epsilon)\delta) \tag{1}\\
k_R &\geq -\alpha\delta/(1 - \delta) \tag{2}
\end{align}$$

In this equilibrium, the regional elites (or would-be elites) expect to be shut out of control and wealth in the region by the government. In consequence, provided their costs

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[27] Payoffs are defined naturally for the coup variant; the only new outcome is a failed coup, which yields a "death" or "jail" payoff for the loser, say $-K$. Also, $1 - c_t$ should now be interpreted as rents distributed to the military by the ruler.

[28] Proofs for the propositions are in Appendix 1.

during a fight are not too high relative to the expected benefits of autonomy (condition 2), they want to try their luck at war whenever they have the chance. And if the rebels fight whenever they have the chance, it makes sense for the government to monopolize control of regional benefits when they can, by setting c to 1. But then exclusion confirms the regional elite's strategy of always rebelling, making an equilibrium. The condition on k_G ensures that the government cares enough about the benefits from controlling the province relative to the costs of fighting that it is willing to fight rather than just cede autonomy (as with much decolonization or the break-up of the Soviet Union).

In the Fight Equilibrium, the expected duration of a civil war once it starts is $1/(\alpha+\beta)$. Note that this can be very long when neither side has the capabilities to provide a good chance of a decisive military victory ($\alpha + \beta$ close to zero). Note also that if the rebels are able to arrogate enough tax and political authority in the region *during* a war that they are doing better than they would as non-rebels without a war ($k_R > 0$), then the fight equilibrium can be sustained even if they expect *zero* chance of prevailing militarily ($\alpha = 0$). Unfortunately, it is also possible to sustain the Fight Equilibrium when the government has zero chance of winning outright, provided that $k_G > 0$. As shown below in Proposition 3, in this depressing case the parties can be locked in a completely unwinnable war despite the presence of mutually preferable deals on sharing control of the region.

> *Proposition 2.* The Fight Equilibrium is inefficient – there is always a set of possible deals $C \subset [0,1]$ on regional autonomy such that both sides would prefer to have any $c \in C$ chosen by the government in every period over the Fight Equilibrium.

Even if rebel and government military leaders can "make out like bandits" in a civil war (k_R and k_G greater than zero), the fact that the conflict is destructive of life, property, and economic activity imply that they could do even better with an appropriately distributed settlement.[29] Proposition 3 establishes, however, that under certain conditions it is *impossible*

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[29]In fact, a stronger version of Proposition 2 is true: Any equilibrium of the game in which fighting occurs with positive probability is inefficient, since both players could be made better off by replacing a "fight" period with a peace period in which all the gains of regional control are divided up.

to construct a peaceful subgame perfect equilibrium that attains such a distribution.

> *Proposition 3.* Suppose that conditions 1 and 2 above hold. Then when inequality
> (13) in Appendix 1 obtains, there does not exist a subgame perfect equilibrium in
> which the government shares control of the region in each period by choosing $c^* \in
> (0, 1)$, and the rebels always choose peace when they have the chance. When this
> inequality does not hold, it is possible to construct a subgame perfect equilibrium
> in which government and region share power in the region and do not fight on the
> equilibrium path.

The problem is credible commitment. When the government is weak, it would like
to commit to a regional autonomy deal in preference to a long civil war. Regional elites
anticipate, however, that once the government has regained its strength, nothing will stop
it from seeking to overturn or undermine the arrangements. When the government expects
that it can maintain its position for sufficiently long when its capabilities are strong (i.e., ϵ
is small enough relative to δ), the threat of future rebellion by the region is not sufficient to
keep it to a bargain.

Before presenting comparative statics results, I give a final Proposition that concerns
cases where the two conditions necessary to sustain a Fight Equilibrium (1 and 2 above) do
not both obtain. To recall, condition (2) says that the rebels prefer to fight in the hopes of
military victory (or war-time tax and other benefits) if the government is expected always
to oppress (set $c = 1$); condition (1) implies that the government prefers to fight in hopes of
reimposing its rule rather than just cede autonomy, if the rebels are expected always to fight.
If (1) is not satisfied, then the government's incentive to let the region go is greater, as is the
rebels' incentive simply to live with zero regional control if (2) is not satisfied. Proposition
4 provides sufficient conditions for these to be unique equilibrium outcomes.

> *Proposition 4.* (a) If (1) holds and $k_R < -\delta(\alpha + \beta)/(1 - \delta)$ then then the game's
> unique subgame perfect equilbrium has the government choosing $c_t = 1$ and to
> fight if given the choice, while the rebels choose not to fight whenever they can.
> Thus, on the equilibrium path, the government assumes full control of the region
> and this is not contested by rebels when the government weakens.
> (b) If (2) holds and $k_G < -\beta\delta/(1 - \delta)$, then the game's unique subgame perfect
> equilibrium has the rebels fighting whenever they can, the government choosing

$c = 1$ whenever it can, and the government ceding autonomy (not fighting, and thus ending the game) whenever it has this choice. Thus, on the equilibrium path, the government assumes full control until it faces a shock, in which period it allows full autonomy.

5.4   Comparative statics results

Changes in the model's parameters can affect the likely duration of a conflict in two ways: directly, by affecting the probability of stalemate during fighting (i.e., changes in γ), or indirectly, by shrinking or expanding the set of enforceable deals that both sides prefer to the Fight Equilibrium. Strictly speaking, in the model the size of the set of enforceable deals bears only on the probability that civil war occurs, not on its duration.[30] It may be reasonable to assume, however, that the larger the set, the more likely that random, possibly unanticipated shocks to parameters that occur in the course of a conflict will make a deal feasible. I will make this assumption in interpreting the comparative statics of the model.

Benefits obtained and costs incurred during a civil war. Increasing the benefits that government or rebel leaders can obtain *during* a civil war (k_G and k_R) lowers the likelihood that a stable regional autonomy agreement can be reached. Increasing the government's benefits for unopposed control of the region, or the rebels' benefits for full autonomy, has the same effect (formally this is equivalent to increasing k_G or k_R).

The logic behind this conclusion is *not* that the parties have less incentive to agree when they are doing relatively well in war. In this model, the parties *always* have an incentive to agree since they can always do better in principle with some autonomy sharing arrangement. Rather, the logic is that when (say) the rebels do better day-to-day in a civil war (due to contraband or outside support, for instance), they need to be given more in a regional autonomy deal to be willing to accept it. But the more the government has to give away,

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[30]If increasing a parameter, say α, shrinks the set of enforceable regional autonomy agreements as given by Proposition 3, then the we can say that the ex ante probability of such a deal decreases on the argument that this is what would occur if all other parameters were drawn from probability distributions before the start of the game.

the more tempted it will be to renege when it is again in a strong position, which makes it harder to construct a credible negotiated settlement.

This result may help explain why sons-of-the-soil and contraband-financed insurgencies are so intractable. When the state is controlled by a majority ethnic group whose members include large numbers of impoverished, land-poor farmers, the government has an enduring interest in favoring migration to less populated peripheral areas. Even if the center has incentives to cut regional autonomy deals to reduce costly fighting with ethnic minority guerrillas, both sides know that the center will soon face strong political pressures to renege on behalf of migrants. Likewise, if there are significant natural resource or contraband rents available in the region, this increases k_G or k_R (whoever controls them), thus making a negotiated settlement more difficult to construct.

A related result may inform the finding that wars of decolonization were relatively brief. Note first that Britain and France let the large majority of their colonies go without any fight at all. And not for lack of military capability and prospects – the British successfully crushed the Mau Mau insurgency in Kenya in a few years, and in only a few cases did the British or French face armed colonial insurrections. In terms of the model, most of decolonization corresponds to the second case described in Proposition 4, where an exogenous shock (the end of World War II and the change in great power leadership to states opposed to colonialism) confronted metropoles that were not willing to bear many costs to keep their empires (k_G was significantly negative). The main exceptions are just those cases where the metropole had strong economic or domestic political benefits (due to lobbying by settlers) for keeping control, namely French Algeria and Angola, Guinea Bissau, and Mozambique for Portugal.[31]

Military capabilities. Empirical studies of both civil and interstate war duration have often looked for an effect of "relative capabilities," usually on the hypothesis that balanced capabilities will imply longer duration.[32] The mere set-up of the model shows that it is

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[31]On the economic importance of the "ultramar" to Salazar's Portugal, see Cann (1997).

[32]Bennett and Stam (1996) found that balanced national capabilities were powerfully associated with

too simplistic to think in terms of a one-dimensional "balance of capabilities" when asking about war duration. A side's military capabilities influence both the probability of stalemate (γ) and the relative odds of decisive victory (α/β). For example, "relative capabilities" in the sense of the odds of a decisive victory might be the same for (a) coup plotters versus a government, and (b) rural guerrillas versus a government, but the odds of stalemate each period would be low in the first case and high in the second. It is not the *balance* of capabilities that directly affects duration here, but their nature (γ). To complicate matters further, the "balance of capabilities" *could* influence duration indirectly by affecting the ability to construct a regional autonomy deal.

Not surprisingly, making the military technology less "decisive" in the model (increasing γ holding α/β constant) increases the expected duration of civil war in the model. However this also makes it more likely or easier to construct a negotiated settlement, so the overall implication for war duration is not entirely clear.

A similar ambiguity arises if we increase either the rebels' or the governments' capabilities to gain a decisive military victory (that is, increasing α or β while holding the other fixed and letting γ decrease.) This *decreases* the probability that a negotiated settlement can be constructed, because the stronger party will now need more from peace to accept it, which tends to exacerbate the commitment problem. But at the same time, increasing decisiveness reduces the expected duration of a civil war if it is not settled by negotiation.

Finally, if we hold the decisiveness of the military technologies (γ) constant and vary the relative prospects of the rebels and the government (α/β), we find that negotiated settlements are more feasible when the government is stronger and less feasible when the

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longer interstate wars. The hypothesis is difficult to apply to the context of *civil* wars, since it is meaningless unless we have a common metric by which to compare capabilities. This is available for interstate wars, but how to assess whether a state's military capabilities are "balanced" with those of a band of guerrillas, except by looking at the results that we want to predict? Lindsay and Enterline (1999) find that third party interventions on both sides in a civil war associate with longer duration in the COW civil war data set, although without a common metric we can't say whether these interventions made the "balance of capabilities" more balanced or less balanced.

rebels are stronger. If the government is more likely to win militarily but the expected duration of war remains the same (γ is unchanged), then the rebels' value for war is reduced, and they are willing to accept a less favorable autonomy deal. This makes it easier for the government to abide by the deal when it is strong, thus favoring a negotiated settlement. By contrast, if the rebels are more likely to win militarily, their value for fighting increases and they require more from an autonomy deal, which makes it harder for the government to abide when it is strong.[33]

Government instability. If shocks to the government's repressive capability are sufficiently rare or surprising (ϵ is small enough), then negotiated settlements are impossible in the model. The reason is that negotiated settlements, when they can be constructed, are supported by regional actors' implicit threat to return to war if the government reneges. Anything that weakens this threat, such as greater assurance of continued relative advantage for the government (low ϵ), makes peace harder to build.

6 Conclusion

The model and related arguments in the last section may help explain four of the five principal empirical findings from the first part of the paper. Wars originating as coups or popular revolutions have tended to be short because this technology for taking state power turns on the success or failure of a rapid tipping process – hoped for defections within the security apparatus. Peripheral insurgencies, by contrast, succeed or fail either by military victory or by gaining a favorable negotiated settlement.[34]

Civil wars since 1945 have lasted significantly longer when they have involved land or natural resource conflicts between state-supported migrants from a dominant ethnic group

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[33]Quite possibly the reverse result would obtain if we assumed that random shocks influence the capabilities of a regional political authority set up by an autonomy deal.

[34]Alternatively, as shown by an interesting case in the model, they may "succeed" by providing the rebels and government agents an income and other benefits that is better than what they could get under a peace deal, due to commitment problems that destabilize mutually advantageous settlements.

and the ethnically distinct "sons of the soil" who inhabit the region in question. They also appear to last longer when the rebels have access to finance from contraband goods like opium or cocaine. The model's results showed that a stable regional autonomy deal is harder to construct when the political center's stakes in the region are greater (as when land is wanted for migration of members of the ethnic minority, or the region has valuable natural resources), and when the rebel force can extract more from a region during the course of a war (by "taxing" or trafficking contraband). Both factors make deals harder to reach by requiring that one side get more to prefer peace to war, which implies that suspicions about reneging will be more justified.

Finally, wars of decolonization tended to be few relative to the numbers of colonies and brief compared to the average in this period. In the model, a political center that faces large costs for fighting relative to the benefits of holding a territory will hold on till faced with an exogenous shock, and then "let go" without a fight. If the costs are just low enough to incline it to fight, a negotiated settlement would be expected to be relatively easy to reach.

Empirically, the several civil wars in post-Soviet Eastern Europe have been relatively short. These cases appear to have been shorter because the rebels in most of them had support from a strong power against quite weak and new states, allowing for fairly decisive rebel victories at an early stage. In the model, increasing one side's probability of decisive victory shortens expected war duration. However, the thrust of the analytical results on relative military capabilities is that matters are complicated, since imbalanced capabilities should reduce prospects for a negotiated settlement while balanced capabilities increase them. The empirical obstacles to testing the impact of relative capabilties on civil war duration are also great, since governments and guerrillas deploy such different capabilities that it is difficult to know how to measure the balance. In addition, the model highlights the problem of untangling relative capabilities from the propensity of different capabilities to produce decisive victory or stalemate.

The idea that commitment problems are important obstacles to reaching stable regional

autonomy deals is advanced here largely as a theoretical conjecture that has implications consistent with the empirical record.[35] Future research might profitably investigate whether or how this mechanism matters in particular cases, and policy analysts concerned with civil war termination might focus more on strategies of international monitoring that would allow mutually advantageous commitments to be made. Another simple, general point that emerges from the analysis is that the mechanisms driving civil wars differ markedly. We can gain a lot of empirical and theoretical leverage by looking for these distinct mechanisms before we start running regressions. For example, apart from Weiner (1978) and Fearon and Laitin (2000b), "sons of the soils" cases have not been noticed in the civil conflict literature as having quite distinct and interesting – if tragic – dynamics.

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[35]The model developed in section five focuses the question of credible commitment by the government. However, governments also worry that granting a regional autonomy deal may empower regional radicals to demand even more. So there are potential problems of credible commitment on *both* sides worth exploring more systematically in future work.

Appendix 1

Proof of Proposition 1. Call the Fight Equilibrium strategies $\sigma^{FE} = (\sigma_G^{FE}, \sigma_R^{FE})$. Under σ^{FE}, G's expected payoffs are given by

$$V_G^P = (1-\epsilon)(1+\delta V_G^P) + \epsilon(1+\delta V_G^W) \tag{3}$$

$$V_G^W = k_G + \alpha 0 + \beta \delta V_G^P + \gamma \delta V_G^W \tag{4}$$

where V_G^P is G's expected payoff going into a peace period and V_G^W is G's expected payoff going into a war period.

Similarly, R's expected payoffs in σ^{FE} are determined by

$$V_R^P = (1-\epsilon)(0+\delta V_R^P) + \epsilon(0+\delta V_R^W) \tag{5}$$

$$V_R^W = k_R + \alpha\delta\frac{1}{1-\delta} + \beta\delta V_R^P + \gamma\delta V_R^W \tag{6}$$

These solve, tediously, to

$$V_G^P = \frac{1-\gamma\delta+\epsilon\delta k_G}{(1-(1-\epsilon)\delta)(1-\gamma\delta)-\beta\epsilon\delta^2} \tag{7}$$

$$V_G^W = \frac{k_G}{1-\gamma\delta} + \frac{\beta\delta}{1-\gamma\delta}V_G^P \text{ and} \tag{8}$$

$$V_R^W = \frac{(k_R+\alpha\delta/(1-\delta))(1-(1-\epsilon)\delta)}{(1-(1-\epsilon)\delta)(1-\gamma\delta)-\beta\epsilon\delta^2} \tag{9}$$

$$V_R^P = \frac{e\delta}{1-\delta(1-\epsilon)}V_R^W \tag{10}$$

By the optimality principle for dynamic programming, σ^{FE} is a subgame perfect equilibrium if and only if no one-period deviation by either player after any history improves that player's payoff from that period forward. Given that it will not affect R's play under σ_R^{FE}, deviating to $c < 1$ in a peace period only lowers G's payoff. For fighting rather than ceding autonomy to be optimal in a war period requires that G have $V_G^W \geq 0$, which reduces to condition 1 in Proposition 1. In a peace period in which G is weak, for R to prefer to fight rather requires that $V_R^P \leq V_R^W$, which follows from (8) and $d < 1$. For R to prefer to fight rather than return to a peace period given σ_G^{FE} requires that $V_R^W \geq 0$, which reduces to condition (2) in Proposition 1. QED.

Proof of Proposition 2. In a peace period, at least one deal exists that both G and R prefer to the Fight Equilibrium provided that there is a $c^* \in (0,1)$ such that $c^*/(1-\delta) > V_G^P$ and $(1-c^*)/(1-\delta) > V_R^P$. Such a c^* exists if and only if $V_G^P + V_R^P < 1/(1-\delta)$.

Using expressions (3) and (5) above, algebra shows that this inequality holds provided that $k_G + k_R < 1$, which is assumed. A similar argument works for war periods.

Proof of Proposition 3. When conditions (1) and (2) obtain, σ^{FE} constitutes an optimal penal code since it yields minmax payoffs forever after. So if an equilibrium path agreement on a $c^* \in (0,1)$ cannot be supported by the rebels' threatening reversion to σ^{FE} if G deviates from c^*, then the rebels have no threat that can induce the government to choose anything other than $c = 1$ in each period, which implies further that σ^{FE} is unique.

G prefers to stick with c^* in each peace period provided that

$$\frac{c^*}{1-\delta} \geq 1 + \delta V_G^P. \tag{11}$$

R prefers *not* fight when the government is weak provided that

$$\frac{1-c^*}{1-\delta} \geq V_R^W. \tag{12}$$

There exists a c^* such that both conditions are satisfied provided that

$$V_R^W + \delta V_G^P \leq \frac{\delta}{1-\delta}.$$

Using expressions (3) and (6) above and a great deal of algebra, this reduces to the inequality

$$k_R + k_G \frac{\epsilon\delta}{1-\delta(1-\epsilon)} \leq \frac{1}{1-\delta}\left(\delta(1-\gamma\delta-\alpha) - \frac{\epsilon\beta\delta^3 + (1-\delta)(1-\gamma\delta)}{1-\delta(1-\epsilon)}\right) \tag{13}$$

When (13) obtains, the following strategies will support a subgame perfect equilibrium in which the government chooses any $c^* \in (0,1)$ that satisfies the conditions (11) and (12) above in each period: For R, choose not to fight when the government is weak, provided that the government has always chosen $c_t = c^*$; if the government has ever deviated, play σ_R^{FE}. For G, choose $c_t = c^*$ provided that R has never fought and G has chosen c^* in all prior periods; if either G or R deviated, play σ_G^{FE}. Conditions (1) and (2) ensure that neither player has an incentive to deviate to "not fight" during a war. Condition (11) ensures that G does not want to deviate to any thing other than c^* when G is strong (a fortiori G does not want to deviate from c^* when G is weak, since $V_G^P > V_G^W$). Condition (12) ensures that R is receiving enough on the equilibrium path that it prefers not to deviate to fight when G is weak. QED.

Proof of Proposition 4. (a) It is straightforward to check that the strategies described in the Proposition form a subgame perfect equilibrium whenever (1) holds and (2) does not (note that $k_R < -\delta(\alpha + \beta)/(1-\delta)$ is slightly stronger than condition (2)). We also know from Proposition 3 that we cannot support the Fight Equilibrium unless both (1) and (2) hold. So, to show uniqueness we need to show that it is not possible when (1) holds and

$k_R < -\delta(\alpha + \beta)/(1 - \delta)$ to construct an equilibrium in which the rebels at least sometimes get $c < 1$ on the equilibrium path.

To induce G to play $c < 1$ in equilibrium, R has to be able credibly to threaten to fight at the next opportunity. This is only possible if failing to fight after a deviation to $c_t > c_t^*$ by G results in R doing even worse. The worst R can do in equilibrium is to get 0 (R's minmax payoff when condition (2) fails) ever after by not fighting in the face of $c_t = 1$. R's payoffs for fighting to "get back to" an expected equilibrium path agreement at c^* is

$$\hat{V}_R^W = k_R + \alpha\delta/(1 - \delta) + \beta\delta\frac{1 - c^*}{1 - \delta} + \gamma\delta\hat{V}_R^W.$$

Algebra shows that $\hat{V}_R^W \geq 0$ if $k_R + \alpha\delta(1 - \delta) + \beta\delta(1 - c^*)/(1 - \delta) \geq 0$. Since R cannot possibly do better than get $c^* = 0$ (in fact, when condition (1) holds it cannot do this well), the largest $\hat{V}_R^W$ can possibly be is $k_R + \delta(\alpha + \beta)/(1 - \delta)$, which yields the condition in the Proposition. QED.

(b) Exactly the same sort of argument applies here, regarding whether G can credibly threaten to fight in order to return to an equilibrium deal when R deviates by fighting if the government is weak.

Appendix 2

Country	Duration:Years	Case Name	Country	Duration:Years	Case Name
UK	31:69-99	IRA	IRAQ	14:61-74	KDP, PUK (Kurds)
PORTUGAL	15:61-75	Angola	MOROCCO	14:75-88	Polisario
PORTUGAL	13:62-74	Guinea-Bissau	ALGERIA	8:92-	FIS
FRANCE	10:45-54	Vietnam	YEMEN AR	8:62-69	Royalists
FRANCE	8:54-61	Algeria	TURKEY	4:77-80	Militia-ized party politics
UK	7:50-56	CPM (Emergency)	YEMEN PE	2:86-87	Faction of Socialist Party
BELGIUM	6:56-61	Rwandan revolution	ALGERIA	2:62-63	Kabylie
FRANCE	6:55-60	Cameroon	IRAN	2:78-79	Khomeini
GREECE	5:45-49	DSE	YEMEN	1:94-94	South Yemen
UK	5:52-56	Mau Mau	IRAQ	1:59-59	Shammar
PORTUGAL	5:65-69	Mozambique	YEMEN AR	1:48-48	Opp. coalition
FRANCE	4:53-56	Morocco	LEBANON	1:58-58	Nasserites v. Chamoun
FRANCE	3:52-54	Tunisia	CYPRUS	1:74-74	Cypriots, Turkey
NETHERLA	2:45-46	IPA	JORDAN	1:70-70	Fedeyeen/Syria v. govt
FRANCE	2:47-48	Madagascar	CHAD	36:65-	FROLINAT, various ...
MOLDOVA	6:92-97	Dniestr Rep.	ANGOLA	25:75-	UNITA
TAJIKIST	6:92-97	UTO	MOZAMBIQ	20:76-95	RENAMO
BOSNIA	4:92-95	Rep. Srpska/Croats	ETHIOPIA	19:74-92	Eritrea, Tigray, etc.
CROATIA	4:92-95	Krajina	SUDAN	17:83-	SPLA, etc.
RUSSIA	3:94-96	Chechnya	SOUTH AF	12:83-94	ANC, PAC, Azapo
AZERBAIJ	3:92-94	Nagorno-Karabagh	SENEGAL	11:89-	MFDC (Casamance)
GEORGIA	3:92-94	Abkhazia	SOMALIA	11:81-91	SSDF, SNM (Isaaqs)
RUSSIA	1:99-	Chechnya II	RWANDA	10:90-99	RPF, genocide
YUGOSLAV	1:91-91	Croatia/Krajina	SUDAN	10:63-72	Anya Nya
BURMA	52:48-	CPB, Karens, etc.	SIERRA L	9:91-	RUF, AFRC, etc.
INDIA	49:52-	N.East rebels	ANGOLA	9:92-	FLEC (Cabinda)
INDONESI	35:65-	OPM (West Papua)	SOMALIA	9:91-	post-Barre war
PHILIPPI	30:68-97	MNLF, MILF?	LIBERIA	8:89-96	NPFL, INPFL
INDONESI	25:75-99	E. Timor	ZIMBABWE	8:72-79	ZANU, ZAPU
PHILIPPI	23:72-94	NPA	UGANDA	7:81-87	NRA, etc.
BANGLADE	22:76-97	Chittagong Hills	BURUNDI	7:93-	Hutu groups v. govt
SRI LANK	17:83-	LTTE, etc.	UGANDA	7:93-	LRA, West Nile, etc.
VIETNAM,	16:60-75	NLF	DEM. REP	6:60-65	Katanga, Kasai, CNL
AFGHANIS	15:78-92	Mujahideen	MALI	6:89-94	Tuaregs
CAMBODIA	15:78-92	Khmer Rouge, etc	ZIMBABWE	5:83-87	Ndebele guer's
LAOS	14:60-73	Pathet Lao	CHAD	5:94-98	Rebels in South
INDIA	12:82-93	Sikhs	NIGERIA	4:67-70	Biafra
PAPUA N.	11:88-98	BRA (Bougainville)	RWANDA	4:62-65	Post-rev strife
INDIA	11:89-	Kashmir	ETHIOPIA	3:97-	ALF, ARDUF (Afars)
CHINA	9:91-	Xinjiang	DEM. REP	2:96-97	AFDL (Kabila)
INDONESI	9:91-	GAM (Aceh)	DJIBOUTI	2:93-94	FRUD
AFGHANIS	8:92-	v. Taliban	GUINEA B	2:98-99	Mil. faction
PHILIPPI	7:46-52	Huks	CENTRAL	2:96-97	Factional fighting
PAKISTAN	7:93-99	MQM:Sindhis v. Mohajirs	DEM. REP	2:98-	RCD, etc v. govt
CAMBODIA	6:70-75	FUNK	CONGO	2:98-99	Factional fighting
CHINA	5:46-50	PLA	BURUNDI	1:88-88	Org. massacres
PAKISTAN	5:73-77	Baluchistan	BURUNDI	1:72-72	Hutu uprising
CHINA	4:56-59	Tibet	COLOMBIA	37:63-	FARC, ELN, etc
SRI LANK	3:87-89	JVP II	GUATEMAL	29:68-96	URNG, various
INDONESI	3:58-60	Darul Islam, PRRI, etc.	COLOMBIA	15:48-62	La Violencia
NEPAL	3:97-	CPN-M/UPF (Maoists)	PERU	15:81-95	Sendero Luminoso
CHINA	2:50-51	Tibet	EL SALVA	14:79-92	FMLN
KOREA, S	2:49-50	v. Rhee	NICARAGU	8:81-88	Contras
INDIA	1:48-48	Hyderabad	HAITI	5:91-95	Mil. coup
SRI LANK	1:71-71	JVP	NICARAGU	2:78-79	FSLN
PAKISTAN	1:71-71	Bangladesh	CUBA	2:58-59	Castro
INDONESI	1:53-53	Darul Islam	ARGENTIN	1:55-55	Mil. coup
INDONESI	1:50-50	Rep. S. Moluccas	BOLIVIA	1:52-52	MNR
LEBANON	16:75-90	various militias	PARAGUAY	1:47-47	Febreristas, Libs, Comms
TURKEY	16:84-99	PKK	COSTARIC	1:48-48	NLA
IRAN	15:79-93	KDPI (Kurds)	DOMINICA	1:65-65	Mil. coup

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Table 2: Correlates of Civil War Duration, 1945-99

(Weibull regression with duration in years as dep. var.)

Model #	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Coup/Rev.	4.110**	3.810**	3.991**	4.338**	3.628**	4.081**	4.115**
	(5.20)	(4.83)	(4.90)	(5.05)	(4.47)	(4.97)	(5.22)
Post-Soviet	3.100**	3.154**	2.619*	3.188**	3.192**	3.155**	3.177**
	(2.89)	(2.93)	(1.97)	(2.94)	(2.97)	(2.90)	(2.95)
Not contiguous	1.848*	2.301*	1.802	1.736	2.060*	3.355	1.805
	(2.01)	(2.43)	(1.92)	(1.69)	(2.27)	(1.17)	(1.94)
Sons of Soil	0.291**	0.306**	0.294**	0.275**	0.324**	0.266**	0.314**
	(3.27)	(3.13)	(3.20)	(3.29)	(2.90)	(3.28)	(3.03)
Contraband	0.300**	0.287**	0.296**	0.298**	0.269**	0.318**	0.290**
	(2.77)	(2.87)	(2.79)	(2.78)	(2.97)	(2.62)	(2.85)
Ethnic Frac. (0 to 1)		0.560					
		(1.47)					
GDP/cap (lagged, in 1000s)			1.068				
			(0.67)				
ln(Pop.) (lagged)				1.046			
				(0.53)			
Ethnic War (1,2,3)					0.847		
					(1.27)		
Democracy (lagged, -10 to 10)						0.988	
						(0.72)	
ln(Tot. dths/duration)							1.077
							(1.24)
p	1.21	1.22	1.22	1.21	1.21	1.19	1.23
se(p)	.09	.10	.10	.10	.09	.10	.10
N	121	121	116	121	121	106	121
N(ended)	98	98	93	98	98	83	98

Abs. value of z-statistics in paren
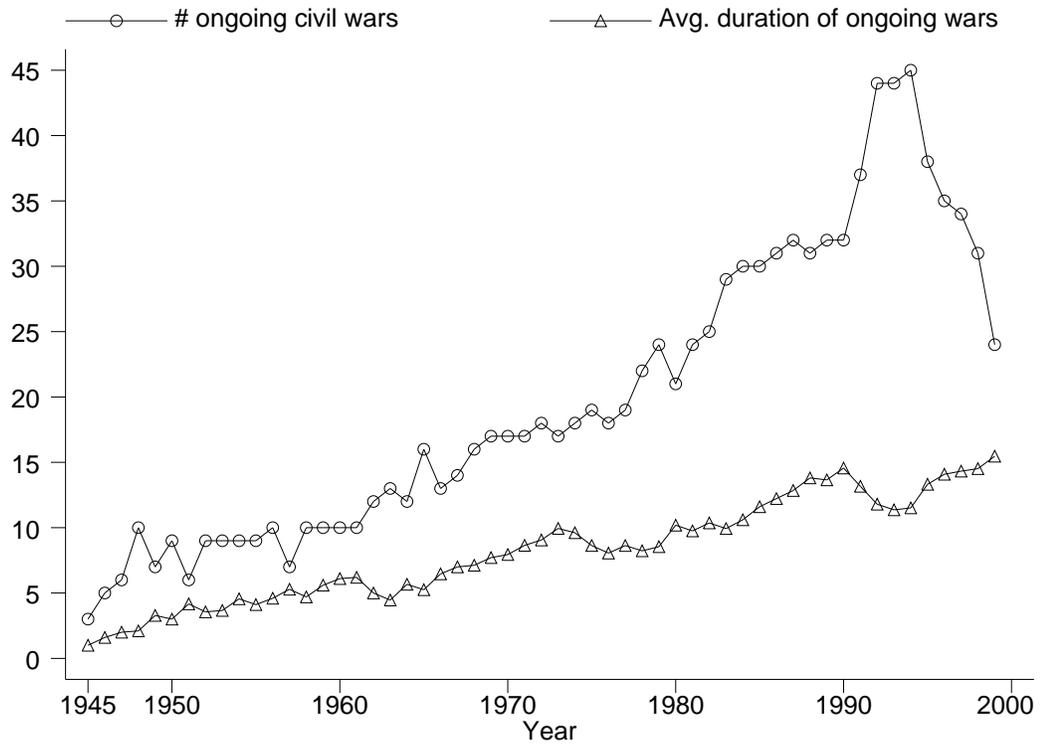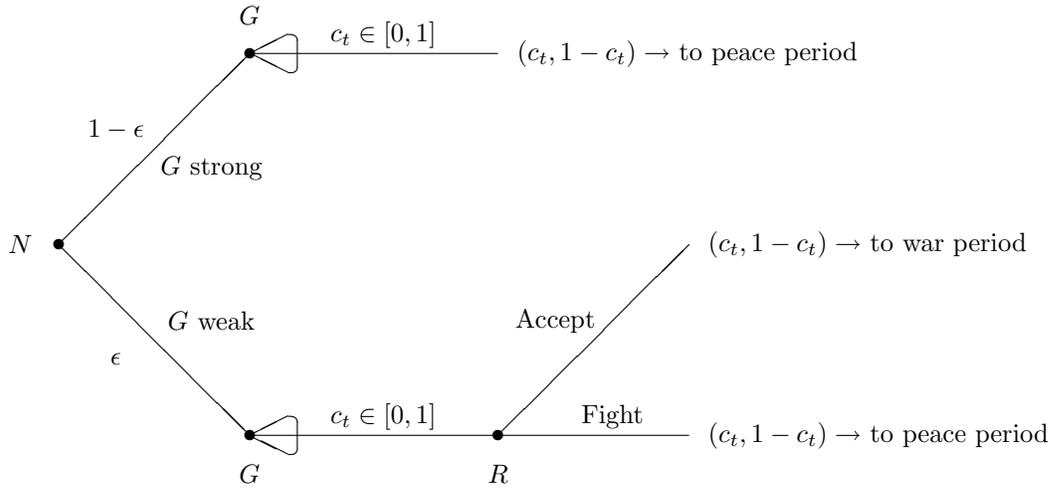* significant at 5%; ** significant at 1%

Figure 1

Figure 2

Peace periods

War periods