A Theory of Strategic Civil War Aims: Explaining the Mixed Oil-Conflict Curse

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Abstract

This article develops a theory of strategic civil war aims and applies it to explain an empirical puzzle: oil wealth correlates positively with separatist civil war onset (among oil-rich ethnic minorities), but negatively with civil wars to capture the center. A formal model with endogenous war aims highlights two countervailing oil production effects, a conflict-suppressing budget effect and a conflict-inducing relative prize effect. Regional ethnic challengers that optimally choose separatism experience a larger relative prize effect for two reasons. First, a strategic selection mechanism: governments face more severe commitment problems toward small ethnic groups—which prefer separatist over center-seeking civil war. Second, a geography of rebellion mechanism: oil-funded repression more effectively deters center-seeking challenges than peripheral insurgencies. The results yield additional conditional implications for civil war onset supported by empirical evidence, and broader insight into endogenous civil war aims and how risk factors can heterogeneously affect civil war.

Keywords: Civil war, formal theory, oil, resource curse

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Conventional civil war theories posit diverse explanations for civil war onset ranging from economic motivations (Collier and Hoeffler, 2004) to state weakness (Fearon and Laitin, 2003) to ethnopolitical grievances (Cederman, Gleditsch and Buhaug, 2013). However, most major theories explain aggregate civil war onset without distinguishing rebellion aims, despite the empirical prevalence with which rebels pursue different war goals. Between 1946 and 2013, independent non-European countries experienced 74 major *center-seeking civil wars* in which rebel groups aimed to capture the capital. For example, in Angola, rebel leader Joseph Savimbi of UNITA sought to overthrow the Soviet-influenced "imperial" government in Luanda, the capital city (Savimbi, 1985). Also since 1946, countries have experienced 43 major *separatist civil wars* that aimed to create an autonomous region or independent country. Amid the Angolan government's war with UNITA, the rebel group FLEC sought to gain independence and end Angola's "military occupation" of Cabinda (Cabinda Free State, n.d.).[1]

Why do rebel groups sometimes fight for the center and sometimes to separate? Do conflict risk factors that induce center-seeking fighting differ from factors that encourage separatist insurgencies—given distinct rebellion goals? Although several important theories in the broader literature examine causes of separatist civil wars (e.g., Toft, 2005; Walter, 2009; Lacina, 2015) or the technology of rebellion (Kalyvas and Balcells, 2010; Bueno de Mesquita, 2013), most theories do not address how rebels choose center-seeking versus separatist civil war aims.[2] Furthermore, for empirical research, if a risk factor correlates with one type of civil war and not the other—or correlates in opposing directions for different conflict types—then aggregating civil wars can miss important relationships.

The relationship between oil production and civil war onset exemplifies these considerations. Scholars in the vast conflict resource curse literature usually examine two key oil-conflict findings independently, or overlook them by aggregating civil wars. First, oil-rich ethnic minority groups, such as Angola's Cabindan Mayombe, fight separatist civil wars relatively *frequently* (Sorens 2011; Ross 2012, 155-6; Morelli and Rohner 2015). Ethnic groups excluded from power in the central government most strongly exhibit this trend (Asal et al., 2016; Hunziker and Cederman, 2017). Second, oil-rich countries such as Saudi Arabia fight *fewer* center-seeking civil wars (Paine, 2016), consistent with broader anti-resource curse evidence (Menaldo, 2016; Liou and Musgrave, 2014). By contrast, many recent studies demonstrate a null relation-

[1] Data sources and sample described below.

[2] Buhaug (2006) and Morelli and Rohner (2015) provide important exceptions, discussed below.

ship between oil production and *aggregate* civil war onset, as Ross (2015, 251) summarizes.

Like the wider literature, existing resource curse theories either combine civil war types, or propose explanations that account for one half of the mixed pattern but not the other. Amid an oil-conflict literature characterized by an "embarrassment of mechanisms" (Humphreys, 2005, 510), perhaps the most convincing conflict mechanism is that governments can heavily tax oil-producing regions, which generates redistributive grievances (Sorens 2011; Ross 2012, 155-6; Asal et al. 2016; Hunziker and Cederman 2017). Oil production is particularly easy for governments to tax not only because of immobility (Boix, 2003), but also because it is a capital-intensive, point-source resource (Le Billon, 2005, 34). Paine (Forthcoming) compares these properties of oil production to other types of economic activities that producers can more easily hide from the government, and argues that producing oil undermines a region's threat to exit the formal economy in reaction to high taxes—creating incentives to fight.

However, despite characterizing a core property of oil production that can potentially explain the separatist pattern, this mechanism cannot explain why oil negatively correlates with center-seeking civil wars. Why are redistributive grievances not also severe for groups trying to a get a slice of oil production in the government's region—which could be obtained by capturing the center?

Similarly, explanations for the rarity of center-seeking civil wars in oil-rich countries cannot explain frequent separatist civil wars in oil-rich regions. Oil and authoritarian stability theories, such as those summarized in Ross (2001), focus overwhelmingly on rentier effects that facilitate massive patronage distribution and coercion spending that can account for stabilizing properties of oil production. But why does greater spending on patronage and armament afforded by more oil revenues not also deter separatist civil wars? Other strands of the literature focused on oil and state weakness are also unsatisfactory because they anticipate oil production raising *center-seeking*, but not separatist, civil war incentives (Buhaug, 2006).[3] Better understanding the widely debated oil-conflict relationship requires studying differential effects on center-seeking and separatist civil wars.

This article presents a new theory that analyzes rebel groups' strategic choice of civil war aims and explains

[3]Other arguments in the vast oil literature focus on rebel financing. Appendix Section D.3 discusses why these theories are unconvincing for explaining empirical patterns, and also discusses new implications that the present theory offers for understanding why within-country oil field location matters.

how conflict risk factors—such as oil production—can generate heterogeneous effects on different types of civil war. Following a sizable strand of the civil war literature, the theory conceives ethnic groups as the unit of analysis. Although the general logic holds for any geographically segregated identity groups, in the real world, guerrilla leaders are more likely to organize rebellions around ethnic identity than other cleavages, which Appendix Section B.1 discusses in more depth. The core theoretical framework incorporates diverse elements from the broader civil war literature by linking ethnic group size to government commitment problems and to civil war aims, and imposing assumptions regarding how geographical factors heterogeneously affect different types of rebellions.

To show how ethnicity and geography factors affect the oil-conflict relationship, I analyze a game with strategic civil war aims. A government accrues revenues from oil production and from other economic activities in (1) the region of the country where it resides and (2) another region of the country where a challenger resides. The government allocates revenues to its military and offers transfers to the challenger, which can either accept, fight a center-seeking civil war, or fight a separatist civil war. In equilibrium, fighting may occur because the government cannot perfectly commit to deliver future transfers to, or refrain from future taxation of, the challenger. This general trigger for fighting draws from formal conflict models (Fearon, 1995, 2004; Powell, 2004; Krainin, 2017), but does not explain the form that conflict will take. The new theoretical implications arise from allowing the challenger to choose between two civil war types. By contrast, in many models, rebels can aim only for the center (Powell, 2012) or only to separate (Gibilisco, 2017). Fearon (2004) discusses how key parameters differ depending on the rebellion's aims, although rebels can choose only one type of civil war in the model. Morelli and Rohner (2015) model distinct types of civil war, but equilibrium bargaining failure results from the possibility of the *government* rather than rebel leaders choosing the rebels' war aims. Therefore, their model does not address how *rebels* choose civil war aims.[4]

Analyzing comparative statics shows that increasing oil production in either region exerts countervailing effects on equilibrium civil war likelihood. On the one hand, governments easily tax oil production—a highly capital intensive point-source resource—relative to other economic outputs. This *budget effect* diminishes equilibrium civil war prospects by increasing available funds to spend on the military and on transfers. On

[4]Additionally, substantively, it is somewhat restrictive to assume the government can make a group fight its less-preferred type of war, for example, forcing a group to fight for the center when it would rather secede.

the other hand, larger oil revenues also create a *relative prize effect* by increasing the challenger's expected utility to fighting by, simply, creating more spoils to capture or to protect from the government.

Juxtaposing these countervailing theoretical effects with the motivating oil empirical patterns suggests that the budget effect of oil outweighs the relative prize effect for center-seeking civil wars, whereas the opposite is true for separatist civil wars (for oil located in the challenger's region). But why?

Integrating these countervailing oil effects within the broader theoretical framework for understanding civil war aims yields two mechanisms to explain the mixed empirical oil-conflict pattern. First, the model explains a strategic selection effect in which commitment ability explains whether civil war occurs or not, and the size of the challenging ethnic group explains rebellion aims. Governments have lower ability to commit to transfers and to refrain from regional taxation of small ethnic groups (Assumption 1),[5] which increases the magnitude of the conflict-enhancing relative prize effect of oil production. Additionally, small groups prefer separatist over center-seeking campaigns (Assumption 2), which determines equilibrium war aims after additionally accounting for how the challenger strategically reacts to government military spending.[6] Consequently, by including distinct war types, the model explains how small groups that optimally choose separatist over center-seeking civil wars face a large relative prize effect of oil relative to the budget effect. This causes aggrieved oil-rich groups to separate. By contrast, governments exhibit greater commitment ability toward large groups, implying that oil wealth enhances the government's ability to peacefully buy off groups that would seek the center conditional on fighting. Figure 7 summarizes the logic.

The second, geography of rebellion, mechanism examines another reason the relative prize effect is larger in magnitude for numerically small challengers that prefer separatist over center-seeking fighting. Heightened military spending afforded by larger oil revenues less strongly diminishes prospects for winning a separatist than a center-seeking war (Assumption 3), grounded in empirical considerations that government military spending less effectively projects power into the periphery than protects the capital. Below, Figure 8 summarizes the logic of this geography of rebellion effect.

The logic of these two mechanisms also yields empirical implications about conditional oil effects. Oil and separatism should most strongly relate among (1) ethnic minority groups because of the strategic selection effect and (2) favorable geography for secession because of the geography of rebellion mechanism, and the

[5] Section 2 empirically supports this and the next two foundational assumptions.

[6] Appendix Section C.2.4 discusses the possibility of oil production directly shaping civil war aims.

model analysis explains why these other conflict risk factors should *complement* the oil effect. By contrast, conditions that create government vulnerability should dampen the budget effect and undermine the negative relationship between oil production and center-seeking civil war. Individual oil-conflict cases and interactive regression models support these conditional implications.

1 Motivating Puzzle: The Mixed Oil-Conflict Relationship

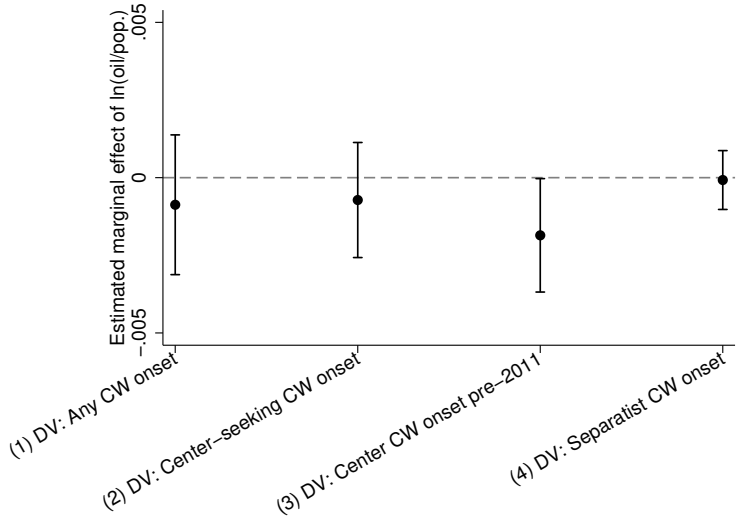
Considerable research analyzes the relationship between oil production and civil war onset, producing mixed findings and an emerging consensus that the aggregate relationship is null (Ross, 2015, 251). However, studying oil highlights the importance of disaggregating civil war aims. Whereas country-level oil wealth covaries with less frequent center-seeking civil wars (at least, before 2011), ethnic group-level oil wealth covaries with more frequent separatist civil wars. Because existing research usually examines these patterns independently, or overlooks them by aggregating civil wars, this section presents regression results that establish the motivating empirical puzzle using a common sample and dataset, and Appendix A provides supporting data information. These regressions motivate the need for a new theory of civil war aims, but do not test the theory. Instead, after analyzing the model, I present additional statistical tests that evaluate conditional implications generated by the theory.

Figure 1 summarizes a series of logit regressions with country-years as the unit of analysis between 1946 and 2013 among 150 independent non-Western European countries. The civil war onset variables draw from Fearon and Laitin's (2003) dataset on major civil war onsets (at least 1,000 battle deaths; often denoted "major" civil wars), updated through 2013 along with other alterations by the author described in Appendix A. Every specification in Figure 1 includes logged annual oil and gas production per capita, log population (the only substantive covariate in Ross' 2012 "core" specification), and peace years and cubic splines. Column 1 uses any type of civil war onset as the dependent variable, Columns 2 and 3 center-seeking civil war onset, and Column 4 separatist civil war onset.

Empirically, almost all post-1945 civil wars enable relatively unambiguous codings about center-seeking versus separatist goals. For the present civil war variables, the author combined information from Fearon and Laitin (2003) and other conflict datasets to code war aims. Only two cases yielded codings of multiple war aims for the same rebel group: SPLM/A in Sudan, and EPRDF and constituent groups in Ethiopia. Other

countries, such as Angola, Burma, and India, have experienced simultaneous center-seeking and separatist civil wars, but fought by distinct rebel groups.[7]

Figure 1: Country-Level Correlations



Notes: Figure 1 shows point estimates for the marginal effect estimate of logged oil production on civil war onset in logit models with 95% confidence intervals. The unit of analysis is country-years. Appendix A presents the corresponding regression equation and table.

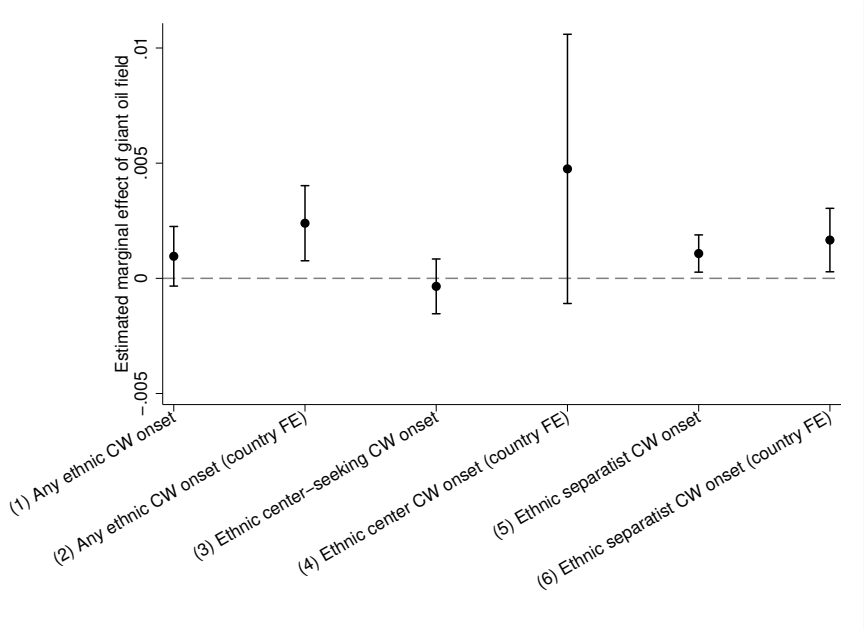
Column 1 of Figure 1 shows that the estimated marginal effect of oil production on any civil war onset is negative. Although this result is inconsistent with earlier proclamations of an oil curse, it corresponds with more recent findings that show no evidence of an unconditional oil-conflict relationship. Disaggregating civil war aims, Column 2 presents a similar estimate for center-seeking civil wars. However, until recently, oil production exhibited a relatively strong negative correlation with center-seeking civil war onset. Column 3 estimates the same model prior to the Arab Spring in 2011 and shows a large-magnitude and statistically significant negative marginal effect estimate—suggesting, perhaps, a resource blessing.[8] Holding the temporal dependence controls at their means, the predicted probability of center-seeking civil onset is 1.09% in country-years with no oil production compared to 0.57% in country-years with $1,000 in oil income per capita, a 48% decline. Finally, the correlation is essentially 0 for separatist civil wars (Column 4).

[7]Appendix A provides additional detail on coding civil war aims, and Section C.2.3 examines Sudan and Ethiopia in more depth.

[8]The theory and subsequent data analysis discuss why the Arab Spring and related events should mitigate the conflict-suppressing effect of oil production on center-seeking civil wars. Unreported specifications show that no other findings in Figures 1 and 2 qualitatively differ when truncating the sample to pre-2011.

Figure 2 summarizes a similar set of logit regressions, except ethnic group-years is the unit of analysis. The sample contains 763 politically relevant ethnic groups from the Ethnic Power Relations (EPR) dataset (Vogt et al., 2015), using similar country and year restrictions from Figure 1. The author coded the ethnic civil war data by merging Fearon and Laitin's (2003) civil war list with the EPR dataset, therefore coding "major" civil wars at the ethnic group level. I also matched EPR ethnic groups with giant oil and gas field locations, and the oil variable indicates whether the ethnic group's territory contains any giant oil or gas fields, or if there is a nearby offshore oil field. Every specification contains peace years, cubic splines, and lagged country-level civil war incidence. Even-numbered columns additionally control for country fixed effects. The dependent variable is any ethnic civil war onset in Columns 1 and 2, ethnic center-seeking in Columns 3 and 4, and ethnic separatist in Columns 5 and 6.[9]

Figure 2: Ethnic Group-Level Correlations



Notes: Figure 2 shows point estimates for the marginal effect of an indicator for giant oil/gas fields on ethnic civil war onset with 95% confidence intervals. The unit of analysis is ethnic group-years. Appendix A presents the corresponding regression equation and table.

Columns 1 and 2 of Figure 2 demonstrate a positive association between oil wealth and any ethnic civil war onset. The remaining columns demonstrate that only separatist civil wars robustly exhibit this relationship. In the Column 5 specification, holding temporal dependence controls at their means, the annual predicted

[9] Hunziker and Cederman (2017) provide complementary statistical results to Figure 2, although use a different oil measure and civil war dataset.

probability of separatist civil onset is 2.2 times greater for oil-rich than oil-poor groups: 0.30% versus 0.13%. Furthermore, whether or not controlling for country fixed effects, the association is statistically significant at 5%. By contrast, the marginal effect estimate for the giant oil field indicator on center-seeking civil wars is inconsistent in sign and not statistically significant in Columns 3 and 4.[10]

2 Foundational Assumptions for Strategic Civil War Aims

Gaps in existing civil war theories highlight the need for a new theory that explains how rebels choose civil war aims, and how that choice can generate heterogeneous effects of a conflict risk factor—such as oil production—on different types of civil war. This article follows a sizable strand of the civil war literature by conceiving ethnic groups as the unit of analysis (also see Appendix Section B.1). Before formally examining strategic incentives, I non-formally state three foundational assumptions that relate ethnicity and geography to civil war onset and aims, accompanied by arguments and evidence to motivate their empirical relevance.[11] Subsequently, the formal model analysis shows how these generally applicable assumptions affect the magnitude of the key oil effects—budget and relative prize—to explain heterogenous effects of oil production on different types of civil war.

2.1 Assumption 1. Ethnic Group Size and Commitment Ability

The first foundational assumption for the theory is that governments have lower ability to commit to transfers and to refrain from exploitative taxes when bargaining with numerically small ethnic groups. This assumption is reasonable because, empirically, central governments exclude small ethnic groups from power relatively frequently. Recent ethnic conflict research focuses considerably on access to central power—which can arise from positions in the cabinet, military, legislature, or ruling party—and demonstrates its empirical relationship with civil war onset (Cederman, Gleditsch and Buhaug, 2013). Power-sharing ar-

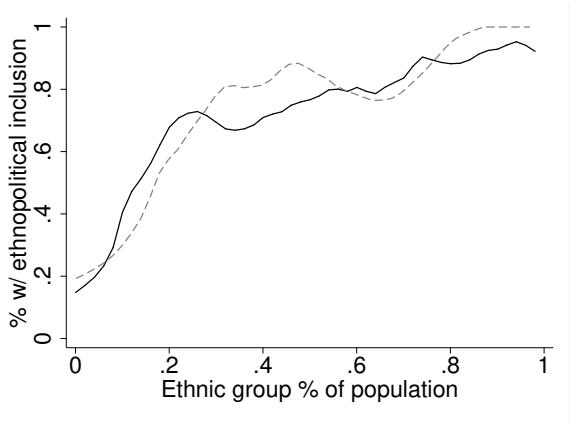
[10]The high uncertainty of the Column 4 specification arises from the large number of ethnic groups dropped by the country fixed effects in logit models (see Table A.2). Unreported estimates from linear models do not alter the statistical significance or lack thereof in any column, but more precisely estimate Column 4.

[11]Appendix Sections B.2, B.3, and B.4 provide supporting information.

rangements at the center should improve a government's ability to commit to future transfers and tax concessions, which formal bargaining models show should mitigate conflict prospects (Powell, 2004; Fearon, 1995, 2004; Krainin, 2017).

However, the ethnic conflict literature devotes considerably less attention to explaining groups' access power at the center.[12] The black line in Figure 3 displays the relationship between group size and power access using the same ethnic group sample as in Figure 2. The horizontal axis expresses the ethnic group's national population share. The vertical axis expresses political representation in the central government. Specifically, the Ethnic Power Relations dataset (Vogt et al., 2015) codes politically relevant ethnic groups' decision-making authority within the central government, based on who controls the presidency, cabinet positions, and senior posts in the administration. In Figure 3, group-years with a power access status of "monopoly," "dominant," "senior partner," or "junior partner" are coded as included in power, whereas groups with any other power access status are coded as excluded. The black local polynomial curve demonstrates a positive relationship between ethnic group size and ethnopolitical inclusion. The dashed gray curve shows that the pattern is similar among ethnic groups with a giant oil field in their territory.

Figure 3: Ethnic Group Size and Ethnopolitical Inclusion



Notes: Figure 3 summarizes the relationship between ethnic group percentage of the population and ethnopolitical inclusion with local polynomial functions. The black curve uses the same ethnic group sample and years as Figure 2, and the dashed gray curve subsets this sample to ethnic groups with a giant oil field in their territory. Appendix A provides additional data details.

Despite these aggregate patterns, there are of course exceptions in which minority groups access power at the center. Following the model, I discuss theoretical implications of these deviant cases (see Hypothesis 1)

[12] Appendix Section B.2 provides a review, and possible theoretical rationales for lower representation for small groups.

and accompanying empirical evidence.

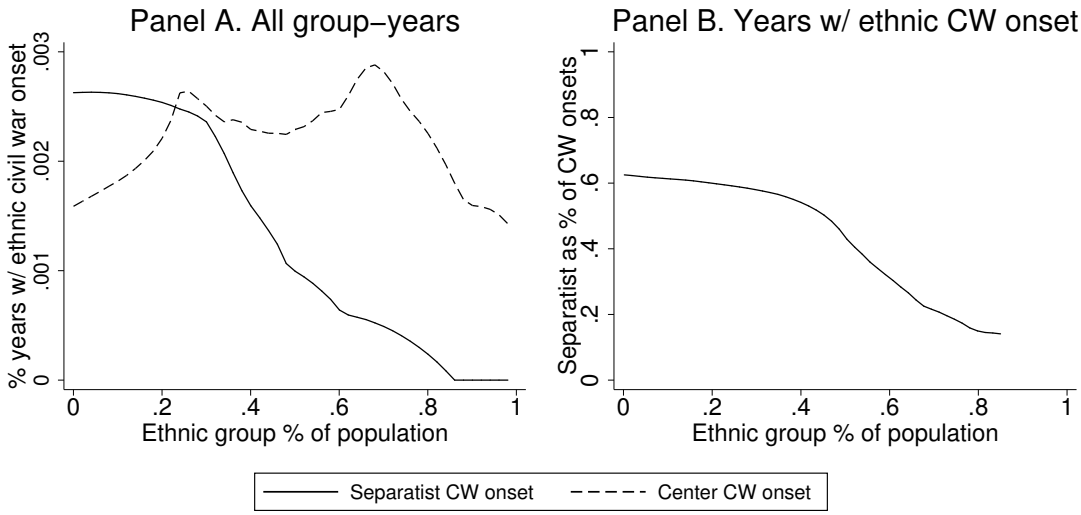
2.2 Assumption 2. Ethnic Group Size and Strategic Civil War Aims

Ethnic group size also influences civil war aims. The second foundational assumption for the theory is that, conditional on fighting, small ethnic groups are more likely to fight separatist civil wars than are large ethnic groups. Figure 4 demonstrates the empirical relevance of this assumption using the same ethnic group sample and civil war data as in Figure 2.[13] In Panel A, the unit of analysis is ethnic group-years. The vertical axis presents ethnic civil war onset frequency, with wars disaggregated into center-seeking and separatist. Panel B restricts the sample to group-years with ethnic civil war onset, and the vertical axis indicates whether the new civil war is separatist. Panel A demonstrates a clear trend of separatist civil war propensity decreasing in ethnic group size. And, the overall pattern for small enough groups (roughly, 75% of the population or less) is that center-seeking civil war frequency increases in group size. Correspondingly, at a threshold of around 25% of the population, the modal type of ethnic civil war switches from separatist to center-seeking. Panel B demonstrates this change in relative frequency even more clearly: conditional on rebelling, separatist civil wars become rarer as ethnic group size increases. In fact, in the sample, only two ethnic majority groups fought separatist civil wars: Bengali in Pakistan in 1971, and Southerners in Yemen in 1994.

Two considerations may explain this relationship. First, small ethnic groups face difficulties mustering sufficient support against numerically superior government forces to win control of the government. By contrast, greater knowledge of terrain and local support may facilitate surviving protracted guerrilla wars in the periphery. Because rebels usually tailor their demands to feasible objectives (Buhaug, 2006; Jenne, Saideman and Lowe, 2007), small groups that fight tend to pursue separatism because the probability of winning is higher. For example, Cabinda is an enclave province of Angola, which, historically, has created difficulties for the government to control the Cabindan Mayombe (Martin, 1977), and the Cabindan Mayombe's small size inhibits conquering the capital city of Luanda. Second, conditional on winning, capturing the government tends to offer a greater prize than gaining an autonomous or independent state. Consequently, for equivalent probabilities of winning each type of civil war, rebel groups should prefer center-seeking. Large ethnic groups can viably contend for the center, which often pushes them toward this civil war type.

[13] As Appendix Section B.3 discusses, existing research overlooks this pattern.

Figure 4: Ethnic Group Size and Civil War Aims



Notes: Figure 4 summarizes the relationship between ethnic group percentage of the population and ethnic civil war onset (disaggregated by civil war aims) with local polynomial curves. Panel A uses the same ethnic group sample and years as Figure 2, and Panel B conditions on group-years with an ethnic civil war onset. Appendix A provides additional data details.

2.3 Assumption 3. Geography of Rebellion

The third foundational premise of the theory relates to geography: an increase in government military capacity weakens a challenger's incentives to attack the center by a greater amount than it decreases incentives to separate. The rationale is that if the government builds military strongholds, deploys tanks, and sends a large army into the field, then rebel groups should face great difficulties to defeating the government in the capital. However, these same military tools less effectively combat separatists in the periphery. In other words, the marginal effect of buying a tank on diminishing the challenger's probability of winning is larger in magnitude if the government defends the capital than if it fights in the periphery. This logic relates to Buhaug's (2010) empirical finding that more coercively strong regimes tend to fight battles farther from the capital. Rebels only stand a chance against strong regimes by fighting in areas that minimize power differential.

Divergent military aims of center-seeking and separatist campaigns also support this logic. Whereas center-seeking rebels usually need to actively engage the government to capture specific targets, separatist rebels can use classic irregular guerrilla tactics such as hit-and-runs and ambushes to avoid direct confrontation with a larger and better equipped government military. Appendix Section B.4 presents regression results

using data from Kalyvas and Balcells (2010) that support this contention.

Yet, despite generic advantages when fighting in the periphery, other geographical factors also matter. Section 5 discusses how territorial concentration affects separatist prospects and also operationalizes "favorable separatist geography" using distance from the center, mountainous terrain, and non-contiguous territories.

3 Model Setup and Equilibrium Analysis

This section formalizes these foundational assumptions and embeds them into a strategic interaction between a government and a regional challenger. In period 1, the government collects taxes from the challenger, arms its military, and makes transfers. The challenger can decide whether to accept the offer, fight a center-seeking civil war, or fight a separatist civil war. Although the challenger cannot choose to fight in future periods, comparing expected future payoffs between the status quo regime—which depend on the government's ability to commit to future transfers and tax concessions—and following success in either type of civil war determines players' incentives in period 1. This model of bargaining, commitment problems, and civil war aims provides a productive framework for studying countervailing oil effects, which the next section examines.

3.1 Setup

Two ethnic groups, a governing group (G) and a challenger (C), that populate different regions of the country interact in an infinite-horizon game of complete information with time denoted by $t = 1, 2, \ldots$ Both players share a common exponential discount factor $\delta \in (0, 1)$. The challenger composes $\alpha \in (0, 1)$ percent of the country's population. Total per-period economic production in each region equals 1, of which oil production contributes $O_i \in [0, 1)$ percent, for $i \in \{G, C\}$.[14] Specifically, oil production is O_G in G's region ("government oil") and O_C in the region in which C resides ("regional oil").

Taxation in each period. In each period, G exogenously collects taxes $1 - e_G$ from its own region and

[14] Setting production to 1 avoids including additional parameters that are not of primary interest. Appendix Section C.2.1 provides additional details.

$\big(1-\theta\big)\cdot\big(1-e_C\big)$ from C's region, yielding per-period revenues $R = 1 - e_G + \big(1-\theta\big)\cdot\big(1-e_C\big)$.[15] Two substantive factors affect these terms, which can be interpreted as maximum possible tax extraction. First, $\theta \in [0,1]$ relates to C's degree of political clout at the center and, conversely, G's ability to commit to reward C. Assuming tax revenues from C's region strictly decrease in θ captures the idea that greater political access (i.e., higher θ) improves G's ability to commit to not imposing an exploitative tax rate.[16] Second, $e_i \in [0,1]$ relates to economic constraints on taxation—such as a producer's threat to withhold output from the formal sector if taxed at high rates—with lower e_i indicating a less viable economic exit option and yielding strictly greater revenues for G. Oil undermines producers' exit option and facilitates easy government taxation, as the introduction discussed:

$$\frac{de_i}{dO_i} < 0, \text{ for } i \in \big\{G, C\big\} \tag{1}$$

Finally, θ and e_C substitute for each other, capturing the intuition that an oil-rich group can still constrain government taxation if represented at the center, and that groups without effective political representation can still guard against exploitation given a viable economic exit option. C's after-tax income is $1-\big(1-\theta\big)\cdot\big(1-e_C\big)$, and actors outside the present interaction consume the e_G remaining income in G's region. Finally, for expositional ease, the functional forms imply that perfect commitment ability and a perfect exit option are individually sufficient for a 0 tax rate on C, whereas no commitment ability and no exit option are individually necessary and jointly sufficient for a tax rate of 1.

Strategic moves in period 1. In period 1, G allocates its revenues among military spending $m \geq 0$ and patronage transfers x, jointly subject to the budget constraint, $m + x \leq R$. This choice set implies that regardless of how much revenue G accrues from C's region, G can offer these revenues back to C[17]—as well as offer revenues from its own region, or spend on the military, police, intelligence, and other repressive apparatuses. The patronage transfer captures a general decision over private transfers, welfare

[15] Assuming exogenous taxes simplifies characterizing the equilibrium, but Appendix Section C.2.2 shows that instead allowing G to choose a tax rate $\tau_{C,t} \in \big[0, \big(1-\theta\big)\cdot\big(1-e_C\big)\big]$ on C's production yields the same intuition. Additionally, the main results are similar for any smooth function $\tau\big(\theta, e_C\big)$ satisfying $\frac{\partial\tau}{\partial\theta} < 0$, $\frac{\partial\tau}{\partial e_C} < 0$, and $\frac{\partial^2\tau}{\partial\theta\partial e_C} > 0$, but the stated functional form simplifies the exposition.

[16] Section 2 provided examples of commitment devices such as cabinet positions and authoritarian parties.

[17] This highlights why endogenizing revenue collection yields similar insights.

policies, public sector job provision, and other ways for a government to distribute benefits.

C decides whether to accept G's offer, to fight a center-seeking civil war, or to fight a separatist civil war. A peaceful bargain in period 1 yields contemporaneous consumption $R-x-m$ for G and $R+x$ for C, and the status quo regime remains intact in periods $t \geq 2$ with future continuation values described below.

If instead C fights in period 1, then its probability of winning depends on its chosen civil war aims: $\mu \in \{0, 1\}$ equals 1 if C chooses center-seeking aims and 0 if C chooses separatist aims. C wins a center-seeking civil war with probability $p_c(\cdot) \in (0, 1)$ and a separatist civil war with probability $p_s(\cdot) \in (0, 1)$. These functions are indexed as $p_j(\cdot)$, for $j \in \{c, s\}$. Three arguments affect the probability of winning functions. First, military spending m which—regardless of war aims—strictly decreases C's probability of winning.[18] Second, C's population share α. Third, a coercive efficiency parameter β_j described alongside Assumption 3. Fighting destroys all consumption in period 1 (although G still pays m), but does not affect total surplus in subsequent periods. If either type of war fails, then the status quo regime remains intact in $t \geq 2$, whereas success in either type of war yields future continuation values described below.

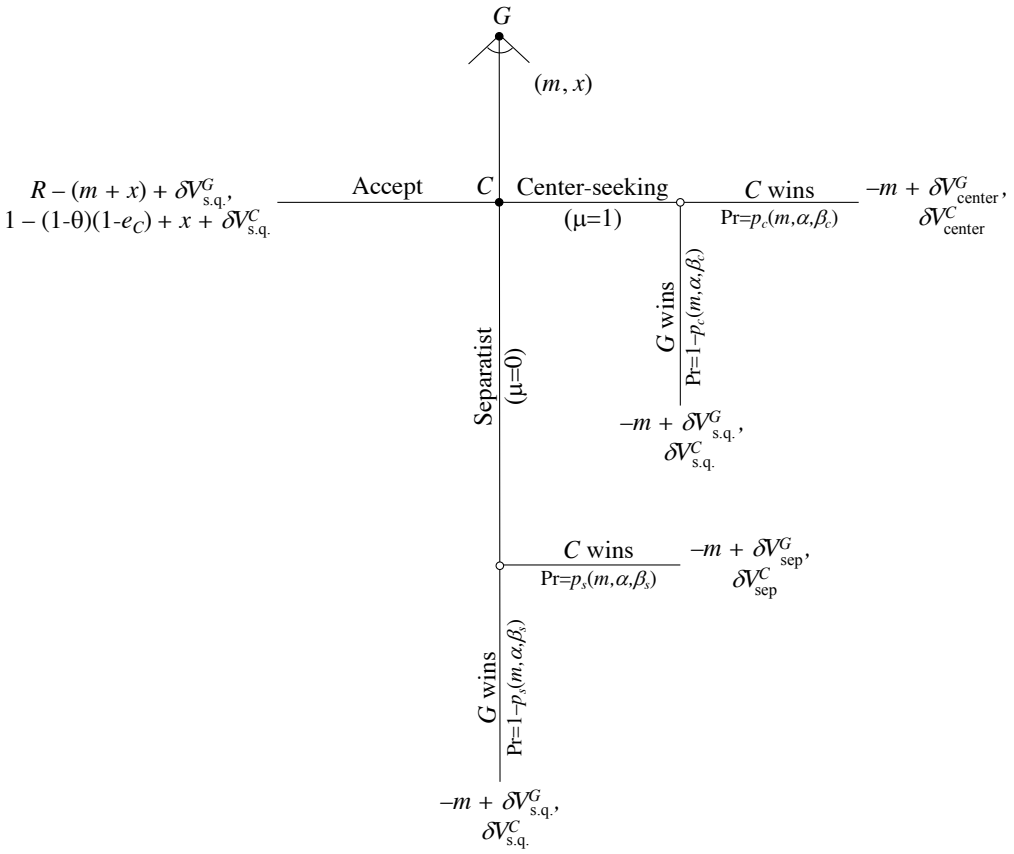
Appendix Section C.2.3 examines a slightly different war setup in which wars can last for two periods, and C can choose to switch civil war aims after period 1. It helps to explain the overall rarity of rebel groups switching aims amid a war, while also examining exceptions such as Ethiopia and Sudan.

Figure 5 presents stage game played in period 1 and Appendix Table C.1 summarizes notation.

Future payoffs. No strategic moves occur in periods $t \geq 2$. If the status quo regime remains intact (i.e., C accepts the period 1 offer, or loses a war), then the G's and C's respective future continuation values are $V^G_{\text{s.q.}}$ and $V^C_{\text{s.q.}}$. Economic production and taxation proceed in each period as described above. By assumption, just as higher commitment ability θ lowers G's tax extraction from C's region, G is assumed to transfer θ

[18] Formally, $p_j(\cdot)$ is a smooth function that, for any $m \geq 0$, satisfies $p_j(m) \in (0, 1)$ and $p'_j(m) < 0$. It also satisfies two Inada-type conditions to rule out uninteresting corner solutions in which G wants to spend none or all of its budget on the military: $\lim_{m \to 0} p'_j(m) = -\infty$ and $\lim_{m \to R} p'_j(m) = 0$. The last assumption states that marginal returns must strictly diminish by a large enough magnitude: $p''_j(m) > \frac{[p'_j(m)]^2}{p_j(m)}$. This assumption is true for any function in which higher-order derivative functions become increasingly steep, such as the simple contest function $\frac{1}{1+m}$.

Figure 5: Stage Game in Period 1



percent of its per-period revenues to C: $\theta \cdot \left(1 - e_G\right)$.[19] Following a successful center-seeking civil war, C consumes all production in its region, 1, and all revenues from G's region, $1 - e_G$, and G consumes 0. The future continuation values are V^C_{center} and V^G_{center}. Following successful secession, C consumes all of its regional production, but G retains consumption from the "central" region, with future continuation values V^C_{sep} and V^G_{sep}.

Assuming that C can initiate a war only in one period corresponds in a simple way with many formal models in which the distribution of power is assumed to shift over time to capture considerations about dynamic commitment problems (e.g., Fearon, 1995, 404-408).[20] Although the strategic interaction ends after period

[19]This lower bound also applies to the period 1 interaction.

[20]This setup delivers similar insights as a model that allows additional shifts in power over time, while considerably reducing technical complexity (caused by the endogenous arming, which many dynamic bargaining models do not incorporate). Paine (2016) describes additional technical issues that arise with arming over multiple periods.

1, C's per-period consumption in future periods determines optimal civil war aims, and the possibility of preventing civil war, in period 1. Table 1 summarizes the per-period future continuation values and G's and C's differences in consumption following successful war (of either type) relative to the status quo.

Table 1: Per-Period Future Continuation Values and Differences

	Government	**Challenger**
***C* wins center**	$(1-\delta)\cdot V^G_{\text{center}} = 0$	$(1-\delta)\cdot V^C_{\text{center}} = 2 - e_G$
***C* secedes**	$(1-\delta)\cdot V^G_{\text{sep}} = 1 - e_G$	$(1-\delta)\cdot V^C_{\text{sep}} = 1$
Status quo	$(1-\delta)\cdot V^G_{\text{s.q.}} =$ $\underbrace{(1-\theta)\cdot(1-e_C)}_{\text{Maximum taxes}} + \underbrace{(1-\theta)\cdot(1-e_G)}_{\text{Minimum transfers}}$	$(1-\delta)\cdot V^C_{\text{s.q.}} =$ $1-(1-\theta)\cdot(1-e_C)+\theta\cdot(1-e_G)$
Center – s.q.	$(1-\delta)\cdot\left(V^G_{\text{center}} - V^G_{\text{s.q.}}\right) =$ $-\left[(1-\theta)\cdot(1-e_C)+(1-\theta)\cdot(1-e_G)\right]$	$(1-\delta)\cdot\left(V^C_{\text{center}} - V^C_{\text{s.q.}}\right) =$ $(1-\theta)\cdot(2-e_G-e_C)$
Sep. – s.q.	$(1-\delta)\cdot\left(V^G_{\text{sep}} - V^G_{\text{s.q.}}\right) =$ $-(1-\theta)\cdot(1-e_C)+\theta\cdot(1-e_G)$	$(1-\delta)\cdot\left(V^C_{\text{sep}} - V^C_{\text{s.q.}}\right) =$ $(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)$

3.2 Formalizing the Foundational Assumptions

This section formalizes the foundational assumptions that Section 2 introduced. Assumption 1 states that the government's ability to commit to providing transfers and to not exploitatively tax C strictly increases in C's relative share of the population, denoted as α. This assumption is supported by the empirical observation (Figure 3) that larger groups tend to have greater political representation in the central government. Below, the analysis shows that Assumption 1 affects C's likelihood of accepting G's transfer offer.

> **Assumption 1** (Ethnic group size and commitment ability)**.** *G's ability to commit to raising C's consumption strictly increases in C's share of the population. Formally, for any challenger of size α' with corresponding G commitment ability θ', and for any challenger of size $\alpha'' > \alpha'$ with corresponding θ'', we have $\theta'' > \theta'$.*

The next two assumptions affect C's optimal civil war aims. Both relate to parameters that affect C's probability of winning, $p_j(\cdot)$. Assumption 2 states that larger groups win any civil war with higher probability than smaller groups, but with a larger effect for center-seeking than separatist civil wars (Figure 4).[21] Group size also diminishes the effect of military spending on lowering C's probability of winning: $\frac{\partial^2 p_j}{\partial m \partial \alpha} > 0$.

[21] See below for parts b and c of the assumption.

Assumption 2 (Ethnic group size and civil war aims)**.**

> ***Part a.*** *An increase in C's percentage of the population increases its probability of winning a center-seeking civil war by a greater magnitude than it increases C's probability of winning a separatist civil war, and both effects are strictly positive. Formally, for all $m \geq 0$:*
>
> $$\frac{\partial p_c}{\partial \alpha}(m, \alpha, \beta_c) > \frac{\partial p_s}{\partial \alpha}(m, \alpha, \beta_s) > 0$$

Assumption 3 concerns the geography of rebellion and assumes that military spending lowers C's probability of winning a center-seeking civil war by a greater magnitude than separatist. Higher values of β_j, for $j \in \{c, s\}$, indicate greater coercive effectiveness: $\frac{\partial p_j(\cdot)}{\partial \beta_j} < 0$. Furthermore, greater military efficiency enhances the effect of military spending on decreasing C's probability of winning, i.e., β_j and m are complements: $\frac{\partial^2 p_j(\cdot)}{\partial m \partial \beta_j} < 0$. Assumption 3 distinguishes these considerations by civil war aims.

> **Assumption 3** (Coercive effectiveness)**.** *G's military spending more effectively decreases C's probability of winning a center-seeking civil war than a separatist civil war. Formally, $\beta_c > \beta_s$.*

3.3 Equilibrium Analysis

The analysis solves backwards on the period 1 subgame to characterize the unique subgame perfect Nash equilibrium. It examines conditions in which C accepts G's offer along the equilibrium path of play, denoted as a peaceful equilibrium. Appendix C.1 proves all formal statements.

3.3.1 Challenger's Civil War Aims

In period 1, C can choose to fight upon receiving an unfavorable offer. The allure of initiating a separatist war ($\mu = 0$) is that, if C wins, it retains all future economic production in its region. But center-seeking civil war ($\mu = 1$)—if successful—carries the additional benefit for C of capturing future taxable output from G's region. Therefore, conditional on winning, C prefers to take the center. However, if C's probability of winning a separatist civil war sufficiently exceeds capturing the center, then C's binding fighting threat is separatist. The terms from Table 1 yield:

$$\mu^*(m) = \begin{cases} 0 & \text{if } p_c(m,\alpha,\beta_c)\cdot\left[1+\overbrace{\frac{1-e_G}{1-e_C-\theta\cdot(2-e_C-e_G)}}^{\text{Additional benefits of capturing center}}\right] < p_s(m,\alpha,\beta_s) \\ [0,1] & \text{if } p_c(m,\alpha,\beta_c)\cdot\left[1+\frac{1-e_G}{1-e_C-\theta\cdot(2-e_C-e_G)}\right] = p_s(m,\alpha,\beta_s) \\ 1 & \text{if } p_c(m,\alpha,\beta_c)\cdot\left[1+\frac{1-e_G}{1-e_C-\theta\cdot(2-e_C-e_G)}\right] > p_s(m,\alpha,\beta_s) \end{cases} \tag{2}$$

Assumption 2 on ethnic group size and civil war aims yields Lemma 1, which sorts C by center-seeking/separatist aims depending on group size and affects C's equilibrium civil war constraint.[22] Lemma 1 also requires boundary conditions such that C prefers separatist to center-seeking civil wars at $\alpha = 0$, and vice versa at $\alpha = 1$. Formally, for all $m \in (0, R)$, assume:

Assumption 2, part b. $$p_c(m,\alpha=0,\beta_c)\cdot\left[1+\frac{1-e_G}{1-e_C-\theta\cdot(2-e_C-e_G)}\right] - p_s(m,\alpha=0,\beta_s) < 0$$

Assumption 2, part c. $$p_c(m,\alpha=1,\beta_c)\cdot\left[1+\frac{1-e_G}{1-e_C-\theta\cdot(2-e_C-e_G)}\right] - p_s(m,\alpha=1,\beta_s) > 0$$

Lemma 1 (Optimal civil war aims)**.** *Small groups' optimal civil war aims are separatist and large groups' optimal civil war aims are center-seeking. Formally, there exist unique* $0 < \underline{\alpha} < \overline{\alpha} < 1$ *and* $\hat{m}$ *derived in the appendix such that:*

Part a. *If* $\alpha \in (0, \underline{\alpha})$*, then* $\mu^*(m) = 0$ *for all* $m \in (0, R)$*.*

Part b. *If* $\alpha \in (\underline{\alpha}, \overline{\alpha})$*, then* $\mu^*(m) = 1$ *if* $m < \hat{m}(\alpha)$ *and* $\mu^*(m) = 0$ *if* $m > \hat{m}(\alpha)$*; and* $\hat{m}(\alpha)$ *strictly increases in* α*.*

Part c. *If* $\alpha \in (\overline{\alpha}, 1)$*, then* $\mu^*(m) = 1$ *for all* $m \in (0, R)$*.* *[Go to proof]*

3.3.2 Challenger's Acceptance/Fighting Decision

C optimally responds to G's period 1 proposal by accepting any offer yielding expected utility at least as high as from initiating its optimal civil war. G faces incentives to prevent fighting, which destroys period 1 consumption and eliminates G's ability to tax C in the future if the war succeeds.[23] G must transfer at least

[22] Appendix Section C.2.4 discusses the alternative possibility that regional oil production can cause C to strictly prefer separatism.

[23] Table 1 shows that if θ is large and C prefers separatism, then G may prefer civil war to avoid providing future transfers to C. However, Assumption 4 rules out this and related strategically uninteresting cases in

θ percent of revenues from its region to C, but conditional on satisfying this lower bound, the no-fighting constraint binds G's optimal offer. Values from Table 1 enable calculating the equilibrium offer:

$$x^*(m) = \max\Bigg\{ \underbrace{\theta \cdot (1 - e_G)}_{\text{Minimum transfers}}, \quad \frac{\delta}{1-\delta} \cdot \Bigg[\underbrace{\mu^*(m) \cdot p_c(m) \cdot (1-\theta) \cdot (2 - e_G - e_C)}_{\text{Center-seeking}}$$

$$+ \underbrace{\big[1 - \mu^*(m)\big] \cdot p_s(m) \cdot \Big[(1-\theta) \cdot (1 - e_C) - \theta \cdot (1 - e_G)\Big]}_{\text{Separatist}} \Bigg] - \underbrace{\Big[1 - \big(1-\theta\big) \cdot \big(1 - e_C\big)\Big]}_{\text{Period 1 opp. cost. of war}} \Bigg\} \tag{3}$$

The remainder of the analysis focuses on strategically interesting parameter values in which C can credibly threaten to fight either type of war—i.e., demand concessions above the minimum amount—if G does not arm.

Assumption 4 (Credible war threats)**.**

$$\frac{\delta}{1-\delta} \cdot \min\Big\{ p_c(0) \cdot (1-\theta) \cdot (2 - e_G - e_C), p_s(0) \cdot \Big[(1-\theta) \cdot (1 - e_C) - \theta \cdot (1 - e_G)\Big] \Big\} - \Big[1 - \big(1-\theta\big) \cdot \big(1 - e_C\big)\Big] > \theta \cdot \big(1 - e_G\big)$$

3.3.3 Government's Strategic Choices

In addition to offering C a share of spoils, G can also affect C's calculus via military spending. Greater armament decreases C's expected utility to initiating either type of war by decreasing its probability of winning (see Equation 3), which decreases the transfer amount that C can credibly demand—implying that G consumes a larger percentage of revenues. As Lemma 1 highlights, if C is very small or very large, then G's military spending does not affect C's optimal war aims. However, for intermediate-sized groups, high enough m can deter center-seeking civil wars—via Assumption 3, military spending more steeply decreases C's probability of winning a center-seeking war. Therefore, G seeks to maximize lifetime expected utility

which C cannot credibly threaten to fight.

taking into account its effect on civil war aims.[24]

$$m^* \equiv \arg\max \left\{ \max_{m\in[0,\hat{m}]} R - m - x^*(\mu = 1, m) + \delta \cdot V^G_{\text{s.q.}},\ \max_{m\geq\hat{m}} R - m - x^*(\mu = 0, m) + \delta \cdot V^G_{\text{s.q.}} \right\} \quad (4)$$

The appendix explains why this optimization problem yields a unique solution for all parameter values, and why this value differs depending on C's group size (Appendix Figure C.1 and Lemmas C.1 and C.2). For small groups, optimal armament equals G's interior optimal arming amount conditional on facing a separatist civil war, m^*_s. For intermediate-sized groups, optimal military spending makes C indifferent between civil war aims, $\hat{m}$. For large groups, G spends its interior optimal arming amount conditional on facing a center-seeking civil war, m^*_c.

3.3.4 Equilibrium

Peaceful bargaining ensues if and only if the budget constraint is satisfied in equilibrium:[25]

$$B^* \equiv R - x^* - m^* \geq 0, \quad (5)$$

for $x^* \equiv x^*(m^*)$. The possibility of fighting in equilibrium in period 1, i.e., the possibility that Equation 5 is violated, arises because of G's limited commitment to transfers or tax concessions in future periods when C cannot fight. To see that low θ is necessary for equilibrium fighting, suppose instead $\theta = 1$. Then Table 1 shows that it cannot be optimal for C to fight: it faces no taxes and receives maximum transfers in every future period in the status quo regime—identical to successful center-seeking civil war—and G can satisfy Equation 5 by setting $m = 0$. By contrast, if $\theta < 1$, then Equation 5 may be violated. Proposition 1 characterizes the unique subgame perfect Nash equilibrium strategy profile. If $B^* > 0$, then there exists a

[24]Regarding the inclusive $\hat{m}$ boundary for the two minimization problems, combining Equation 2 and Lemma 1 shows that $\mu^*(\hat{m}) \in [0, 1]$. C's indifference over civil war aims at $\hat{m}$ also makes G indifferent, and therefore $\hat{m} + x^*(\mu, \hat{m})$ is constant in $\mu \in [0, 1]$. Appendix Section C.1 expands upon this and related technical considerations.

[25]Comparing Equations 4 and 5 shows that G's optimization problem to maximize lifetime utility is equivalent to maximizing net revenues in period 1 because its period 1 choices of m and x do not affect future-period consumption conditional on preventing war in period 1.

unique equilibrium with no civil war characterized by the results above. If instead $B^* < 0$, then the unique equilibrium features civil war along the equilibrium path.

Proposition 1 (Equilibrium)**.**

Part a. *If $B^* > 0$, then C accepts any $x \geq x^*(m)$. If $x < x^*(m)$, then C will fight and Lemma 1 characterizes C's optimal war aims as a function of m. Furthermore, there exist unique thresholds satisfying $\underline{\alpha} < \hat{\alpha}_s < \hat{\alpha}_c < \overline{\alpha}$ such that:*

- *If $\alpha < \hat{\alpha}_s$: G chooses $(m, x) = \left(m_s^*, x^*(m_s^*)\right)$ and $\mu^* = 0$.*
- *If $\alpha \in \left(\hat{\alpha}_s, \hat{\alpha}_c\right)$: G chooses $(m, x) = \left(\hat{m}, x^*(\hat{m})\right)$ and $\mu^* \in [0, 1]$.*
- *If $\alpha > \hat{\alpha}_c$: G chooses $(m, x) = \left(m_c^*, x^*(m_c^*)\right)$ and $\mu^* = 1$.*

Part b. *If $B^* < 0$, then G's choice of m is identical to part a, and G is indifferent among all $x \in \left[\theta \cdot (1 - e_G), R - m\right]$. C fights in response to any offer and Lemma 1 characterizes C's optimal war aims, which in equilibrium follow the $\hat{\alpha}_c$ and $\hat{\alpha}_s$ thresholds just stated. [Go to proof]*

Importantly, the model generalizes beyond oil production. The remaining formal analysis presents results that provide insight into the mixed oil-conflict empirical pattern before the conclusion elaborates on additional possible applications.

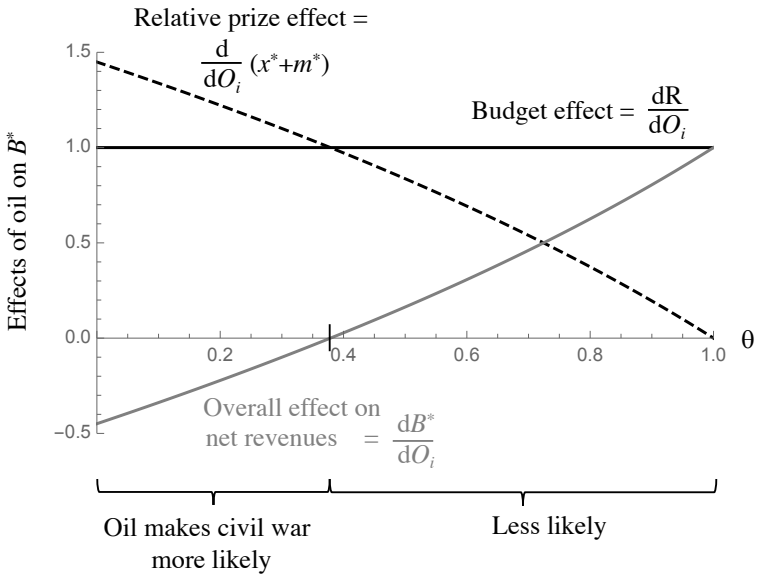
4 Comparative Statics: Divergent Implications for Civil War Aims

Why does oil production positively correlate with one type of civil war but negatively with another? Taking comparative statics on oil production highlights two key effects—a budget effect that decreases conflict prospects, and a relative prize effect that increases civil war likelihood—and incorporating the foundational assumptions for civil war aims determines the magnitude of these two effects. Two mechanisms help to explain the mixed empirical oil-conflict pattern: a strategic selection effect for ethnic minorities (based on taking comparative statics on the commitment parameter) and a geography of rebellion effect (comparative statics on the coercive capacity parameter).

4.1 Countervailing Effects of Oil Production: Budget and Relative Prize

To highlight common mechanisms for both civil war types, this subsection fixes C's civil war aims before the next two subsections show how endogenizing civil war aims yields important insights.[26] Figure 6 depicts the effects of oil as a function of θ. The gray curve is the overall effect of oil production on the equilibrium period 1 budget constraint B^* from Equation 5. If the value of the gray curve is negative, then this implies that an increase in oil production makes civil war more likely, and the opposite is true if the gray curve is positive.

Figure 6: Countervailing Effects of Oil Production



Notes: Figure 6 uses the following parameter values and functional form assumptions: $e_G = e_C = 0.7$, $\mu = 1$, $\gamma = 1$, $\alpha = 0.7$, $\beta_c = 5$, $\delta = 0.9$, $p_c(m) = \left(\frac{1}{1+\beta_c \cdot m}\right) \cdot \alpha$, and $\frac{de_G}{dO_G} = -1$.

The figure also disaggregates the overall effect of oil into two countervailing effects. The solid black line depicts the *budget effect*. Because oil enables higher taxes than other types of economic activities (Equation 1), an increase in either government or regional oil production raises revenues available to spend on transfers and coercion in period 1. Formally, this effect equals:

$$\textbf{Budget effect: } \frac{dR}{dO_i} = \left(1 - \gamma \cdot \theta\right) \cdot \left(- \frac{de_i}{dO_i}\right) > 0, \tag{6}$$

[26] Formally, the civil war aims indicator $\mu \in \{0, 1\}$ is fixed in this subsection.

where $\gamma = 0$ indicates production in G's region and $\gamma = 1$ indicates C's region. The budget effect is qualitatively similar regardless of within-country oil location, although regional oil causes the effect be multiplied by θ because of the commitment constraint on G taxing C's production.

Oil production also creates a *relative prize effect*—(1) in Equation 7—that increases conflict incentives.[27] An increase in government oil production raises the prize of capturing the center relative to future transfers in the status quo regime, and an increase in regional oil raises the relative prize from winning either type of civil war by preventing higher taxes that would occur in the status quo regime. In both cases, the effect is multiplied by $1-\theta$ because G can commit to some tax concessions under the status quo regime. The dashed black line in Figure 6 depicts this effect, which works through G's expenditures $x^* + m^*$ because increasing C's post-successful war consumption relative to the status quo raises the minimum amount of spending on carrots and sticks required to induce acceptance.

Relative prize effect:

$$\frac{d}{dO_i}(m^* + x^*) = \Bigg\{ \Big[1 - (1-\mu^*)\cdot(1-\gamma)\Big] \cdot \Bigg[\underbrace{\frac{\delta}{1-\delta}\cdot p_j(m^*)}_{\text{(1) Relative prize effect}} + \underbrace{\gamma}_{\text{(2)}} \Bigg] \cdot (1-\theta) + (1-\mu^*)\cdot(1-\gamma)\cdot \underbrace{\frac{\delta}{1-\delta}\cdot p_s(m^*)\cdot(-\theta)}_{\text{(3)}} \Bigg\} \cdot \left(-\frac{de_i}{dO_i}\right) \tag{7}$$

The relative prize effect highlights an important point about attributes of economic production and war: even if C is coercively strong and G's commitment ability is low, C may still face low fighting incentives. If economic production in G's region cannot easily be taxed, then center-seeking incentives are low. Similarly,

[27] Applying the envelope theorem to equilibrium period 1 expenditures yields Equation 7, which applies for all $\alpha \in [0, \hat{\alpha}_s] \cup [\hat{\alpha}_c, 1]$ because G chooses an interior optimal m value. For $\alpha \in [\hat{\alpha}_s, \hat{\alpha}_c]$, oil production also exerts an indirect effect $\left(1 + \frac{\partial x^*}{\partial m}\right) \cdot \frac{d\hat{m}}{dO_i}$ by affecting C's indifference condition over civil war aims (see Appendix Equation C.4). However, this parameter range is less substantively relevant than parameter values in which C prefers one type of civil war. As noted, almost all rebel groups since 1945 have articulated clear aims for the center or to separate, and rarely change civil war aims (which we might expect, empirically, if they mixed). See also Appendix Section C.2.3.

if economic production in C's region cannot easily be taxed, then C does not need to win a war to prevent high government taxation because a high-valued economic exit option substitutes for avoiding government predation in the status quo regime. These converse considerations highlight the conflict-inducing properties of easy-to-extract revenue sources such as oil production.

Equation 7 highlights similar effects for most combinations of oil location and C's civil war aims—which, again, are exogenous in this subsection. Effect (2) is the lower opportunity cost of fighting in period 1 caused by an increase in regional (but not government) oil, as the last term in Equation 3 shows. The only deviant effect is (3), which occurs if government oil increases and C aims to separate. There is no conflict-inducing relative prize effect because even a successful civil war would not yield control of government oil. Instead, this effect strictly decreases conflict incentives because of lost future transfers from separating (θ percent of government revenues in all periods). By contrast, as effect (1) shows, if government oil increases and C fights for the center, then the larger prize conditional on winning (100% percent of government revenues in all periods, hence $1-\theta$ in the equation) strictly dominates the θ opportunity cost.

Proposition 2 formalizes the countervailing effects from Equations 6 and 7 by taking comparative statics on B^*. An increase in B^* implies a narrower space of parameter values in which fighting will occur, hence decreasing equilibrium civil war prospects. By contrast, a decrease in B^* corresponds with an increase in equilibrium civil war likelihood.[28]

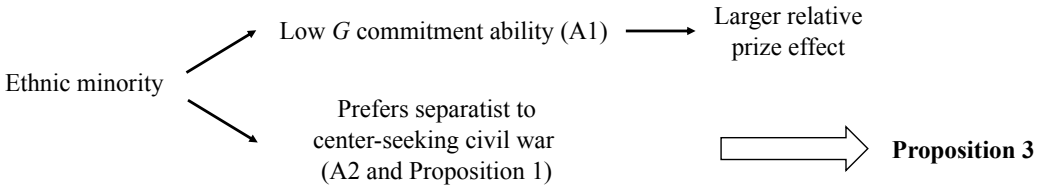
> **Proposition 2** (Effect of oil production)**.** *An increase in oil production exerts both a budget effect and a relative prize effect. Formally, the overall effect of oil production on the equilibrium budget constraint in period 1 is:*
>
> $$\frac{dB^*}{dO_i} = \underbrace{\frac{dR}{dO_i}}_{\textit{Budget effect}} \underbrace{- \frac{d}{dO_i}\left(m^* + x^*\right)}_{\textit{Relative prize effect}},$$
>
> *for $i \in \{G, C\}$ and for the derivatives in Equations 6 and 7.*

[28] For a given set of parameters, civil war either occurs with probability 0 or 1. The "likelihood" of war in equilibrium refers to the size of the parameter space in which a civil war occurs in equilibrium, implicitly assuming a veil of ignorance over the realized parameter values.

4.2 Divergent Civil War Effects 1: Ethnic Minorities Selection Effect

The first explanation the model offers for the mixed empirical relationship between oil production and different types of civil wars is a selection effect that Figure 7 summarizes. The commitment parameter θ is relatively small if C is an ethnic minority (Assumption 1),[29] and minority groups are more likely to fight separatist over center-seeking civil wars (Assumption 2).[30] Therefore, the relative prize effect is large in magnitude for groups that prefer separatist civil wars, creating what other strands of the literature term "redistributive grievances." By contrast, larger groups that—if they fought—would fight for center tend not to be aggrieved by "stolen" oil production from their territory or by transfers from G's region withheld from them. G's greater ability to commit to deals with large groups diminishes the relative prize effect relative to the budget effect. The analysis also shows that formalizing this proposition requires addressing a subtle indirect substitution effect.

Figure 7: Oil, Ethnic Minorities, and Civil War Aims



Equation 8 formally evaluates comparative statics for the effect of θ on $\frac{dB^*}{dO_i}$ (Proposition 2) for the substantively interesting oil location-war aims cases.[31] An increase in G's commitment parameter affects the magnitude of the oil effect in two ways. The direct effect (1) decreases the magnitude of the relative prize effect because, in future periods, G can commit to transfer more government oil to C and to tax regional oil at lower levels. Therefore, greater political representation substitutes for the easy-revenue properties of oil production that lower C's consumption in the status quo regime relative to fighting, therefore decreasing G's optimal transfer in period 1. Formally:

[29] Figure 3 empirically supports this assumption by showing that ethnic group size positively associates with representation in the central government.

[30] Figure 4 provides empirical support for the underlying assumption, although Proposition 1 shows that establishing the formal relationship requires addressing C's strategic reactions to G's armament.

[31] Recall that the relative prize effect *decreases* conflict incentives if government oil increases and C's aims are separatist.

Commitment ability conditioning effect. If $(1-\mu^*)\cdot(1-\gamma)=0$, then:

$$\frac{d^2B^*}{dO_i d\theta} = \frac{\delta}{1-\delta}\cdot\Bigg\{\underbrace{\mu^*\cdot p_c(m^*)+(1-\mu^*)\cdot p_s(m^*)}_{①}$$

$$-\underbrace{\left[\mu^*\cdot p_c'(m^*)\cdot\frac{dm^*}{d\theta}+(1-\mu^*)\cdot p_s'(m^*)\cdot\frac{dm^*}{d\theta}\right]\cdot(1-\theta)}_{②}\Bigg\}\cdot\left(-\frac{de_i}{dO_i}\right) \tag{8}$$

There is also a countervailing indirect substitution effect, ②, that increases the magnitude of the relative prize effect. Because higher θ lessens C's fighting constraint, G lowers its equilibrium military spending m^* (see Appendix Equations C.6 and C.7). This substitution effect increases C's equilibrium probability of winning, $\mu^*\cdot p_c(m^*)+(1-\mu^*)\cdot p_s(m^*)$. However, assuming that the probability of winning function p_j exhibits steep-enough diminishing marginal returns implies that the direct effect outweighs the indirect effect in magnitude, i.e., oil production does not cause G to substitute so much from military investments to counteract the negative direct effect of higher θ on the relative prize effect. Proposition 3 formalizes this intuition.

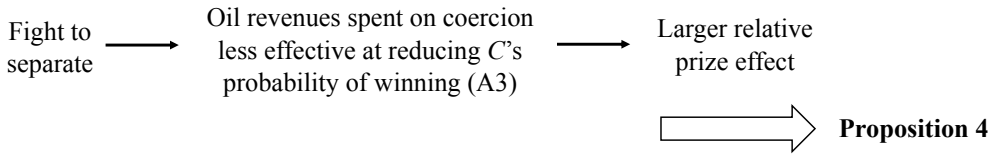
> **Proposition 3** (Ethnic minorities selection effect and civil war aims)**.** *An increase in commitment ability—which corresponds to majority group challengers whose optimal civil war aims are center-seeking rather than separatist—modifies the oil effect to decrease equilibrium fighting likelihood. Formally, if* $(1-\mu^*)\cdot(1-\gamma)=0$*, then for* $i\in\{G,C\}$ *and* $\frac{dB^*}{dO_i}$ *defined in Proposition 2:*
>
> $$\frac{d^2B^*}{dO_i d\theta} > 0$$
>
> *[Go to proof]*

4.3 Divergent Civil War Effects 2: Geography of Rebellion

The second explanation the model offers for the mixed empirical relationship between oil production and different types of civil wars examines G's ability to translate revenues into a strong coercive apparatus, which Figure 8 summarizes. G's coercive efficiency is greater—and therefore the relative prize effect is smaller in magnitude—if C seeks the center rather than separates (Assumption 3). Geography of rebellion factors imply that oil-generated government revenues more effectively decrease C's likelihood of winning a

center-seeking than a separatist civil war.

Figure 8: Oil, Geography of Rebellion, and Civil War Aims



Formally, Equation 9 evaluates comparative statics for the effect of β_j on $\frac{dB^*}{dO_i}$ (see Proposition 2) for the substantively interesting oil location-war aims cases. The coercive effectiveness parameter β_j alters the magnitude of the oil effect in two ways. The direct effect (1) decreases the magnitude of the relative prize effect because G more efficiently translates oil revenues into military capacity. This effect decreases C's probability of winning and, consequently, G's optimal period 1 transfer offer. The indirect substitution effect (2) reinforces the direct effect. Higher β_j increases the marginal benefit of arming (see Appendix Equations C.6 and C.7), which increases G's equilibrium military spending m^* and therefore decreases C's equilibrium probability of winning, $\mu^* \cdot p_c(m^*) + (1-\mu^*) \cdot p_s(m^*)$. This logic yields Proposition 4.

Geography of rebellion conditioning effect. If $(1-\mu^*) \cdot (1-\gamma) = 0$, then:

$$\frac{d^2B^*}{dO_i d\beta_j} = \frac{\delta}{1-\delta} \cdot \Bigg\{ \underbrace{-\left[\mu^* \cdot \frac{\partial p_c(m^*)}{\partial \beta_c} + (1-\mu^*) \cdot \frac{\partial p_s(m^*)}{\partial \beta_s}\right]}_{(1)}$$

$$\underbrace{-\left[\mu^* \cdot \frac{\partial p_c}{\partial m} \cdot \frac{dm^*}{d\beta_c} + (1-\mu^*) \cdot \frac{\partial p_s}{\partial m} \cdot \frac{dm^*}{d\beta_s}\right]}_{(2)} \Bigg\} \cdot (1-\theta) \cdot \left(-\frac{de_i}{dO_i}\right) \tag{9}$$

Proposition 4 (Geography of rebellion and civil war aims)**.** *An increase in coercive efficiency—which occurs if C fights for the center rather than separates—modifies the oil effect to decrease equilibrium fighting likelihood. Formally, if* $(1-\mu^*) \cdot (1-\gamma) = 0$*, then for* $i \in \{G, C\}$ *and* $\frac{dB^*}{dO_i}$ *defined in Proposition 2:*

$$\frac{d^2B^*}{dO_i d\beta_j} > 0$$

[Go to proof]

4.4 Summary of Theoretical Logic

To recap the theoretical logic, imagine a country with two regions that correspond to different ethnic groups. How does oil production—which provides additional revenues to the government—affect incentives for different types of civil war? On the one hand, the government has more resources to devote to buying off and to coercing the challenger (budget effect in Equation 6). On the other hand, there is more for the other group to grab by winning a civil war (relative prize effect in Equation 7). The overall effect depends on whether the challenging group is either numerically large or small and, if the group is small, also on within-country oil location.

Large groups' optimal civil war aims are center-seeking (Assumption 2 and Proposition 1). Two factors diminish the relative prize effect. First, governments can more credibly commit to transfers and tax concessions toward large groups (Assumption 1), empirically, because large groups have greater political representation at the center. This yields Proposition 3. Furthermore, governments can effectively translate revenues into low winning probabilities when defending the center (Assumption 3 and Proposition 4). Therefore, oil production (anywhere in the country) diminishes center-seeking civil war likelihood.

However, if the challenging group is small, then oil production in the challenger's region exerts a different effect. The group prefers to separate if it fights (Assumption 2 and Proposition 1). Two factors raise the magnitude of the relative prize effect. First, governments can less credibly commit to transfers and tax concessions toward small groups (Assumption 1), yielding Proposition 3. Furthermore, defending the periphery implies that the government can less effectively translate its revenues to lower the challenger's probability of winning (Assumption 3 and Proposition 4). These considerations imply that oil production in a small challenger's region makes separatist civil wars more likely. By contrast, oil located in the government's region does not create a relative prize effect because even separation would not capture the oil (Equation 7).

5 Additional Empirical Implications and Evidence

Although in broad strokes the theory can account for differences in the empirical relationship between oil and both types of civil war, the logic of Propositions 3 and 4 is inherently conditional. After discussing three

key conditional hypotheses produced by the theory, this section summarizes oil-civil war cases and presents simple interactive regression models that support the conditional implications. Qualitative evidence from Saudi Arabia and Angola additionally supports central mechanisms.

5.1 Conditional Empirical Implications

5.1.1 Separatist Civil Wars

The main propositions offer important scope conditions for when regional oil production should cause separatist civil wars. The first conditional hypothesis follows from Proposition 3. In the model, oil production only triggers separatist civil war if present in regions populated by small groups, which prefer separatism and have low political representation at the center (i.e., low commitment ability θ). By contrast, even if a group is a minority, if they deviate from the general pattern in Figure 3 by having access to power at the center, then higher government commitment ability θ alleviates the relative prize effect of oil production and secession is unlikely (although, conditional on fighting, it would be the preferred type of civil war). This hypothesis relates to existing arguments that highlight the conditioning effect of ethnopolitical inclusion (Asal et al., 2016; Hunziker and Cederman, 2017), but differs in two important ways. First, the logic arises from a theory of strategic civil war aims that explains why "redistributive grievance" effects of oil should affect separatist but not center-seeking civil wars. Second, existing ethnicity theories do not explain why ethnopolitical exclusion should complement rather than substitute for the civil war risk induced by oil production. The present theory anticipates complementarities because oil production should only exert net conflict-inducing effects given weak government commitment ability, and oil production does not exert conflict-inducing effects independent of this political condition—a crucial theoretical consideration for explaining the negative oil-center empirical pattern.

> **Hypothesis 1** (Politically excluded minorities)**.** *Only among politically excluded ethnic minorities should regional oil wealth raise separatist civil war propensity.*

The second conditional hypothesis follows from Proposition 4 and has similar theoretical foundations as H1. In general, a coercively strong government less effectively projects power into the periphery to defeat a separatist rebellion than to protect the capital. However, the oil-separatist effect should be strongest in territories that have particularly favorable geographic conditions for separatism (low β_s), which I operationalize

in the next section. Similar to ethnic minorities, the complementarity between oil production and favorable separatist geography follows because oil production only exerts a net conflict-enhancing effect if the government is ineffective at using oil revenues to lower the challenger's probability of winning. By contrast, with difficult geography to separate (high β_s), even a group dissatisfied with the status quo because they are denied profits from their region's oil production lacks recourse to arms.

> **Hypothesis 2** (Favorable separatist geography)**.** *Only among ethnic groups with favorable separatist geography should regional oil wealth raise separatist civil war propensity.*

At the extreme, groups that lack a concentrated territorial location cannot feasibly secede because they lack a natural territory from which to create a state (very high β_s). Therefore, to reduce heterogeneity, the sample in the separatist civil war figure below excludes ethnic groups that are not geographically concentrated. Appendix Section D.2 shows that the absence of geographic concentration nearly perfectly predicts the absence of separatist civil war (but not center-seeking).

The model also offers an intriguing *non*-implication about geography. Many existing resource curse theories focus on rebel finance and offer a prediction about within-country oil location: offshore oil production should not cause separatist civil wars by undermining looting possibilities. By contrast, the present model expects offshore oil to exert similar effects as onshore oil because both cause a relative prize effect. Appendix Section D.3 discusses existing arguments in more depth and shows empirically that both onshore and offshore oil production positively covary with separatist civil war.

5.1.2 Center-Seeking Civil Wars

Propositions 3 and 4 also suggest a conditional hypothesis for center-seeking civil wars. An oil-rich government may lack consolidated control over its oil revenues. If the government is newly oil-rich or if rebels face a (perhaps temporary) mobilization advantage, then large oil revenues will not strongly drive down a challenger's probability of winning a center-seeking war—because low β_c yields a larger-magnitude relative prize effect—despite the general ease of defending the capital relative to fighting in the periphery.

> **Hypothesis 3** (Government vulnerability)**.** *Only among countries with governments that have consolidated control over oil revenues should oil wealth diminish center-seeking civil war propensity.*

5.2 Evidence for Separatist Civil Wars

Qualitative evidence. Before statistically analyzing the relative frequency of civil war onset, verifying whether oil-separatist cases tended to occur under the scope conditions posited by the model provides a transparent and first-pass look at the evidence. Table 2 lists every ethnic group with at least one giant oil field in its territory that fought a major separatist civil war between 1946 and 2013. It reveals a straightforward pattern. Almost every separatist civil war over an oil-rich territory has occurred in locations for which the theory anticipates that the relative prize effect should be large in magnitude because the group is a politically excluded ethnic minority (Hypothesis 1) or faces favorable geography to separate (Hypothesis 2).

Table 2: Separatist Civil Wars in Oil-Rich Regions

Ethnic group	Country	Onset year	Politically excluded minorities (H1)	Favorable separatist geography (H2)
Bakongo*	Angola	1992	m(13%), E	-
Cabindan Mayombe*	Angola	1992	m(2%), E	N
Assamese (non-SC/ST)	India	1991	m(1.4%)	D
Acehnese	Indonesia	1989	m(1%), E	M%,N,D
Acehnese	Indonesia	1999	m(1%), E	M%,N,D
East Timorese*	Indonesia	1975	m(0.5%), E	M%,N,D
Kurds	Iran	2004	m(8%), E	M%,D
Kurds	Iraq	1961	m(17%), E	M%
Kurds	Iraq	1974	m(17%), E	M%
Igbo	Nigeria	1967	m(18%), E	-
Baluchis	Pakistan	1973	m(3%), E	M%,D
Baluchis	Pakistan	2004	m(3%), E	M%,D
Chechens	Russia	1994	m(1%), E	M%,D
Chechens	Russia	1999	m(1%), E	M%,D
Dinka	Sudan	1983	m(10%), E	D
Malay Muslims*	Thailand	2004	m(5%), E	D
Southerners	Yemen	1994	- (55%)	M%

Notes: Table 2 lists every year in which an ethnic group with a giant oil or gas field in its territory initiated a separatist civil war. The text describes the various symbols, and Appendix A discusses the data sources. *Only offshore oil.

In the column for H1, "m" indicates ethnic minority groups (with the group's national population share in parentheses), and "E" indicates groups excluded from power in the central government. Appendix Section D.1 describes the data sources. All but two of the ethnic groups are both excluded and minorities,[32] and only Southerners in Yemen are neither. Yemen is a somewhat exceptional case because majority groups—oil-rich or not—almost never fight separatist civil wars, as mentioned in Section 2. The war occurred four years after

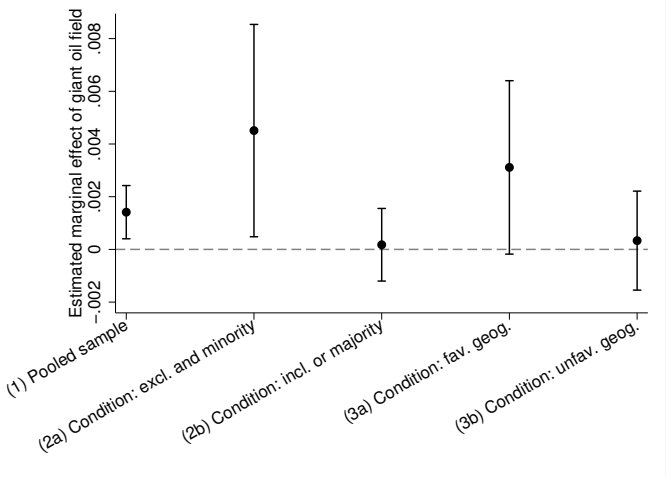
[32]See also Ross (2012, 155-6). Paine (Forthcoming) presents additional evidence consistent with the hypothesis by showing that in most oil-separatist cases, rebel groups espoused concerns specifically about unfair oil redistribution.

South Yemen merged with North Yemen. The north was the stronger partner despite having a minority of the population, and southern politicians commanded less important cabinet positions.

The column for H2 in Table 2 contains information on the favorability of separatist geography. "M%" indicates that the percentage of the ethnic group's territory with mountains is higher than the median in the sample, "N" indicates that the ethnic group's territory is noncontiguous from the territory that contains the country's capital city, and "D" indicates that the centroid of the ethnic group's territory is farther than the median distance from the capital in the sample. These variables relate to different aspects of favorable geography for rebellion discussed in the literature (Fearon and Laitin, 2003; Buhaug, Cederman and Rød, 2008). Fifteen of the 17 oil-separatist cases have at least one favorable geography condition.

Statistical evidence. Adding an interaction term to the model used in Figure 2 (Appendix Equation D.1) enables statistically assessing the conditional hypotheses. Figure 9 and Appendix Table D.1 show that the estimated marginal effect of oil wealth on separatist civil war onset is between 2.4 and 2.9 times larger than in the baseline specification (Column 1) among ethnic groups that either are politically excluded minorities (Column 2a), or have any of the favorable geography conditions (p-value is 0.064 in Column 3a). By contrast, there is no relationship among groups lacking either of these conditions. The results are similar when adding country fixed effects to the models (Appendix Figure D.1), or when disaggregating onshore from offshore oil production (Appendix Figure D.2).

Figure 9: Separatist Civil War Onset (Ethnic Groups)



Notes: Figure 9 presents point estimates and 95% confidence intervals for a series of logit regressions described in Appendix Equation D.1 and Appendix Table D.1. The dependent variable is separatist civil war onset, and the unit of analysis is ethnic group-years.

5.3 Evidence for Center-Seeking Civil Wars

Qualitative evidence. Table 3 lists the 16 center-seeking civil war onsets that occurred between 1946 and 2013 in a country producing at least $100 in oil income per capita in the previous year. Eleven oil-center wars occurred in country-years for which the theory anticipates that the relative prize effect should be large in magnitude because the government should be vulnerable (Hypothesis 3). Several oil-rich countries experienced defeat in warfare and/or violent political transitions within two years prior of their center-seeking civil war ("W" for war), which should correspond with vulnerable governments that lack consolidated control over oil revenues.[33] Governments should face particular difficulties deterring rebel groups in violent independence cases where a domestic war that began during foreign occupation was already ongoing (Angola 1975, Algeria 1962, Iraq 2011), or where the rebel group was already organized from a previous civil war, as with SPLA in Sudan in 2011 after South Sudan gained independence. War defeats can also create focal periods for opposition organization independent of the government's oil wealth, such as the Shi'a uprisings following Iraq's defeat in the Persian Gulf war in 1991.

Table 3: Center-Seeking Civil Wars in Oil-Rich Countries

Country	Onset year	Oil production per capita	Government vulnerability (H3)
Argentina	1973	$130	S
Algeria	1962	$161	W
Syria	1979	$455	S
Peru	1981	$467	S
Sudan	2011	$479	W
Angola	1975	$543	S,W
Yemen	2004	$592	-
Syria	2011	$651	A
Nigeria	2013	$677	-
Iraq	1959	$701	-
Algeria	1992	$708	-
Congo, Rep.	1997	$788	-
Iraq	1991	$1,814	W
Iraq	2011	$2,451	W,A
Iran	1978	$3,481	S
Libya	2011	$9,007	A

Notes: Table 3 lists every country-year with a center-seeking civil war onset and at least $100 in oil and gas income per capita in the previous year. It uses the same country sample and years as Figure 1. "W" denotes that any of the following conditions were true in the country within the past two years: defeat in international warfare, government defeat in a civil war, or independence gained amid a domestic war (typically, a war fought to gain independence from a European power or the U.S.). "S" denotes the conflict occurred during the oil shock period between 1973 and 1982. "A" denotes Arab Spring, specifically, MENA countries in 2011.

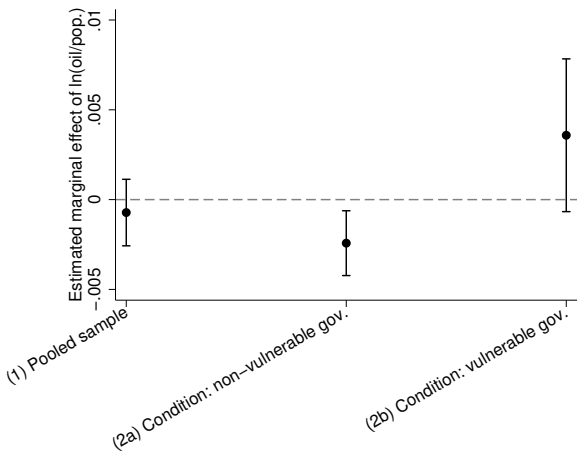
Regarding other conditions that correspond with government vulnerability, Peru crossed the $100 oil income

[33] Appendix Section D.4 describes these variables.

per capita threshold the year before its war began, and Argentina and Syria (1979) within five years, which gave the government little time to consolidate control over oil revenues. These countries' newfound oil wealth occurred in the context of the major oil shock ("S") that lasted roughly a decade after the OPEC oil embargo of 1973, a time in which many countries became (at least temporarily) major per capita oil producers. Finally, although oil-rich countries tended to fare better during the Arab Spring of 2011 ("A") than oil-poor countries (Gause III, 2013), Libya and Syria experienced new civil wars despite oil wealth as demonstrations that began in Tunisia proved focal for opposition movements across the Middle East and North Africa (MENA) even in the face of repressive and coercively strong governments.

Statistical evidence. Appendix Equation D.3 adds an interaction term to the model used in Figure 1. Figure 10 and Appendix Table D.5 show that the predicted probability of center-seeking civil war onset drops by 67% if hypothetically increasing annual oil and gas income per capita from $0 to $1,000 among countries lacking any of the vulnerability conditions listed in Table 3. This is larger in magnitude than the difference after subsetting the sample to pre-2011 years, as in Column 3 of Figure 1. By contrast, there is a positive association between oil production and center-seeking civil war onset among countries that have at least one of the vulnerability conditions. Appendix Figure D.3 shows similar results for ethnic center-seeking civil wars.

Figure 10: Center-Seeking Civil War Onset (Countries)



Notes: Figure 10 presents point estimates and 95% confidence intervals for a series of logit regressions described in Appendix Equation D.3 and Appendix Table D.5. The dependent variable is center-seeking civil war onset, and the unit of analysis is country-years.

5.4 Evidence from Saudi Arabia and Angola

Evidence from Saudi Arabia and Angola provides additional support for key mechanisms from the theory. Two aspects of these cases provide opportunities to examine mechanisms in "typical" cases: oil-rich Saudi Arabia has not experienced any major center-seeking civil wars, and Angola's oil-rich Cabinda province has fought a major separatist civil war. However, as Appendix Section D.5 describes, there are also "deviant" aspects of these cases that the theory can help to explain: oil-rich Angola's major center-seeking civil war, and no major separatist civil wars by oil-rich Saudi Shi'a.

Saudi Arabia provides clear evidence of oil-rich rulers using patronage and coercion—key tools from the formal model—to prevent challenges, and has not experienced any major center-seeking civil wars since becoming oil-rich. Oil companies made their first discovery in 1938, and the country has produced at least $1,000 in oil income per capita in every year since 1951 (Haber and Menaldo, 2011). This initial period coincided with favorable conditions for consolidating control over oil revenues (Hypothesis 3). Ibn Saud had recently asserted military dominance over the modern territory of the Saudi state that spans the Arabian peninsula. This included capturing eastern Arabia in 1913, which produces the bulk of the country's oil. Furthermore, in the interim period between initial discoveries and the onset of major exports, British and U.S. oil companies provided concessionary payments and assistance. King Saud used payments from oil concessions in the 1930s to start building a modern army (Khatani, 1992, 52). Over time, the size of and expenditures on the military have grown considerably (Gause, 1994, 66-8), and the kingdom has employed large percentages of citizens in the public sector (roughly half in the 1990s) to buy their loyalty (59). Overall, Saudi Arabia has experienced a dramatic transformation from pre-oil periods in which the government relied on tribal leaders for resources and faced occasional tribal revolts (12-14, 24).

Providing another typical case, Angola's Cabinda province exemplifies coercive separation by an exploited oil-rich minority with favorable geography, which Hypotheses 1 and 2 anticipate. Cabinda produces the majority of Angola's oil, and Cabinda's oil revenues have provided roughly half the country's budget since independence (Martin 1977, 57; Porto 2003, 3). The Cabindan Mayombe are a small minority group that, since independence, has never enjoyed political representation in Angola's government (Vogt et al., 2015), supporting H1. Despite experiencing heavy taxation, residents have received few compensating benefits from the central government. Cabinda "remains one of the poorest provinces in Angola. An agreement in

1996 between the national and provincial governments stipulated that 10% of Cabinda's taxes on oil revenues should be given back to the province, but Cabindans often feel that these revenues are not benefiting the population as a whole, largely because of corruption" (Porto, 2003, 3). Failed promises are consistent with assuming that a lack of political representation undermines government commitment ability. Oil exploitation features prominently in separatists' narrative: the words "oil" and "petroleum" appear 62 times on the main page of the Cabinda Free State's website (Cabinda Free State, n.d.).

Cabinda also features favorable geography for rebellion (H2) due to territorial separation from mainland Angola, and Portugal governed Cabinda as a largely distinct colony (Martin, 1977, 54-55). Even during Angola's decolonization struggle, the eventual-government MPLA failed to establish a strong presence in Cabinda (58). In 1992, following low-intensity fighting since independence, the Cabindan rebel group FLEC launched major separatist operations. Also supportive of favorable conditions for fighting, FLEC escalated its activities in response to intensification of the government's center-seeking war fought in a different part of the country (Porto, 2003, 5), i.e., attacking when the government was coercively weak.

6 Conclusion

This article presented a foundational theory of strategic civil war aims and applied it to explain an empirical puzzle from the oil-conflict literature: oil wealth correlates positively with separatist civil war onset (among oil-rich ethnic minorities), but negatively with civil wars to capture the center. Future research can also build on this theoretical framework to examine civil war aims. The model draws mainly from two influential literatures—formal bargaining models of war, and ethnic grievances and civil war—that provide considerable insight into conflict conditions but less into civil war aims. Although many frame ethnic grievances primarily in terms of long-term cultural explanations (Cederman, Gleditsch and Buhaug, 2013, 30-54), existing theories implicitly contain a crucial strategic component: political exclusion exacerbates government commitment problems—a central feature of conflict bargaining models. Low commitment ability not only makes fighting more likely, but also may correlate with rebels' strategically chosen civil war aims. One possible implication of the present framework is that Cederman, Gleditsch and Buhaug's (2013) key hypothesis—politically excluded ethnic groups more frequently fight civil wars—may better explain separatist than center-seeking civil wars. Political exclusion indeed should create powerful incentives to

fight, but the groups that face the highest risk of exclusion from power tend to prefer separatism.

The theory of strategic civil war aims relates to additional mechanisms from the broader civil war literature, including government coercive capacity and economic incentives to fight (Fearon and Laitin, 2003; Collier and Hoeffler, 2004). Despite extensive debates regarding the importance of these explanatory factors for civil war, scholars have devoted little attention to their specific effects on different types of civil war (although see Buhaug 2006). Strong government coercive capacity may tend to be more important for deterring center-seeking rather than separatist civil wars because of difficulties projecting power into the periphery, as discussed here. Therefore, for example, military aid and other types of foreign aid that funnel directly to the government may more effectively prevent center-seeking than separatist civil wars. And although oil production produces easy government revenues, other economic causes of war exhibit different properties. For example, rebel groups more easily loot alluvial diamonds than oil. Perhaps for this and other types of natural resources, the relative prize effect often outweighs the budget effect even for center-seeking civil wars, as examples from Liberia and Sierra Leone in the 1990s suggest. Beyond natural resources, the model may also be fruitfully extended by examining dynamic civil war aims, as Appendix Section C.2.3 discusses.

Overall, the common implicit assumption in much existing civil war research that risk factors equally affect center-seeking and separatist civil wars may limit the usefulness of some theories as well as generate uninformative empirical estimates given underlying causal heterogeneity. Extensions of the present framework should help to guide future theorizing and empirical evaluations of strategic civil war aims.

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Online Appendix

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A Supporting Information for Section 1

A.1 Country-Level Data and Regressions (Figure 1)

For country index j and year index t, the regression equation for Figure 1 and its corresponding regression table, Table A.1, is:

$$\ln\left(\frac{Y_{jt}}{1-Y_{jt}}\right) = \beta_0 + \beta_O \cdot ln(oil/pop)_{jt} + \beta_P \cdot ln(pop)_{jt} + \boldsymbol{T}'_{jt} \cdot \beta_T + \epsilon_{jt}, \tag{A.1}$$

where Y_{jt} indicates either all civil war onset, center-seeking civil war onset, or separatist civil war onset, and $\boldsymbol{T}'_{jt}$ is a vector of peace years and cubic splines calculated since the last year in a which a conflict of the specified type ended.

Table A.1: Regression Table for Figure 1

Dependent variable:	All CW onset	Center CW onset	Center CW onset	Sep CW onset
	(1)	(2)	(3)	(4)
ln(Oil & gas p.c.)	-0.000873	-0.000721	-0.00186**	-7.65e-05
	(0.00115)	(0.000945)	(0.000932)	(0.000483)
ln(Population)	0.0630***	0.0268***	0.0249***	0.0290***
	(0.0126)	(0.00801)	(0.00801)	(0.00588)
Country-years	6,416	6,828	6,411	6,906
Countries	150	150	149	150
Time controls?	YES	YES	YES	YES
Sample	Full	Full	Pre-2011	Full

Notes: Table A.1 estimates Equation A.1. It summarizes a series of logit regressions with country-clustered standard error estimates. The coefficient estimates are semi-elasticity marginal effects (because oil is logged) evaluated at coefficient means. The dependent variable in each column is civil war onset (either all civil wars, center-seeking, or separatist), and ongoing years are set to missing. Every regression contains peace years and cubic splines generated from the last year in which a war of the specified type was ongoing for each country. The unit of analysis is country-years. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Sample. The unit of analysis is country-years. Among countries with a population of at least 200,000 in the year 2000, the sample contains annual data for all independent non-Western European countries between the later of 1946 and their year of independence, and 2013. Western European countries and their four New World offshoots are excluded because they do not meet a key scope condition of conflict resource curse theories: weakly institutionalized states in which civil war may occur with a non-trivial probability. The 2013 end year corresponds with the last year of ethnic group data (see below). The population threshold for country size is the same as Ross and Mahdavi (2015) use in their oil data. Their population threshold is sensible because it is low enough to include small but substantively important oil producers, such as Qatar and Brunei. Finally, the independent country criterion excludes countries under Western European colonization. This criterion additionally excludes before 1990 all of Eastern Europe (plus Mongolia) besides Russia/Soviet Union, Serbia/Yugoslavia, and Albania because of foreign occupation. Similarly, all country-years under other foreign occupation—such as Iraq under U.S. occupation between 2003 and 2011—are excluded, coded based off Geddes, Wright and Frantz (2014). In foreign occupation cases, wars almost always focus on overthrowing the colonizer rather than a local government, the focus of the formal model.

Civil war data. The main civil war data used for this article draw from Fearon and Laitin's (2003) updated civil war data through 2009, and further updated by the author through 2013 by adding new conflicts from the Correlates of War database (COW; Dixon and Sarkees, 2015), which also uses a 1,000 death threshold,

and the UCDP/PRIO Armed Conflict Database (ACD; Gleditsch et al. 2002). I included every "intra-state war" that COW—which uses a 1,000 battle death threshold for wars—codes as beginning between 2010 and 2013 that ACD also codes as reaching 1,000 battle deaths, one of Fearon and Laitin's key coding rules. I also consulted COW and ACD for conflict termination years for any civil wars that Fearon and Laitin coded as ongoing in 2009. Additionally, Ross and Mahdavi (2015) use a lower population threshold than Fearon and Laitin (2003), which necessitates coding civil wars for smaller countries. ACD does not use a population threshold for deciding which countries to include (see pg. 14 of Version 7.1 of their codebook), therefore providing the needed information—although no civil wars were added through this procedure (Comoros had two conflicts but neither reached 1,000 battle deaths). Finally, I excluded any colonial wars.

Finally, Fearon and Laitin code whether the civil war was center-seeking or separatist. I verified their coding of civil war aims with both COW and ACD, and additional secondary sources when necessary. This enabled assigning aims to the wars that Fearon and Laitin code as mixed or ambiguous. Most cases that they code as mixed are aggregated rebellions that contain distinct rebel groups fighting center-seeking and separatist civil wars (see, for example, the Angola example in the first paragraph of the article), whereas I further distinguish each case by war aims. By contrast, COW or ACD code each war as *either* center-seeking or separatist, but never both. My coding scheme allows for the possibility of coding a rebellion as exhibiting both aims. However, after disaggregating Fearon and Laitin's civil war entries that contain multiple distinct rebel groups, I only coded two cases as exhibiting both aims (Ethiopia and Sudan, cases that Section C.2.3 describes). By contrast, in countries such as Burma (coded as mixed war aims by Fearon and Laitin), largely distinct center-seeking and separatist rebellions broke out in 1948, and several other countries such as Angola and India have featured center-seeking civil wars and separatist civil wars at the same time despite not beginning in the same year.

Advantages of Fearon and Laitin's coding scheme. The major advantage of using data based off Fearon and Laitin's (2003) coding procedure rather than ACD is that ACD does not provide a coherent scheme for coding distinct civil wars, and hence civil war *onsets*. Scholars use a lapse rule, typically two years, for translating ACD's incidence data into distinct conflict onsets. If the 25 or 1,000 death threshold (ACD codes both thresholds) is not met for at least two years after being met in the past, then using a two-year lapse rule counts any future year that meets the death threshold as a new civil war. Problematically, this procedure often either undercounts or (more likely) overcounts civil war onsets, especially when applied to the 25 battle death threshold standard in EPR studies. Fearon and Laitin (2013, 25) summarize:

> "They apply a criterion of one year (or two, or ten, for different codings) with no conflict above their 25 death threshold. This has the advantage of being relatively definite, but the disadvantage of making many long-running, low level conflicts that flit above and below the 25 dead threshold look like many distinct civil wars. In our view they often are more naturally seen as a single, long-running but low level civil conflict, that happens often by chance to get above or below the threshold in some years" (25). (Also see Sambanis 2004, 818-9.)

For an example of overcounting, using the standard two-year lapse coding in ACD2EPR, the Bakongo in Angola fought four different civil wars in the 1990s and 2000s even though the same rebel group was operative during the entire period. Solely using a lapse rule to distinguish conflicts can also undercount civil war onsets. For example, the UCDP Conflict Encyclopedia describes civil wars in the Democratic Republic of the Congo in the 1990s: "In 1996-1997 an armed rebellion led by AFDL and supported by Rwanda and Uganda managed to topple President Mobutu in May 1997. However the new regime was soon at war again [in 1998], this time against RCD and MLC." Although two different sets of governments and rebel groups fought what by any reasonable conceptualization are two distinct wars, the two-year lapse rule does not count a new onset in 1998 for the Tutsi-Banyamulenge because they participated in conflict in the previous year.

Although scholars can also employ lapse rules of other length, coding civil war episodes solely by using lapse rules does not address these problems of undercounting and overcounting. Two of Fearon and Laitin's (2003) coding rules help to guard against these issues. First, "War ends are coded by observation of a victory, wholesale demobilization, truce, or peace agreement followed by at least two years of peace" (Fearon and Laitin 2003, 76, fn. 4; which also states their full set of rules). This directly addresses the concern about overcounting onsets for periodic conflicts, such as Bakongo in Angola, because clear signals of intent to end the current episode of fighting characterize the end of a war. Importantly, this rule still enables coding repeated civil wars with the same rebel group. Second, "If a main party to the conflict 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)." This addresses the problem of undercounting onsets in cases such as the Democratic Republic of the Congo in the 1990s.

Oil and population data. Ross and Mahdavi (2015) provide annual data between 1932 and 2014 on the total value of oil and natural gas production at the country level, measured in 2014 dollars. The variable has consistent coverage, especially since 1960 (before which many countries in the sample were under colonial rule). For countries with missing data, which in all cases is some period before the first data point, I used the following procedure. If there was less than $2 in oil and gas income per capita in the first year of data, I imputed all previous years as $0. If oil and gas income per capita exceeded this amount in the first year, I used corresponding data from Haber and Menaldo (2011).

Ross and Mahdavi (2015) also provide population data, drawn mostly from World Bank (2017) and from Maddison (2008). I used their data to create a per capita oil variable, and, following Ross (2012), also control for population as a separate covariate in every country-level regression specification. For country-years in the sample during the 1940s, the country's 1950 population data point is used because both of Ross and Mahdavi's (2015) source datasets have sparse coverage before 1950 (only Afghanistan had missing population data for a later point among country-years in the sample, and their 1961 population figure is used for all previous years).

Finally, the regressions lag each of oil and gas income per capita and population by one year. If the country has missing data in their first year in the dataset (because of the lagging), they are assigned the next year's oil and/or population data. Overall, no country-years that meet the sample criteria discussed above are dropped because of missing data.

A.2 Ethnic Group-Level Data and Regressions (Figure 2)

For ethnic group index i, country index j, and year index t, the regression equation for Figure 2 and the corresponding regression table, Appendix Table A.2, is:

$$\ln\left(\frac{Y_{it}}{1-Y_{it}}\right) = \beta_j + \beta_O \cdot Oil_{it} + \boldsymbol{T}'_{it} \cdot \beta_T + \epsilon_{it}, \tag{A.2}$$

where Y_{it} indicates either all civil war onset, center-seeking civil war onset, or separatist civil war onset, and $\boldsymbol{T}'_{it}$ is a vector of peace years and cubic splines calculated since the last year in a which a conflict of the specified ended as well as a lagged country-level civil war incidence variable. The even-numbered specifications include country-level intercepts β_j, and the odd-numbered columns contain a constant intercept.

Table A.2: Regression Table for Figure 2

Dependent variable:	All CW onset		Center CW onset		Separatist CW onset	
	(1)	(2)	(3)	(4)	(5)	(6)
Giant oil/gas field	0.000957	0.00239***	-0.000349	0.00475	0.00108***	0.00166**
	(0.000660)	(0.000832)	(0.000606)	(0.00298)	(0.000412)	(0.000703)
Ethnic group-years	30,741	16,965	31,519	6,035	30,984	13,817
Ethnic groups	762	398	763	168	762	293
Country FE?	NO	YES	NO	YES	NO	YES
Time controls?	YES	YES	YES	YES	YES	YES

Notes: Table A.2 estimates Equation A.2. It summarizes a series of logit regressions with ethnic group-clustered standard error estimates. The coefficient estimates are the marginal effects evaluated at coefficient means. The dependent variable in each column is ethnic civil war onset (either all civil wars, center-seeking, or separatist), and ongoing years are set to missing. Every regression contains peace years and cubic splines generated from the last year in which a war of the specified type was ongoing for each ethnic group, and a lagged country-level civil war incidence variable. The unit of analysis is ethnic group-years. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Sample. The unit of analysis is ethnic group-years. The sample contains every politically relevant ethnic group with a location polygon in the Ethnic Power Relations (EPR; Vogt et al. 2015) dataset for all non-Western European countries and offshoots between the later of 1946 and their year of independence, and 2013. The start and end years correspond with the start and end years of the 2014 EPR (Update 2) dataset. The previous section discusses additional sample restrictions that are also used for this sample.

Civil war data. Using the list of civil wars described above, I assigned wars to EPR ethnic groups using the following procedure. To my knowledge, this is the first attempt for a global sample to integrate a different civil war dataset than UCDP/PRIO with EPR ethnic groups. First, I matched each Fearon and Laitin (2003) conflict and each post-2009 conflict to the corresponding conflict in the UCDP/PRIO Armed Conflict Database (ACD; Gleditsch et al. 2002). Because Fearon and Laitin use a higher death threshold than the 25 battle deaths per year needed to be included in the ACD, the ACD contains almost all their civil wars. This facilitated using the ACD2EPR dataset (Vogt et al., 2015), which links rebel groups in the ACD to EPR groups and codes whether the rebel group made ethnic claims and recruited within an ethnic group. Ethnic claims and recruitment are individually necessary and jointly sufficient conditions for ACD2EPR to code the ethnic group as involved in an "ethnic" conflict, and I use this same definition to code an ethnic war. By contrast, in every regression table in this article that uses ethnic groups as the unit of analysis, the dependent variable codes as 0 (i.e., not an ethnic war) any civil war that lacked ethnic aims and recruitment. For Fearon and Laitin wars not included in the Armed Conflict Dataset, the author used Fearon and Laitin's coding of whether or not it was an ethnic civil war and consulted secondary sources to code ethnic participation.

In Fearon and Laitin conflicts with only a single corresponding rebel group and ethnic group in ACD2EPR, I coded that ethnic group as participating in a civil war during the years coded by Fearon and Laitin. Assigning Fearon and Laitin civil wars to EPR ethnic groups for conflicts involving multiple rebel groups and/or multiple ethnic groups required additional considerations. In most cases with multiple ethnic groups participating in the same conflict, I used the PRIO Battle Deaths dataset (Lacina and Gleditsch, 2005) to assess whether that ethnic group was responsible for at least 1,000 battle deaths. This was not possible, however, for center-seeking conflicts featuring multiple ethnic groups because the ACD and the PRIO Battle Deaths dataset code all rebel groups participating in a center-seeking civil war as part of the same conflict. (By contrast, in countries with multiple separatist civil wars, such as Ethiopia, the dataset provide battle death estimates for each distinct territorial conflict.) For these center-seeking conflicts, I coded any participating EPR group (drawing from ACD2EPR) with ethnic claims and recruitment as experiencing an ethnic civil war. I use ACD2EPR's conflict years for the group rather than Fearon and Laitin's because, in some conflicts

featuring multiple ethnic groups, individual ethnic groups only participated in a subset of the years of the overall conflict.

Finally, as discussed above for the country-level data, rebelling ethnic groups have almost always articulated clear aims for either the center or to separate, with Ethiopia and Sudan providing the only exceptions.

Advantages of Fearon and Laitin's coding scheme. Similar to the concerns discussed with country-level data, ACD does not provide a scheme for distinguishing civil war episodes. Conventional procedures using the two-year lapse rule for translating UCDP/PRIO's conflict incidence data into distinct war onsets yield many cases that overcount onsets. Particularly relevant for the present analysis, this includes several separatist conflicts in oil-rich regions such as Angola vs. FLEC/FAC in Cabinda and Iraq vs. PUK in Kurdistan. Although in principle scholars could recode ACD into distinct episodes, in practice, applying this coding procedure is particularly difficult at the ethnic group level. From examining ACD2EPR data, there are frequent gaps in fighting for individual ethnic groups. To measure distinct conflict episodes, it is more sensible to start with a list like Fearon and Laitin's that distinguishes civil wars, and then to code ethnic affiliation—rather than starting with ACD2EPR and trying to classify fighting years into unique civil wars.

Oil data. The oil variable indicates whether the EPR ethnic group has any onshore giant oil or gas fields in its territory, or any giant oil/gas fields located offshore within 250 kilometers of a segment of the group's location polygon that touches a coast and within its country's maritime boundaries. GeoEPR provides the EPR spatial data (Vogt et al., 2015) and Flanders Marine Institute (2016) provides the maritime boundary spatial data.[34] A giant oil field contains ultimate recoverable reserves of at least 500 million barrels of oil equivalent before extraction began. An updated version of Horn's (2003) dataset provides coordinates for every major oil field discovered in the world between 1868 and 2010 (Horn, 2015). Because the source provides data on when the field was initially discovered (with no missing data on this variable), the oil variable can vary over time for ethnic groups.

I use Horn's data, which has been used in recent oil-civil war publications such as Lei and Michaels (2014), rather than an alternative sometimes used in the literature, PETRODATA (Lujala, Rod and Thieme, 2007), for two reasons. First, PETRODATA includes all oil fields, giant or not. Coding groups as oil-rich or not based on giant oil fields ensures that any group coded as oil-rich has (at least potentially) an economically important well, as opposed to a minor oil field that is not of high enough economic value to make the mechanisms posited in the model empirically relevant. Second, PETRODATA has considerable missing data for the year of discovery (38% of its oil fields), which makes it difficult to use this data to code a time-varying variable for oil-richness. Furthermore, although a binary oil-rich variable is somewhat coarse, given data limitations it appears to provide the best option. Annual production data at the oil field level does not exist—in fact, there are many difficulties estimating the value of oil production even at the country level, as Ross and Mahdavi's (2015) codebook discusses. Additionally, as noted, even having a single giant oil field should be sufficient to trigger to oil mechanisms posited in the theory.

B Supporting Information for Section 2

B.1 Ethnicity and Civil War

Although in principal the theoretical logic holds for any geographically segregated identity groups, in the real world, ethnic groups are more likely to initiate civil wars—especially separatist civil wars—than groups

[34] Section D.3 discusses differences between onshore and offshore oil.

organized by class or political ideology. Denny and Walter (2014) propose three main explanatory factors for the ethnicity-conflict relationship: grievances, opportunity, and likelihood of bargaining breakdown. First, regarding grievances, "when political power is divided along ethnic lines, ruling elites can disproportionately favor their own ethnic group at the expense of others. This creates grievances that fall along ethnic lines" (199). Differences and discrimination are particularly likely to occur along ethnic lines because sources of economic and political power argued in the literature to create grievances are frequently distributed along ethnic lines (203). Research such as Cederman, Gleditsch and Buhaug (2013), Roessler (2016), Wucherpfennig, Hunziker and Cederman (2016), and Paine (2018) have discussed historical and strategic factors that motivate exclusion along ethnic lines, and the discussion of Assumption 1 in the present paper discusses how ethnic group size affects this calculus.

Second, regarding opportunity, "ethnic groups tend to live together in concentrated spaces, sharing the same language and customs, and enjoying deep ties with ethnic kin. This means that ethnic groups, if they are aggrieved, will have an easier time mobilizing support to demand change" Denny and Walter (2014, 199). The model implicitly incorporates this aspect of ethnicity by assuming, in period 1, that the challenger has solved the collective action that both center-seeking and separatist rebellions pose. As Section D.2 discusses, territorial concentration is particularly relevant for separatist civil wars.

Third, regarding the likelihood of bargaining breakdown, "the fact that ethnic identity tends to be less elastic than other types of identity means that credible commitments to any bargain—before and during a conflict—will be more difficult to make" Denny and Walter (2014, 199). Low elasticity arises from the descent-based criteria determining who belongs to which ethnic group, therefore making ethnic identity very difficult to change (Fearon, 1999). Roessler (2011, 313) proposes a related argument that in political environments where ethnicity is believed to be politically salient (which, in many cases, arose from colonial rule and other historical influences), ethnic identity can serve as an "information shortcut" for distinguishing loyalists from disloyal actors even if "competing elites are necessarily motivated by ethnic aims." The model implicitly incorporates this idea by treating members of the government's ethnic group and members of the challenger's ethnic group as distinct actors, although the commitment parameter θ may correspond with cross-cutting cleavages that can mitigate strains caused by belonging to different ethnic groups.

B.2 Supporting Information for Assumption 1

Existing research devotes relatively little attention to studying which groups tend to have access to power at the center. However, findings contained in recent articles present similarly supportive evidence for Assumption 1. Wucherpfennig, Hunziker and Cederman (2016) find that larger groups were more more likely to win control of the post-colonial state in a sample of British and French colonies. Francois, Rainer and Trebbi (2015) show in a sample of African countries that cabinet positions are usually allocated in proportion to ethnic group size. These patterns likely stem from strategic concerns that large groups pose the greatest threats to overthrowing the government if excluded from power (Roessler and Ohls, Forthcoming), and from historical advantages in which large ethnic groups were often organized as hierarchical states prior to the colonial era and, consequently, tended to dominate the post-colonial state (Paine, 2018).

B.3 Supporting Information for Assumption 2

Perhaps surprising, existing research pays little attention to the relationship between group size and civil war aims, instead usually aggregating all civil wars. Instead, existing research only demonstrates that larger ethnic groups covary positively with onset of *any* type of civil war (Buhaug et al. 2008, 544; Cederman

et al. 2013, 73). These findings rest on the sensible premise that larger group size makes a rebellion more feasible, but do not address incentives for different types of civil war.

B.4 Supporting Information for Assumption 3

Kalyvas and Balcells (2010) analyze rebel tactics—but not civil war aims—and conceptualize technologies of rebellion based on rebel and government strength. This includes irregular conflicts between weak rebels and a strong government, and conventional conflicts between strong rebels and a strong government. They provide a series of multinominal logit estimates that examine correlates of civil war tactics (Table 3 on pg. 425 of their article). They do not, however, examine civil war aims, and the interest here is to see if civil war aims correlate with civil war tactics. To do so, I coded civil war aims for each conflict in their list (which is similar to the civil war list used in Figure 1; their years span from 1944 to 2004) and added a separatist civil war indicator to the specifications in their Table 3, which includes a handful of control variables listed below in Table B.1. They run multinomial logit models and compare the outcomes "conventional tactics" and "symmetric non-conventional wars"—their third category of civil war aims, in which both the rebels and government are weak—to the basis category of irregular tactics. Here, I estimate standard logit models with conventional tactics equaling 1 on the dichotomous outcome variable and irregular tactics equaling 0, thus ignoring symmetric non-conventional wars. The unit of analysis in Table B.1 is civil wars.

The table shows that separatist civil wars covary negatively and significantly with conventional tactics—indicating that separatism and irregular tactics tend to coincide. Using a multinomial logit model that additionally compares symmetric non-conventional wars to the basis category of irregular wars (not shown) yields a null correlation for separatist civil wars, as expected because both symmetric non-conventional wars and irregular wars involve guerrilla tactics.

Table B.1: Replicating Kalyvas and Balcells (2010) with Separatist Indicator

	DV: Civil war fought with conventional tactics					
	(1)	(2)	(3)	(4)	(5)	(6)
Separatist aims	-1.147**	-1.574***	-1.457***	-1.398**	-1.598***	-1.636***
	(0.498)	(0.525)	(0.510)	(0.568)	(0.569)	(0.589)
Rough terrain	0.00306	0.00224	0.00710	0.00184	0.00210	0.00271
	(0.00750)	(0.00383)	(0.00910)	(0.00383)	(0.00348)	(0.00567)
Ethnic war	0.596	0.746	0.135	0.491	0.612	0.125
	(0.493)	(0.477)	(0.540)	(0.510)	(0.496)	(0.555)
GDP/capita	0.104	0.0227	0.347**	0.113	0.0930	0.271
	(0.154)	(0.162)	(0.157)	(0.169)	(0.174)	(0.172)
Post-1990	1.381***			0.947*		
	(0.512)			(0.539)		
New post-communist country		3.255***			1.871	
		(1.211)			(1.394)	
Marxist rebels			-1.873***			-1.499**
			(0.593)			(0.591)
Military personnel				9.12e-05	6.22e-05	4.56e-05
				(0.000192)	(0.000193)	(0.000195)
# of civil wars	120	120	120	108	108	108

Notes: Table B.1 summarizes a series of logit models in which the dependent variable equals 1 if the civil war is fought using conventional tactics and 0 if fought with irregular tactics. The unit of analysis is civil wars, and the sample is all civil wars in Kalyvas and Balcells's (2010) dataset between 1944 and 2004, except symmetric non-conventional wars. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

C Supporting Information for Sections 3 and 4

Section C.1 proves all the formal statements, and Section C.2 discusses several extensions to the core model.

Table C.1: Summary of Parameters and Choice Variables

Stage	Variables/description
Primitives	• G: government • C: regional challenger • δ: discount factor • t: time • α: C's population share • i: indexes regions; G for government and C for challenger
Production and taxation	• O_i: percent of economic output in region i that is oil • e_i: parameterizes producers' economic exit option in player i's region • θ: G's commitment ability; determines maximum taxes and minimum transfers • R: per-period total revenues, equal $1 - e_G + (1-\theta) \cdot (1 - e_C)$ • γ: indicator for production in C's territory
Government's period 1 choices	• m: period t military spending • x_t: period t transfers
Challenger's period 1 choices	• μ: C's civil war aims, 1 equals center-seeking and 0 equals separatist •: $p_c(\cdot)$: C's probability of winning a center-seeking civil war •: $p_s(\cdot)$: C's probability of winning a separatist civil war •: j: indexes civil war aims; c for center-seeking and s for separatist •: β_j: efficiency with which G's military spending decreases C's probability of winning
Continuation values	• $V^G_{\text{s.q.}}$: G's future continuation value in the status quo regime • $V^C_{\text{s.q.}}$: C's future continuation value in the status quo regime • V^G_{center}: G's future continuation value following a successful center-seeking civil war • V^C_{center}: C's future continuation value following a successful center-seeking civil war • V^G_{sep}: G's future continuation value following a successful separatist civil war • V^C_{sep}: C's future continuation value following a successful separatist civil war

C.1 Proofs for Formal Results

Proof of Lemma 1.

1. *Definition*. The term π_c expresses the extent to which winning a center-seeking civil war increases C's consumption relative to winning a separatist civil war.

$$\pi_c \equiv \frac{1 - e_G}{1 - e_C - \theta \cdot (2 - e_C - e_G)}$$

2. *Preliminary results*. The following two results will be used throughout the remainder of the proof. Part a of Assumption 2 implies that:

$$\frac{d}{d\alpha}\Big[p_c(m, \alpha, \beta_c) \cdot (1 + \pi_c) - p_s(m, \alpha, \beta_s)\Big] = \frac{\partial p_c}{\partial \alpha} \cdot (1 + \pi_c) - \frac{\partial p_s}{\partial \alpha} > 0 \qquad \text{(C.1)}$$

Assumption 3 implies that:

$$\frac{d}{dm}\Big[p_c(m,\alpha,\beta_c)\cdot(1+\pi_c)-p_s(m,\alpha,\beta_s)\Big]=\frac{\partial p_c}{\partial m}\cdot(1+\pi_c)-\frac{\partial p_s}{\partial m}<0 \tag{C.2}$$

3. *Proof of part a.* Show that there exists a unique $\underline{\alpha}\in(0,1)$ such that:

$$p_c(0,\underline{\alpha},\beta_c)\cdot(1+\pi_c)-p_s(0,\underline{\alpha},\beta_s)=0$$

Satisfying the intermediate value theorem conditions implies there exists at least one such $\underline{\alpha}$:

- $p_c(0,0,\beta_c)\cdot(1+\pi_c)-p_s(0,0,\beta_s)<0$ follows from Assumption 2, part b.
- $p_c(0,1,\beta_c)\cdot(1+\pi_c)-p_s(0,1,\beta_s)>0$ follows from Assumption 2, part c.
- $p_c(\cdot)$ and $p_s(\cdot)$ are each assumed to be continuous in α.

Equation C.1 proves the unique threshold claim for $\underline{\alpha}$.

4. *Proof of part c.* Show that there exists a unique $\overline{\alpha}\in(0,1)$ such that:

$$p_c(R,\overline{\alpha},\beta_c)\cdot(1+\pi_c)-p_s(R,\overline{\alpha},\beta_s)=0$$

Satisfying the intermediate value theorem conditions implies there exists at least one such $\overline{\alpha}$:

- $p_c(R,0,\beta_c)\cdot(1+\pi_c)-p_s(R,0,\beta_s)<0$ follows from Assumption 2, part b.
- $p_c(R,1,\beta_c)\cdot(1+\pi_c)-p_s(R,1,\beta_s)>0$ follows from Assumption 2, part c.
- $p_c(\cdot)$ and $p_s(\cdot)$ are each assumed to be continuous in α.

Equation C.1 proves the unique threshold claim for $\overline{\alpha}$.

5. *Proof of ordering claim.* Combining the previous two steps and defining $f(m,\alpha)\equiv p_c(m,\alpha,\beta_c)-p_s(m,\alpha,\beta_s)$ yields:

$$f(0,\underline{\alpha})-f(R,\overline{\alpha})+\Big[p_c(0,\underline{\alpha},\beta_c)-p_c(R,\overline{\alpha},\beta_c)\Big]\cdot\pi_c=0 \tag{C.3}$$

To prove $\underline{\alpha}<\overline{\alpha}$, suppose instead $\underline{\alpha}\geq\overline{\alpha}$. Given this premise, Assumption 2 and part b of Assumption 3 imply that $f(0,\underline{\alpha})>f(R,\overline{\alpha})$ and $p_c(0,\underline{\alpha},\beta_c)>p_c(R,\overline{\alpha},\beta_c)$. This generates a contradiction because then the left-hand side of Equation C.3 is strictly positive.

6. *Proof of part b.* First, show that for any $\alpha\in(\underline{\alpha},\overline{\alpha})$, there exists a unique $\hat{m}\in(0,R)$ such that:

$$p_c(\hat{m},\alpha,\beta_c)\cdot(1+\pi_c)-p_s(\hat{m},\alpha,\beta_s)=0 \tag{C.4}$$

Satisfying the intermediate value theorem conditions implies that there exists at least one such $\hat{m}$:

- $p_c(0,\alpha,\beta_c)\cdot(1+\pi_c)-p_s(0,\alpha,\beta_s)>0$ follows from $\alpha>\underline{\alpha}$.
- $p_c(R,\alpha,\beta_c)\cdot(1+\pi_c)-p_s(R,\alpha,\beta_s)<0$ follows from $\alpha<\overline{\alpha}$.
- $p_c(\cdot)$ and $p_s(\cdot)$ are each assumed to be continuous in α.

Proving that $\hat{m}$ strictly increases in α establishes the unique threshold claim. Applying the implicit function theorem to Equation C.4 demonstrates:

$$\frac{d\hat{m}}{d\alpha} = -\frac{\frac{\partial p_c}{\partial \alpha} \cdot (1+\pi_c) - \frac{\partial p_s}{\partial \alpha}}{\frac{\partial p_c}{\partial m} \cdot (1+\pi_c) - \frac{\partial p_s}{\partial m}} > 0, \tag{C.5}$$

and the sign follows from Equations C.1 and C.2. ■

Lemmas C.1 and C.2 will be used to prove Proposition 1. There are three notable points about these formal statements. First, Assumption 4 enables restricting attention to parameter values in which x^* is interior. Second, although the optimization problems in Lemma C.1 (also see Equation 4) do not bound G's choice set, the Inada-type conditions stated in the model setup generate bounded solutions. Third, none of the optimization problems below explicitly bound the solutions by the budget constraint (Equation 5) because G's lifetime utility maximization problem is equivalent to maximizing B^*. Related, as the proof for Proposition 1 establishes, G's optimization problem conditional on facing a civil war is an affine transformation of the optimization problems stated in these results.

Lemma C.1 (Military expenditures)**.**

Part a. *There exists a unique interior optimizer $m_c^* \in (0, R)$ to G's maximization problem (Equation 4) subject to $\mu = 1$.*

Part b. *There exists a unique interior optimizer $m_s^* \in (0, R)$ to G's maximization problem (Equation 4) subject to $\mu = 0$.*

Part c. $m_s^* < m_c^*$.

Proof of part a. If $\mu = 1$, then G's unconstrained lifetime utility maximization problem is:

$$\max_{m_c} \; R - m_c - x^*(\mu = 1, m_c) + \delta \cdot V^G_{\text{s.q.}}$$

with associated first-order condition:

$$\underbrace{-\frac{\delta}{1-\delta} \cdot \left[p_c'(m_c^*, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\right]}_{\text{MB}} = \underbrace{1}_{\text{MC}} \tag{C.6}$$

Assuming $\lim_{m \to 0} p_c'(m) = -\infty$ and $\lim_{m \to R} p_c'(m) = 0$ implies $m_c^* \in (0, 1)$. Assuming $p_c'' > 0$ suffices to show the second derivative is strictly negative, establishing the unique maximizer.

Proof of part b. If $\mu = 0$, then G's unconstrained expenditure minimization problem is:

$$\max_{m_s} \; R - m_s - x^*(\mu = 1, m_s) + \delta \cdot V^G_{\text{s.q.}}$$

with associated first-order condition:

$$\underbrace{-\frac{\delta}{1-\delta} \cdot \left[p_s'(m_s^*, \alpha, \beta_s) \cdot \left[(1-\theta) \cdot (1-e_c) - \theta \cdot (1-e_G)\right]\right]}_{\text{MB}} = \underbrace{1}_{\text{MC}} \tag{C.7}$$

Assuming $\lim_{m\to 0} p_s'(m) = -\infty$ and $\lim_{m\to R} p_s'(m) = 0$ implies $m_s^* > 0$. Assuming $p_s'' > 0$ suffices to show the second derivative is strictly negative, establishing the unique maximizer.

Proof of part c. Combining Equations C.6 and C.7 yields:

$$-p_c'(m_c^*, \alpha, \beta_c) = -p_s'(m_s^*, \alpha, \beta_s) \cdot \omega, \tag{C.8}$$

for $\omega = \frac{(1-\theta)\cdot(1-e_c)-\theta\cdot(1-e_G)}{(1-\theta)\cdot(2-e_G-e_C)}$. Assumption 3 implies that $-p_s'(m_c^*, \alpha, \beta_s) < -p_c'(m_c^*, \alpha, \beta_c)$, and $-p_s'(m_s^*, \alpha, \beta_s) \cdot \omega < -p_s'(m_s^*, \alpha, \beta_s)$ follows from $\omega < 1$. Combining these two inequalities with Equation C.8 implies:

$$-p_s'(m_c^*, \alpha, \beta_s) < -p_s'(m_s^*, \alpha, \beta_s)$$

The result follows because $-p_s'(\cdot)$ strictly decreases in m. ■

Lemma C.2 (Population size thresholds)**.**

Part a. *There exists a unique value $\hat{\alpha}_c \in (\underline{\alpha}, \overline{\alpha})$ such that: if $\alpha < \hat{\alpha}_c$, then $\hat{m} < m_c^*$; and if $\hat{m} > m_c^*$ otherwise.*

Part b. *There exists a unique value $\hat{\alpha}_s \in (\underline{\alpha}, \overline{\alpha})$ such that: if $\alpha < \hat{\alpha}_s$, then $\hat{m} < m_s^*$; and if $\hat{m} > m_s^*$ otherwise.*

Part c. $\hat{\alpha}_s < \hat{\alpha}_c$.

Proof of part a. Define $\hat{\alpha}_c$ implicitly as:

$$\hat{m}(\hat{\alpha}_c) - m_c^*(\hat{\alpha}_c) = 0 \tag{C.9}$$

Satisfying the intermediate value theorem conditions implies there exists a least one such $\hat{\alpha}_c \in (\underline{\alpha}, \overline{\alpha})$:

- $\hat{m}(\underline{\alpha}) - m_c^*(\underline{\alpha}) < 0$ follows from $\hat{m}(\underline{\alpha}) = 0$ (see the proof for Lemma 1), and part a of Lemma C.1 shows $m_c^* \in (0, R)$.
- $\hat{m}(\overline{\alpha}) - m_c^*(\overline{\alpha}) > 0$ follows from $\hat{m}(\overline{\alpha}) = R$, and part a of Lemma C.1 shows $m_c^* \in (0, R)$.
- These functions are each continuous in α because each constituent function is continuous in α.

The unique threshold claims follow from applying the implicit function theorem to Equation C.6:

$$\frac{d}{d\alpha}\left[\hat{m}(\alpha) - m_c^*(\alpha)\right] = \underbrace{-\frac{\frac{\partial p_c}{\partial \alpha}\cdot(1+\pi_c) - \frac{\partial p_s}{\partial \alpha}}{\frac{\partial p_c}{\partial m}\cdot(1+\pi_c) - \frac{\partial p_s}{\partial m}}}_{>0} + \underbrace{\frac{\frac{\partial^2 p_c}{\partial m \partial \alpha}}{\frac{\partial^2 p_c}{\partial m^2}}}_{>0} > 0,$$

where the sign follows from Equation C.5 (see the proof for Lemma 1) and from the second-order partial derivatives stated in the text.

Proof of part b. Define $\hat{\alpha}_s$ implicitly as:

$$\hat{m}(\hat{\alpha}_s) - m_s^*(\hat{\alpha}_s) = 0 \tag{C.10}$$

Satisfying the intermediate value theorem conditions implies there exists a least one such $\hat{\alpha}_s \in (\underline{\alpha}, \overline{\alpha})$:

- $\hat{m}(\underline{\alpha}) - m_s^*(\underline{\alpha}) < 0$ follows from $\hat{m}(\underline{\alpha}) = 0$ (see the proof for Lemma 1), and part b of Lemma C.1 shows $m_s^* \in (0, R)$.
- $\hat{m}(\overline{\alpha}) - m_s^*(\overline{\alpha}) > 0$ follows from $\hat{m}(\overline{\alpha}) = R$, and part b of Lemma C.1 shows $m_s^* \in (0, R)$.
- These functions are each continuous in α because each constituent function is continuous in α.

The unique threshold claims follow from applying the implicit function theorem to Equation C.7:

$$\frac{d}{d\alpha}\left[\hat{m}(\alpha) - m_s^*(\alpha)\right] = \underbrace{-\frac{\frac{\partial p_c}{\partial \alpha} \cdot (1 + \pi_c) - \frac{\partial p_s}{\partial \alpha}}{\frac{\partial p_c}{\partial m} \cdot (1 + \pi_c) - \frac{\partial p_s}{\partial m}}}_{>0} + \underbrace{\frac{\frac{\partial^2 p_s}{\partial m \partial \alpha}}{\frac{\partial^2 p_s}{\partial m^2}}}_{>0} > 0,$$

where the sign follows from Equation C.5 (see the proof for Lemma 1) and from the second-order partial derivatives stated in the text.

Proof of part c. Combining Equations C.9 and C.10 and slightly rearranging yields:

$$\hat{m}(\hat{\alpha}_c) - \hat{m}(\hat{\alpha}_s) = m_c^*(\hat{\alpha}_c) - m_s^*(\hat{\alpha}_s)$$

Suppose the claim is false, and $\hat{\alpha}_c \leq \hat{\alpha}_s$. This hypothesis yields the following inequalities, generating a contradiction:

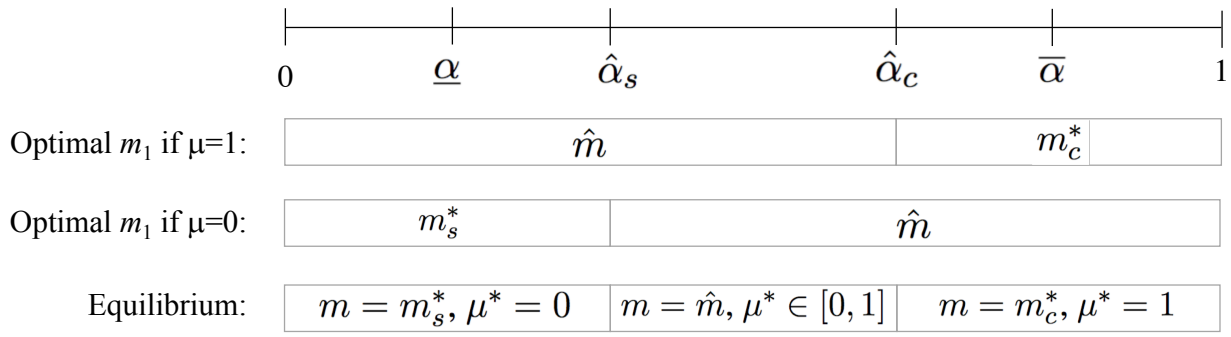
- LHS: $\hat{m}(\hat{\alpha}_c) - \hat{m}(\hat{\alpha}_s) \leq 0$ because $\hat{m}$ strictly increases in α (see step 6 in the proof for Lemma 1).
- RHS: $m_c^*(\hat{\alpha}_c) - m_s^*(\hat{\alpha}_s) > m_c^*(\hat{\alpha}_c) - m_c^*(\hat{\alpha}_s) \geq 0$. The first inequality follows from part c of Lemma C.1 and the second inequality follows because m_c^* strictly decreases in α (see part a of this proof). ■

Figure C.1 visually summarizes the different α thresholds and optimal military spending amounts stated in Proposition 1 and Lemmas C.1 and C.2, and provides intuition for proving Proposition 1. It not only states equilibrium military spending, but also optimal military spending when fixing C's civil war aims. Recall that for $\alpha \in \left(\underline{\alpha}, \overline{\alpha}\right)$, G's military spending affects C's civil war aims (see part b of Lemma 1). G's optimization problem (Equation 4) compares expenditures for the optimal amount within the center-seeking range to the optimal amount within the separatist range, and chooses the one that minimizes period 1 expenditures (note that G's lifetime utility maximization problem is identical to minimizing period 1 expenditures).

- *Center-seeking range.* If $\alpha > \hat{\alpha}_c$, then $\mu^*(m_c^*) = 1$, which implies that G can choose its interior optimal military spending amount and still induce $\mu^* = 1$ (i.e., the center-seeking range). However, if $\alpha < \hat{\alpha}_c$, then $\mu^*(m_c^*) = 0$. In words, if G spends that high an amount when facing a smaller ethnic group, then it will deter a center-seeking war. Therefore, to stay within the bounds of the center-seeking range, G must lower its military expenditures to $\hat{m}$.

- *Separatist range.* If $\alpha < \hat{\alpha}_s$, then $\mu^*(m_s^*) = 0$, which implies that G can choose its interior optimal military spending amount and still induce $\mu^* = 0$ (i.e., the separatist range). However, if $\alpha > \hat{\alpha}_s$, then $\mu^*(m_s^*) = 1$. In words, if G spends that low an amount when facing a larger ethnic group, then it will fail to deter a center-seeking civil war. Therefore, to stay within the bounds of the separatist range, G must raise its military expenditures to $\hat{m}$.
- *Combining these considerations.* The key to understanding G's optimal choice as a function of α is that, at $m = \hat{m}$, G is indifferent between facing a center-seeking or separatist civil war. The logic is as follows. By definition, at $m = \hat{m}$, C is indifferent between war aims because $x^*(\mu = 1, \hat{m}) = x^*(\mu = 0, \hat{m})$. This implies that, at $m = \hat{m}$, G's expenditures are also equal for either type of civil war: $\hat{m} + x^*(\mu = 1, \hat{m}) = \hat{m} + x^*(\mu = 0, \hat{m})$. Therefore:
  - If $\alpha < \hat{\alpha}_s$, then the two possible equilibrium choices are $m = \hat{m}$ (center-seeking range) and $m = m_s^*$ (separatist range). G prefers $m = m_s^*$ to $m = \hat{m}$ within the separatist range, and G's utility if $m = \hat{m}$ is not a function of μ. Therefore, G's equilibrium choice must be $m = m_s^*$, which also implies that C's equilibrium civil war constraint is separatist.
  - If $\alpha > \hat{\alpha}_c$, then the two possible equilibrium choices are $m = m_c^*$ (center-seeking range) and $m = \hat{m}$ (separatist range). G prefers $m = m_c^*$ to $m = \hat{m}$ within the center-seeking range, and G's utility if $m = \hat{m}$ is not a function of μ. Therefore, G's equilibrium choice must be $m = m_c^*$, which also implies that C's equilibrium civil war constraint is center-seeking.
  - If $\alpha \in (\hat{\alpha}_s, \hat{\alpha}_c)$, then the interior optimal spending amounts violate both the center-seeking and separatist ranges: optimal center-seeking spending is high enough to deter C from fighting for the center, and optimal separatist spending is too low to deter C from fighting for the center. This implies that G optimally sets $m = \hat{m}$, which makes C indifferent between civil war aims.

Figure C.1: Equilibrium Military Spending and Civil War Aims



Proof of Proposition 1, part a. The proof proceeds in three steps.

1. Solve G's constrained optimization problem (Equation 4) in the center-seeking range. Define the Lagrangian:

$$\max_{m,\lambda_1,\lambda_2} R - \big[m + x^*(\mu = 1, m)\big] + \delta \cdot V_{\text{s.q.}}^G + \lambda_1 \cdot m + \lambda_2 \cdot (\hat{m} - m)$$

The associated KKT conditions are:

$$\frac{\partial \mathcal{L}}{\partial m} = -\left\{1 + \frac{\delta}{1-\delta} \cdot \left[p_c'(m, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\right]\right\} + \lambda_1 - \lambda_2 = 0,$$

$$m \geq 0, m \leq \hat{m}, \lambda_1 \geq 0, \lambda_2 \geq 0, \lambda_1 \cdot m = 0, \lambda_2 \cdot \left(\hat{m} - m\right) = 0$$

- If $\alpha < \hat{\alpha}_c$, then one solution is $m = \hat{m}$ with associated multipliers $\lambda_1 = 0$ and $\lambda_2 = -\left\{1 + \frac{\delta}{1-\delta} \cdot \left[p_c'(\hat{m}, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\right]\right\}$. Part a of Lemma C.2 implies that $\hat{m} < m_c^*$ in this parameter range, and part a of Lemma C.1 establishes that $1 + \frac{\delta}{1-\delta} \cdot \left[p_c'(m, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\right] < 0$ for any $m < m_c^*$. This implies that the second non-negative multiplier constraint is met, and it is straightforward to verify that this vector satisfies every other KKT condition.

  The following steps prove uniqueness. Setting $m < \hat{m}$ requires $\lambda_2 = 0$ to satisfy the second complementary slackness condition. Then, for any $\lambda_1 \geq 0$, the first-order condition is violated because $1 + \frac{\delta}{1-\delta} \cdot \left[p_c'(m, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\right] < 0$ for any $m < m_c^*$ (and we already established that $\hat{m} < m_c^*$ in this parameter range).

- If $\alpha > \hat{\alpha}_c$, then one solution is $m = m_c^*$ (see Lemma C.1) with associated multipliers $\lambda_1 = 0$ and $\lambda_2 = 0$. Because part a of Lemma C.2 implies that $\hat{m} > m_c^*$ in this parameter range, it is straightforward to verify that this vector satisfies every KKT condition.

  The following steps prove uniqueness.

  - We have established that $m_c^* < \hat{m}$ in this parameter range. Therefore, any $m < m_c^*$ requires $\lambda_2 = 0$ to satisfy the second complementary slackness condition. However, for any $\lambda_1 \geq 0$, this violates the first-order condition because $1 + \frac{\delta}{1-\delta} \cdot \left[p_c'(m, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\right] < 0$ for any $m < m_c^*$.
  - Part a of Lemma C.2 establishes that $m_c^* > 0$. Therefore, any $m > m_c^*$ requires $\lambda_1 = 0$ to satisfy the first complementary slackness condition. However, for any $\lambda_2 \geq 0$, this violates the first-order condition because part a of Lemma C.1 establishes that $1 + \frac{\delta}{1-\delta} \cdot \left[p_c'(m, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\right] > 0$ for any $m > m_c^*$.

2. Solve G's constrained optimization problem (Equation 4) in the separatist range. Define the Lagrangian:

$$\max_{m, \lambda} \quad R - \left[m + x^*(\mu = 0, m)\right] + \delta \cdot V_{\text{s.q.}}^G + \lambda \cdot \left(m - \hat{m}\right)$$

The associated KKT conditions are:

$$\frac{\partial \mathcal{L}}{\partial m} = -\left\{1 + \frac{\delta}{1-\delta} \cdot \left[p_s'(m, \alpha, \beta_s) \cdot \left[(1-\theta) \cdot (1 - e_c) - \theta \cdot (1 - e_G)\right]\right]\right\} + \lambda = 0,$$

$$m \geq \hat{m}, \lambda \geq 0, \lambda \cdot \left(m - \hat{m}\right) = 0$$

- If $\alpha < \hat{\alpha}_s$, then one solution is $m = m_s^*$ (see Lemma C.1) with associated multiplier $\lambda = 0$. Because part b of Lemma C.2 implies that $\hat{m} < m_s^*$ in this parameter range, it is straightforward to verify that this vector satisfies every KKT condition.

  The following steps prove uniqueness.

- For any $\lambda \geq 0$, any $m < m_s^*$ violates the first-order condition because part b of Lemma C.1 establishes that $1 + \frac{\delta}{1-\delta} \cdot \Big[p_s'(m, \alpha, \beta_s) \cdot \big[(1-\theta) \cdot (1-e_c) - \theta \cdot (1-e_G)\big]\Big] < 0$ for all $m < m_s^*$.
- We have established that $\hat{m} < m_s^*$ in this parameter range. Therefore, any $m > m_s^*$ requires $\lambda = 0$ to satisfy the complementary slackness condition. However, this violates the first-order condition because part b of Lemma C.1 establishes that $1 + \frac{\delta}{1-\delta} \cdot \Big[p_s'(m, \alpha, \beta_s) \cdot \big[(1-\theta) \cdot (1-e_c) - \theta \cdot (1-e_G)\big]\Big] > 0$ for any $m > m_s^*$.

- If $\alpha > \hat{\alpha}_s$, then one solution is $m = \hat{m}$ with associated multiplier $\lambda = 1 + \frac{\delta}{1-\delta} \cdot \Big[p_s'(m, \alpha, \beta_s) \cdot \big[(1-\theta) \cdot (1-e_c) - \theta \cdot (1-e_G)\big]\Big]$. Part b of Lemma C.2 implies that $\hat{m} > m_s^*$ in this parameter range, and part b of Lemma C.1 establishes that $1 + \frac{\delta}{1-\delta} \cdot \Big[p_s'(m, \alpha, \beta_s) \cdot \big[(1-\theta) \cdot (1-e_c) - \theta \cdot (1-e_G)\big]\Big] > 0$ for any $m > m_s^*$. This implies that the non-negative multiplier constraint is met, and it is straightforward to verify that this vector also satisfies every other KKT condition.

  The following proves uniqueness. Setting $m > \hat{m}$ requires $\lambda = 0$ to satisfy the complementary slackness condition. Then, the first-order condition is violated because $1 + \frac{\delta}{1-\delta} \cdot \Big[p_s'(m, \alpha, \beta_s) \cdot \big[(1-\theta) \cdot (1-e_c) - \theta \cdot (1-e_G)\big]\Big] > 0$ for any $m > m_s^*$ (and we already established that $\hat{m} > m_s^*$ in this parameter range).

3. To solve the full maximization problem stated in Equation 4, part c of Lemma C.2 implies the need to examine three non-trivial parameter ranges: $\alpha \in \big(\underline{\alpha}, \hat{\alpha}_s\big)$, $\alpha \in \big(\hat{\alpha}_s, \hat{\alpha}_c\big)$, and $\alpha \in \big(\hat{\alpha}_c, \overline{\alpha}\big)$.

   - If $\alpha \in \big(\underline{\alpha}, \hat{\alpha}_s\big)$, then part 1 of this proof shows that $m = \hat{m}$ is the unique optimal solution conditional on facing a center-seeking civil war and part 2 shows that $m = m_s^*$ is the unique optimal solution conditional on facing a separatist civil war. By construction, $\hat{m} + x^*\big(\mu = 1, \hat{m}\big) = \hat{m} + x^*\big(\mu = 0, \hat{m}\big)$. Part 2 of this proof shows that $m_s^* + x^*\big(\mu = 0, m_s^*\big) < \hat{m} + x^*\big(\mu = 0, \hat{m}\big)$, which implies m_s^* is the unique optimal solution.
   - If $\alpha \in \big(\hat{\alpha}_s, \hat{\alpha}_c\big)$, then parts 1 and 2 of this proof show that $m = \hat{m}$ is the unique optimizer.
   - If $\alpha \in \big(\hat{\alpha}_c, \overline{\alpha}\big)$, then part 1 of this proof shows that $m = m_c^*$ is the unique optimal solution conditional on facing a center-seeking civil war and part 2 shows that $m = \hat{m}$ is the unique optimal solution conditional on facing a separatist civil war. By construction, $\hat{m} + x^*\big(\mu = 1, \hat{m}\big) = \hat{m} + x^*\big(\mu = 0, \hat{m}\big)$. Part 1 of this proof shows that $m_c^* + x^*\big(\mu = 1, m_c^*\big) < \hat{m} + x^*\big(\mu = 1, \hat{m}\big)$, which implies m_c^* is the unique optimal solution.

Part b. Multiplying the continuation values from Table 1 by the relevant probability of winning terms shows that G's maximization problem if $B^* < 0$ is an affine transformation of its maximization problem if $B^* > 0$, therefore yielding identical solutions. By definition of B^* and by construction of G's optimization problem, assuming $B^* < 0$ implies that C rejects any feasible offer by G, which also implies that G cannot profitably deviate from any transfer proposal that satisfies the budget constraint (given optimal military expenditures). ■

Proof of Proposition 3. A sufficient condition for the right-hand side of Equation 8 to be strictly positive is:

$$p_j(m^*) > p_j'(m^*) \cdot \frac{dm^*}{d\theta} \cdot (1-\theta) \tag{C.11}$$

Need to solve for $\frac{dm^*}{d\theta}$. Using the generic probability of winning function $p_j(\cdot)$ and setting $(1-\mu^*) \cdot (1-\gamma) = 0$ enables rewriting either Equation C.6 or C.7 as:

$$\frac{\delta}{1-\delta} \cdot \left[-p_j'(m^*) \right] \cdot (1-\theta) \cdot (1-e_i) = 1 \tag{C.12}$$

Applying the implicit function theorem to Equation C.12 yields:

$$\frac{dm^*}{d\theta} = \frac{p_j'(m^*)}{p_j''(m^*) \cdot (1-\theta)} \tag{C.13}$$

Substituting Equation C.13 into Equation C.11 and rearranging yields:

$$p_j''(m^*) > \frac{\left[p_j'(m^*)\right]^2}{p_j(m^*)}, \tag{C.14}$$

which follows for all m from the assumption that $p_j(\cdot)$ exhibits large enough diminishing marginal returns. ■

Proof of Proposition 4. It suffices to show that effects (1) and (2) in Equation 9 are each strictly positive. The strict positivity of (1) follows directly from assuming $\frac{\partial p_j}{\partial \beta_j} < 0$. The strict positivity of (2) follows from assuming $p_j'(m) < 0$ and from applying the implicit function to Equation C.12, which shows:

$$\frac{dm^*}{d\beta_j} = \frac{-\frac{\partial^2 p_j(m^*)}{\partial m \partial \beta_j}}{p_j''(m^*)} > 0,$$

which follows from assuming $\frac{\partial^2 p_j(m)}{\partial m \partial \beta_j} < 0$ and $p_j''(m) > 0$. ■

C.2 Extensions

C.2.1 Spoils of Predation

Another argument from the literature is that oil production contributes to civil war by creating large spoils of predation.[35] For example, Collier and Hoeffler (2005, 44) proclaim that one of two major reasons that natural resources might be a powerful risk factor for civil wars is "the lure of capturing resource ownership permanently if the rebellion is victorious." Laitin (2007, 22) proclaims: "If there is an economic motive for civil war in the past half-century, it is in the expectation of collecting the revenues that ownership of the state avails, and thus the statistical association between oil (which provides unimaginably high rents to owners of states) and civil war." Contest function models such as Garfinkel and Skaperdas (2006) and Besley and Persson (2011, ch. 4) also show that larger spoils increase equilibrium fighting likelihood.

This section explains why introducing this additional consideration would make deriving the main comparative statics predictions more cumbersome, but would not qualitatively alter the insights. In some regards, the spoils of predation effect merely replicates the countervailing effects of the easy taxation effect (Equation 1), despite existing arguments that larger spoils should unambiguously heighten incentives for war. In other regards, larger spoils of predation creates even stronger *anti*-conflict incentives than the easy taxation effect.

Formally, assume economic production in each region is Y_i, for $i \in \{G, C\}$, replacing the assumption from the main text that production equals 1. Furthermore, assume that an increase in oil production O_i strictly increases Y_i. With this additional assumption, the equilibrium budget constraint would be:

$$B^*(Y_i) \equiv \underbrace{\big(1-e_G\big)\cdot Y_G + \big(1-\theta\big)\cdot\big(1-e_C\big)\cdot Y_C}_{(1)} - x^* - m^* \geq 0, \tag{C.15}$$

with a corresponding equilibrium interior transfer amount:

$$\begin{aligned} x^*(m;Y_i) \equiv \frac{\delta}{1-\delta}\cdot\Bigg[& \mu^*(m)\cdot p_c(m)\cdot \underbrace{(1-\theta)\cdot\Big[\big(1-e_G\big)\cdot Y_G + \big(1-e_C\big)\cdot Y_C\Big]}_{(2a)} \\ & + \big[1-\mu^*(m)\big]\cdot p_s(m)\cdot \underbrace{\Big[(1-\theta)\cdot(1-e_C)\cdot Y_C - \theta\cdot(1-e_G)\cdot Y_G\Big]}_{(2b)}\Bigg] \\ & \underbrace{-\Big[1-\big(1-\theta\big)\cdot\big(1-e_C\big)\Big]\cdot Y_C}_{(3)} \end{aligned} \tag{C.16}$$

Effect (1) shows that parameterizing the size of production creates a similar effect as the budget effect, and effects (2a) and (2b) show a similar effect as the relative prize effect. Therefore, existing spoils of predation arguments are correct that larger production creates some conflict-inducing incentives, but over-

[35] This contrasts with the "relative prize effect" from the article, which refers to the prize of secession or gaining the center relative to the status quo, as opposed to the absolute increase in the spoils gained from winning that this section discusses.

look the countervailing budget effect. Effect (3) highlights another countervailing effect. Whereas the easy revenue effect decreases C's opportunity cost of fighting—lower e_C implies that C loses less consumption from its region by fighting—larger spoils of predation increases the fighting opportunity cost by increasing the amount of output destroyed. Overall, parameterizing production yields largely similar insights as the simpler setup in the text, contrary to existing arguments that the spoils of predation effect of oil should unambiguously cause civil war.

C.2.2 Endogenous Taxation

It is straightforward to extend the model to allow G to choose a tax rate τ_C on C's production period 1 (and, trivially, in future periods), rather than G exogenously accruing tax revenues. I prefer the exogenous taxation setup for two reasons. First, endogenizing the tax rate yields similar logic as the main model, but characterizing the equilibrium is somewhat more complicated because C's bargaining leverage determines whether there is a net flow of resources from C to G or vice versa. The following sketches the intuition. There exist unique thresholds of the discount factor δ with the following characteristics (note that by increasing the value of the future, higher δ increases C's expected utility to civil war in period 1 and therefore increases its bargaining leverage in period 1):

- If δ is low, $\underline{\delta} > 0$, then G can buy off C even while extracting maximum taxes, making minimum transfers, and not spending on the military: $\left(\tau_C^*, x^*, m^*\right) = \left((1-\theta)\cdot(1-e_C), \theta\cdot(1-e_G), 0\right)$.
- If δ is intermediate, $\underline{\delta} > \underline{\underline{\delta}}$, then there is still a net transfer of resources from C to G, but G lowers the tax rate. Because the civil war constraint binds, G spends a positive amount on the military: $\left(\tau_C^*, x^*, m^*\right) = \left(\tau'_{C,1}, \theta\cdot(1-e_G), m^{*'}\right)$. Fixing $x = \theta\cdot(1-e_G)$, τ'_C and $m^{*'}$ are the unique pair that maximize net revenues subject to meeting C's civil war constraint with equality.
- If δ is high, $\overline{\delta} > \underline{\delta}$, then there is a net transfer of resources from G to C because G provides transfers to C but does not tax C. Because the civil war constraint binds, G spends a positive amount on the military: $\left(\tau_C^*, x^*, m^*\right) = \left(0, x^{*'}, m^{*'}\right)$. Fixing $\tau_C = 0$, $x^{*'}$ and $m^{*'}$ are the unique pair that maximize net revenues subject to meeting C's civil war constraint with equality.
- If δ is very high, $\delta > \overline{\overline{\delta}}$, then G cannot buy off C, corresponding to $B^* < 0$ from the model in the text (although, as the article discusses, $\theta < 1$ is a necessary condition for bargaining breakdown).

Two additional assumptions are sufficient for this result. First, the claim about $\overline{\delta}$ determining whether G net transfers resources to C or vice versa is only true if $\theta\cdot(1-e_G)$ is sufficiently low. Otherwise, even if C has very low bargaining leverage from its fighting threat in period 1, the exogenous constraints on G's resource transfers would still dictate that it makes a net transfer of resources to C. Second, the actions posit that, at $\overline{\delta}$, G switches from positive taxes and minimum transfers to 0 taxes and higher-than-minimum transfers. A sufficient assumption is for collecting taxes to exhibit a bureaucratic cost, $b(\tau_C)$, that is strictly increasing and strictly convex in the tax rate, even if this cost is infinitesimally small. This breaks G's indifference between making the budget constraint bind with equality among a continuous set of tax and transfer amounts, as would instead be true without the bureaucratic costs.

The second reason I prefer the exogenous taxation setup is that it is consistent with an interpretation of the model in which G has had the opportunity to extract resources for some period of time before C poses a coercive threat. Therefore, even if G makes a net transfer of resources toward C in the period C is coercively strong, it would still be true that G extracts high tax rates from C in most periods (see, for example, Paine Forthcoming). The current model with exogenous taxes captures this substantively relevant consideration in a tractable manner.

C.2.3 Evolving Civil War Aims

For simplicity, the model assumes that civil wars last a single period and that civil war aims are fixed throughout this one-period conflict. However, it is also of interest to understand why rebels might change civil war aims during a conflict. Considering how the model could account for this phenomenon (which has occurred in Ethiopia and Sudan) while also acknowledging its empirical rarity may provide deeper insights into civil war aims and open new questions for future research.

Consider an alternative setup in which, if a civil war occurs in period 1, it lasts two periods (however, if C does not fight in period 1, then it cannot initiate a civil war in period 2). Although C still chooses civil war aims in period 1, at the beginning of period 2, C can decide whether to change its "final" aims, paying a cost $\epsilon > 0$. If all the parameters remained constant during the war, then C would never switch war aims. However, changes in parameters can cause C to change civil war aims. Consistent with the model's focus on ethnic group size as an important determinant of civil war aims, suppose that C's group size in period 1 equals $\alpha_1 < \underline{\alpha}$. Therefore, C's most-preferred type of civil war given its period 1 size is separatist. In period 2, Nature draws α_2 from a Bernoulli distribution, equaling $\alpha_1' > \overline{\alpha}$ with probability q—in which case C's most-preferred type of civil war given its period 2 size becomes center-seeking—and α_1 with probability $1 - q$ (in which case its most-preferred civil war aims remain separatist). The Ethiopia and Sudan cases below interpret changes in group size as alliances formed (or not formed) among multiple ethnic groups during a war to pursue center-seeking aims.

If ϵ is low enough, then C's optimal civil war aims in period 2 follow the same logic as the main model: separatist if $\alpha_2 = \alpha_1$ and center-seeking if $\alpha_2 = \alpha_1'$ (see Lemma 1).[36] However, combining this behavior with decisions in period 1 yields intriguing possibilities. Suppose we are in the parameter range in which war occurs in period 1, either because C prefers to fight even if $q = 0$ (i.e., $B^* < 0$ for pure separatist aims) or because the probability of becoming the larger group in period 2 causes C to gamble.[37] For low enough ϵ and q, the group will proclaim separatist aims in period 1 but switch to center-seeking aims in period 2 if $\alpha_2 = \alpha_1'$. If instead q is higher, then the group will proclaim center-seeking aims in period 1 but switch to separatist aims in period 2 if $\alpha_2 = \alpha_1$. The less interesting cases are ones in which the Nature draw of α_2 generates the same civil war aims as proclaimed in period 1.

Ethiopia provides a case in which rebel groups switched from separatist to center-seeking aims several years before the conflict ended. Between the 1960s and 1980s, Ethiopia experienced separatist rebellions over seven different regions. Four of these generated at least 1,000 battle deaths by 1991: Tigray, Eritrea, Ogaden (Somali), and Oromiya (Oromo). According to the Armed Conflict Database, various rebel groups also harbored center-seeking aims in the 1980s. After over a decade of fighting in various regions, the wars changed decisively in 1989 when TPLF (rebel group that proclaimed ethnic aims and primarily recruited from ethnic Tigray, 6% of population) joined forces with EPDM (Amhara, 28%) and OPDO (Oromo, 29%) to form the Ethiopian People's Revolutionary Democratic Front (EPRDF) that sought to overthrow the government.[38] The EPRDF also launched joint operations with EPLF (Eritrea, 6%), which retained separatist aims. EPRDF captured Addis Ababa in 1991, and EPLF gained territorial control over Eritrea and voted to secede in 1993.

Although the model does not attempt to explain how these disparate groups achieved unified organization,

[36] If $\epsilon = 0$, then stated aims in period 1 would be pure cheap talk. However, if ϵ is large, then C may not choose its most-preferred type of war in period 2 because the switching cost is high.

[37] This is, it would not fight if it knew the war would be separatist, but it prefers center-seeking to accepting a deal and is willing to gamble on the probability that α will increase because q is high.

[38] Note that other members of Amhara controlled the government, and Armed Conflict Database codes EPDM as center-seeking in the 1980s.

merging together disparate separatist movements to create a large center-seeking movement clearly corresponds with an increase in α between periods 1 and 2, assuming that actions during the war (here, major government losses in 1988; Dixon and Sarkees (2015, 638)) engendered a coalition that was not possible at the outset of the war, and also substantiating the relevance of having Nature draw α_2. These major government losses also could have presumably facilitated various regions to gain autonomy or independence, but the larger prize of capturing the center assumed in the model explains why groups would take the center if feasible.

Sudan's second civil war provides an opposite case in which a center-seeking rebel group accepted a peace agreement that called for regional autonomy. Prior to the beginning of the second civil war in 1983, Sudan experienced a separatist conflict between 1963 and 1972 in which several different southern ethnic groups participated. Despite this legacy of separatism, when conflict began in the 1980s, war aims differed. John Garang formed the largest rebel group, SPLM/A, and a quote from the 1980s articulates his clear aims for the center: "I would like to reiterate that the SPLA/SPLM is a genuine Sudanese movement that is not interested in concessions for the south, but a movement that is open to all people of the Sudan to join and participate in the building of a new and democratic Sudan" (quoted in Roessler, 2016, 115-116). Early phases of the second civil war can be conceived as period 1. Yet despite these clear center-seeking aims, SPLM-Garang signed a peace agreement with the Sudanese government in 2005 (period 2) that yielded self-determination for the African south, with a distinct Arab and Muslim government in the north. South Sudan gained independence in 2011 following an earlier referendum.[39]

A plausible explanation for changed civil war aims is that in period 1, Garang expected his appeal to broad Sudanese aims to correspond with an increase in α during the conflict, but instead the realization of α_2 was α_1 rather than α_1'. Why was this a reasonable belief? Not only did the mostly African south broadly harbor sharp distaste toward the Arab-dominated Khartoum government, but "[i]n terms of marginalization, Arab groups outside of the Nile River Valley are more similar in terms of their material conditions to non-Arab groups in the periphery than riverain Arabs [the ruling group]" (Roessler, 2016, 117)—creating reasonable expectations that a broadly based rebellion could attract widespread support. However, Roessler (2016, 117) states that "since the war was nationalized in the 1980s, almost all of Sudan's rebel movements have come predominantly from 'African groups' ... In contrast, members of 'Arab groups' have tended to stay on the sidelines or have pre-dominantly fought in pro-government militias." He states that SPLM failed to overcome the government's relatively dense information networks among Arab groups, despite seemingly similar economic incentives to rebel as the south. Furthermore, even southern groups experienced considerable in-fighting including (as footnote 39 states) several distinct southern rebel groups that articulated separatist aims.[40] After two decades of deadly fighting with complicated coalitions among different rebel groups and fluctuating international support, Garang may have concluded that he would not be able to muster significant support to capture the capital, and instead settled for regional concessions. In fact, Garang proclaimed the comprehensive peace agreement of 2005 as providing a "New Sudan," but it lacked provisions that could have generated true national integration (Young, 2005).

However, Section 1 also discussed how these are anomalous cases, since most intra-state wars fit clear classifications as center-seeking or separatist. Although some countries feature simultaneous center-seeking and separatist conflicts, usually, clearly distinct rebel groups account for the different aims. Other civil wars also involve complicated alliances among disparate rebel groups—for example, see Christia's (2012) discussion of alliance formation in Afghanistan—but few of these alliances mix groups with center-seeking and

[39] This case also features further complications in war aims, as competing rebel groups or SPLM/A factions articulated separatist aims. Dixon and Sarkees (2015, 390-394) provide additional details.

[40] Collectively, the six ethnic groups that ACD2EPR codes as involved in SLPM composed 36% of the population: 6% Beja, 10% Dinka, 5% Nuba, 5% Nuer, 9% Other Southern groups, and 1% Shilluk.

separatist aims. This model extension also provides insight into why rebel groups switching war aims (or harboring both aims) occurs so rarely. Ethiopia combined two rare conditions. First, multiple regions experienced both motivation and opportunity for rebellion, creating numerous separatist groups, as opposed more typical separatist cases in which only a single separatist movement exists. Second, these separatist groups were able to overcome organizational hurdles to combine forces, as opposed to cases like India where the geographical challenges of coordinating disparate rebel movements alone would seem to be insurmountable. Sudan also featured a relatively large coalition of different ethnic groups (36% of the population, as footnote 40 states) that, through shared pre-colonial and colonial history, composed a politically coherent region (South Sudan). John Garang and rebel factions could draw on the legacy of the earlier separatist movement, while Garang could also plausibly gamble that he could muster enough support to take the center. By contrast, most groups that constitute a geographically concentrated territory—facilitating separatism (see Section D.2)—are too small to contemplate taking the center. Conversely, many center-seeking rebel groups lack a coherent territory that could form the basis for a new state (either in terms of ethnic geographic concentration or historical roots) as a fall-back option if their campaign to take the capital stagnates.

C.2.4 Does Oil Production Influence Civil War Aims?

The foundational assumptions and equilibrium derivation analyze threshold values of C's population share that determine equilibrium civil war aims. Equation 2 also shows that the amount of production in each region affects C's relative preference for each type of civil war. However, regardless of the amount of taxable production in C's region relative to G's region, conditional on winning, C always prefers center-seeking to separatism because center-seeking yields strictly more resources to consume in future periods.

A slightly different setup can cause an oil-rich C to strictly prefer separatism. This is a relevant consideration not only for thinking more deeply about strategic causes of civil war aims, but also for addressing a possible alternative explanation for the mixed oil-conflict pattern: separatist civil wars in oil-rich regions substitute for center-seeking civil wars that would have occurred if secession was not possible. However, combining the theoretical logic with empirical evidence casts doubt on this possibility.

An alternative reasonable setup is to assume that if the challenger takes the center, then it will have to share some percentage of revenues with other groups in the country after coming to power, whereas this will not be true for separating. Specifically, assume that the structure of C's consumption following a successful center-seeking civil war is similar to the status quo regime, except θ increases to a higher value $\overline{\theta} > \theta$. Formally, C's per-period consumption following a successful center-seeking civil war is now $1 - \left(1 - \overline{\theta}\right) \cdot \left(1 - e_C\right) + \overline{\theta} \cdot \left(1 - e_G\right)$, but all other future-period terms stated in Table 1 are the same as before. It is now possible that for large enough regional oil production, the challenger will consume more from winning a separatist than a center-seeking civil war. Formally, this is true if $e_C < 1 - \frac{\overline{\theta}}{1-\overline{\theta}} \cdot \left(1 - e_G\right)$. This inequality corresponds with high regional oil production because Equation 1 states that e_C strictly decreases in O_C.

Although the model alteration highlights this theoretical possibility, it is empirically implausible. Examining the national population shares of oil-rich groups that have fought separatist civil wars suggests that they were unlikely to have sought the center in the absence of oil wealth. Of the 17 wars in Table 2, only six have been fought by groups with at least 10% of their national population share, and all but one are below the rough threshold in Figure 4 of 30% below which groups are more likely to secede than to seek the center. Furthermore, anecdotal considerations about the three largest groups in Table 2 suggest that center-seeking was not a viable option—or, at least, secession had historical precedent. In addition to Yemen's southerners, discussed in the text, Nigeria's southeast region (Igbo) was governed as a separate territory from the north (who controlled the state at independence) for much of the colonial era, and Mosul (Kurds) composed a

separate Ottoman province from Baghdad prior to Britain colonizing and creating Iraq. Also important for limiting center-seeking possibilities, Igbo had recently been purged from inclusion in the central government in Nigeria after a military counter-coup led by northerners in 1966, and the historical difficulty that Iraq's Kurds faced to constructing durable political organizations suggests that they could more easily fight in the mountains rather than organize an attack on the capital.

D Supporting Information for Section 5

D.1 Separatist Civil Wars: Table 2 and Figure 9

Sample. The sample differs slightly from that in Figure 2. Because Figure 9 focuses only on separatist civil wars, it excludes ethnic groups without a concentrated territory to minimize heterogeneity in the estimates (see Section D.2).

The conditioning factors examined in Figure 9 are measured as follows.

Excluded minorities. Minorities are groups that EPR (Vogt et al., 2015) codes as composing less than 50% of their country's population. An ethnic group-year is coded as politically excluded if it is politically relevant and does not score any of the following on EPR's ethnopolitical inclusion variable: "MONOPOLY," "DOMINANT," "SENIOR PARTNER," or "JUNIOR PARTNER." Figure 3 uses the same political representation variable.

Favorable separatist geography. An ethnic group scores 1 on the favorable separatist geography variable if any of the following are true, and 0 otherwise: distance from the capital exceeding the median in the sample, mountainous percentage of territory higher than the median in the sample, and/or noncontiguous territory from the capital. Distance from capital calculated by author by combining GeoEPR with the CShapes dataset (Weidmann, Kuse and Gleditsch, 2010), and is measured using the distance from the ethnic group's centroid to the capital city. Percent mountainous is from Hunziker and Cederman (2017), who used Blyth (2002) for the source mountain data. The author coded noncontiguous territory from the country's capital.

Regression equation. For ethnic group index i, country index j, and year index t, the regression equation for Columns 2 and 3 of Table D.1 is:

$$\ln\left(\frac{Y_{it}}{1-Y_{it}}\right) = \beta_0 + \beta_O \cdot Oil_{it} + \beta_C \cdot Cond_{it} + \beta_{OC} \cdot Oil_{it} \cdot Cond_{it} + \boldsymbol{T}'_{it} \cdot \beta_T + \epsilon_{it}, \tag{D.1}$$

where $Cond_{it}$ is a conditioning variable that differs by column.

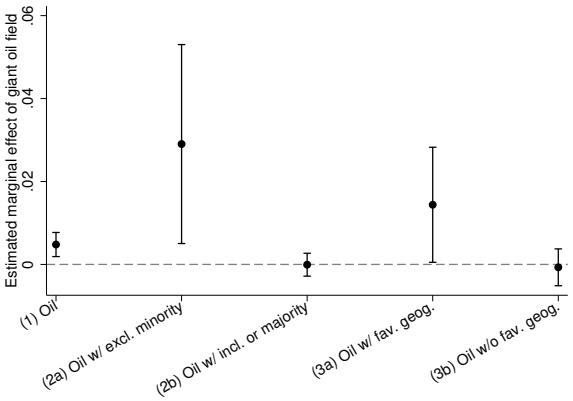
Table D.1: Regression Table for Figure 9

	DV: Separatist civil war onset		
	(1)	(2)	(3)
Giant oil/gas field	0.821***	0.208	0.280
	(0.304)	(0.775)	(0.727)
Excluded minority		1.114***	
		(0.367)	
Giant oil/gas field*Excluded minority		0.875	
		(0.828)	
Favorable geography			0.781**
			(0.328)
Giant oil/gas field*Favorable geography			0.591
			(0.794)
Ethnic group-years	24,552	24,552	24,552
Ethnic groups	599	599	599
Country FE?	NO	NO	NO
Time controls?	YES	YES	YES
		Marginal effects	
Giant oil/gas field, unconditional	0.00161**		
	(0.000654)		
Giant oil/gas field| Excluded minority		0.00451**	
		(0.00206)	
Giant oil/gas field | Included and/or majority		0.000176	
		(0.000703)	
Giant oil/gas field | Favorable geography			0.00311*
			(0.00168)
Giant oil/gas field | Unfavorable geography			0.000333
			(0.000958)

Notes: Table D.1 estimates Equation D.1. It summarizes a series of logit regressions by presenting the coefficient estimates for the substantive variables, with ethnic group-clustered standard errors in parentheses. Every regression contains peace years and cubic splines generated from the last year in which a separatist civil war was ongoing for each ethnic group, and a lagged country-level civil war incidence variable. The unit of analysis is ethnic group-years. The bottom of the table reports marginal effect estimates for different values of the conditioning variables, evaluated at coefficient means ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Figure D.1 and Table D.2 estimate a regression equation identical to Equation D.1 except a country-specific intercept β_j replaces the constant intercept β_0.

Figure D.1: Figure 9 with Country Fixed Effects



Notes: Figure D.1 presents point estimates and 95% confidence intervals for a series of logit regressions described in Equation D.1 with an country-level intercept added, and Table D.2 provides the corresponding regression table.

Table D.2: Regression Table for Figure D.1

	DV: Separatist civil war onset		
	(1)	(2)	(3)
Giant oil/gas field	1.020***	-0.0349	-0.220
	(0.363)	(0.768)	(0.774)
Excluded minority		1.253**	
		(0.533)	
Giant oil/gas field*Excluded minority		1.757**	
		(0.783)	
Favorable geography			0.634
			(0.459)
Giant oil/gas field*Favorable geography			1.389
			(0.847)
Ethnic group-years	11,755	11,755	11,755
Ethnic groups	252	252	252
Country FE?	YES	YES	YES
Time controls?	YES	YES	YES
	Marginal effects		
Giant oil/gas field, unconditional	0.00582***		
	(0.00213)		
Giant oil/gas field | Excluded minority		0.0290**	
		(0.0122)	
Giant oil/gas field | Included and/or majority		-6.44e-05	
		(0.00141)	
Giant oil/gas field | Favorable geography			0.0144**
			(0.00708)
Giant oil/gas field | Unfavorable geography			-0.000694
			(0.00227)

Notes: Table D.2 estimates Equation D.1 with a country-level intercept added. It summarizes a series of logit regressions by presenting the coefficient estimates for the substantive variables, with ethnic group-clustered standard errors in parentheses. Every regression contains peace years and cubic splines generated from the last year in which a separatist civil war was ongoing for each ethnic group, and a lagged country-level civil war incidence variable. The unit of analysis is ethnic group-years. The bottom of the table reports marginal effect estimates for different values of the conditioning variables, evaluated at coefficient means $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

D.2 Territorial Concentration and Civil War Aims

Toft (2014, 191) summarizes existing evidence on the importance of territorial concentration for facilitating separatist civil war: "[R]egional concentration of a group within a circumscribed territory serves as a practically necessary condition for a self-determination movement and secessionist war to emerge (Toft, 2005). Why is this? It appears to be the case that group concentration (1) makes political organization easier over a compact territory, thus overcoming the collective action problem; (2) facilitates military operations; and (3) defines the territory over which claims can be made (Toft, 2005; Weidmann, 2009)."

Table D.3 presents two specifications. Using the same ethnic group sample as Figure 2, Column 1 regresses separatist civil onset on an indicator variable for territorial concentration, coded by EPR, and temporal dependence controls. The Column 2 specification is identical except the dependent variable is center-seeking civil war onset. The table shows that although territorial concentration is strongly and positively correlated with separatist civil war onset, there is no systematic relationship among center-seeking civil wars (p=0.697). The Column 1 regression shows only one case of a non-territorially concentrated launching a separatist civil war, Sahrawis in Morocco in 1976. The different correlations for the two types of war suggest that among Toft's proposed explanations for the importance of territorial concentration in facilitating separatism, the third is the most important, because center-seeking civil wars claim territory beyond that in which the group resides (however, this observation does not rule out that Toft's first two factors could also be more relevant for separatist than center-seeking wars: only separatist wars primarily involve fighting over the territory in which the group resides).

Table D.3: Territorial Concentration

Dependent variable:	Sep. CW onset	Center CW onset
	(1)	(2)
Territorially concentrated	0.00310***	0.000186
	(0.000827)	(0.000478)
Ethnic group-years	30,984	31,519
Ethnic groups	762	763
Time controls?	YES	YES

Notes: Table D.3 presents the marginal effect estimates from regressions of civil war onset (either separatist or center-seeking, with ongoing years set to missing) on a territorial concentration indicator using logit models with ethnic group-level clustered standard errors. Every regression contains peace years and cubic splines generated from the last year in which a war of the specified type was ongoing for each ethnic group, and a lagged country-level civil war incidence variable. $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

D.3 Rebel Finance Theories and Evidence for Onshore/Offshore Oil

The theory also offers a new explanation for why oil location matters, an important theme in recent research (Ross, 2015, 251). Most existing arguments posit that oil located near potential rebel groups makes conflict likely by providing rebels with an opportunity to steal oil production to finance their rebellion (Lujala, 2010; Ross, 2012). However, despite exceptional cases such as ISIS in Iraq and Syria, and the Niger Delta in the 2000s, rebel groups have rarely engaged in large-scale looting of oil production to finance an insurgency (Paine, 2016, Forthcoming). Instead, the present theory follows the better substantively grounded premise that governments control the preponderance of oil revenues (Colgan, 2015, 8), which follows from core properties of oil production such as high capital-intensity and fixed location (Le Billon, 2005, 34). Oil location matters in the present theory because oil production in a region with a politically excluded minority group is likely to trigger separatist conflict. Furthermore, in the theory, within-country location should not affect center-seeking civil wars because groups that consider fighting for the center are likely to have better

political representation.

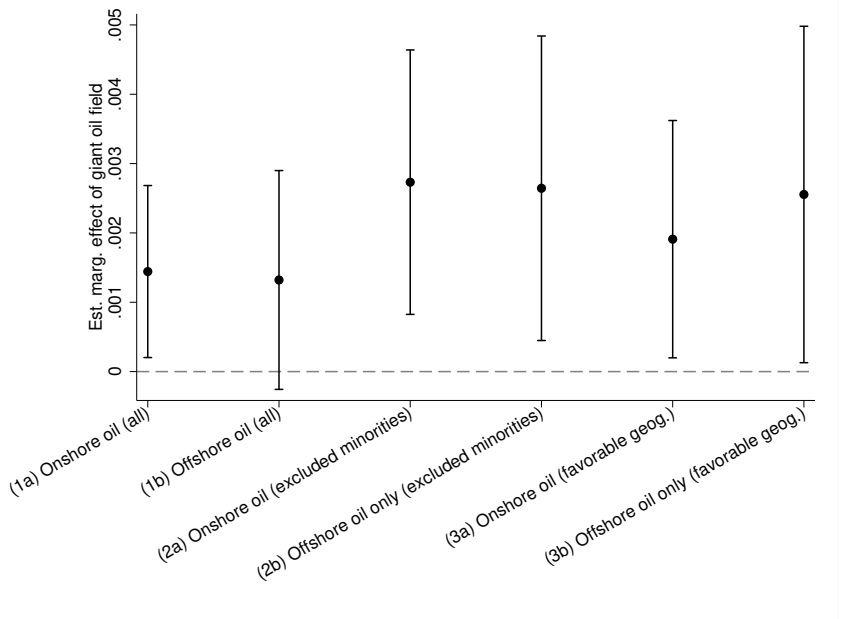
One different implication between the present theory and rebel finance theories that can be assessed statistically arises from distinguishing onshore versus offshore oil. The present theory suggests that this distinction should not matter because both should generate distributional grievances and separatist war if located near a politically excluded minority. By contrast, existing location theories anticipate no relationship between offshore oil production and separatist civil war because offshore oil is very difficult to loot (Lujala, 2010; Ross, 2012). This section shows that the oil-separatist findings are largely similar for onshore and offshore oil when assessing Hypotheses 1 and 2, and evidence from Angola (see Section D.5) provides additional evidence. However, because groups with only offshore oil production are empirically rare, the offshore correlation is based on a small number of cases.

More specifically, the results to this point have used a group-level oil indicator that codes a group as oil rich if it contains either an onshore oil field in its territory or a nearby offshore field. Figure D.2 disaggregates the oil variable into onshore oil and offshore oil. An ethnic group is coded as 1 on the offshore oil (only) variable if it contains at least one giant oil or gas field within 250 kilometers of a segment of the group's location polygon that touches the coast, and the group's territory contains no onshore giant oil or gas fields; and 0 otherwise. Horn (2003; 2015) provides giant oil and gas field data and GeoEPR (Vogt et al., 2015) provides ethnic group location. An ethnic group is coded as 1 on the onshore oil variable if it contains at least one giant onshore oil or gas field in its territory, and 0 otherwise. The regression equation for Figure D.2 and Table D.4 is:

$$\ln\left(\frac{Y_{it}}{1-Y_{it}}\right) = \beta_0 + \beta_N \cdot Onshore_{it} + \beta_F \cdot Offshore_{it} + \boldsymbol{T}'_{it} \cdot \beta_T + \epsilon_{it}, \tag{D.2}$$

where β_N is the coefficient estimate for onshore oil and β_F is the coefficient estimate for offshore oil.

Figure D.2: Disaggregating Onshore and Offshore Oil for Separatist Civil War Onset



Notes: Figure D.2 presents point estimates and 95% confidence intervals for a series of logit regressions described in Equation D.2, and Table D.4 provides the corresponding regression table. The dependent variable is separatist civil war onset, and the unit of analysis is ethnic group-years.

In Figure D.2 and Table D.4, Column 1 uses the same sample as in Figure 9, and Columns 2 and 3 consider more theoretically relevant samples by subsetting the data, respectively, to either excluded minorities (H1) or favorable separatist geography (H2). The figure shows that, among either excluded minorities or favorable separatist geography groups, onshore oil and offshore oil each positively and significantly covary with separatist civil war onset, and in the full sample specification (Column 1) the p-value for offshore oil is 0.101. The positive correlation for offshore oil goes against existing theories positing that it should not trigger separatism because offshore oil is difficult for rebels to loot. However, the positive offshore oil correlation is consistent with the present framework based on governments rather than rebel groups controlling oil revenues because the taxability of oil production does not depend greatly on whether it is onshore or offshore.

An important caveat for interpreting the results in Figure D.2 is that separatist civil war in oil-rich territories (onshore or offshore) is itself a rare event, and separatist civil wars in territories rich only in offshore oil are even rarer: Bakongo in Angola, Cabindan Mayombe in Angola, East Timorese in Indonesia, and Malay Muslims in Thailand (see Table 2). Therefore, although civil wars have occurred relatively more frequently in offshore oil-rich territories than in oil-poor territories (0.7% of group-years compared to 0.3% among excluded minorities), the offshore oil correlation is based on a small number of onset cases.

Table D.4: Regression Table for Figure D.2

	DV: Separatist civil war onset		
	(1)	(2)	(3)
Giant onshore oil field	0.00144**	0.00273***	0.00191**
	(0.000633)	(0.000973)	(0.000873)
Giant offshore oil field (only)	0.00132	0.00264**	0.00255**
	(0.000805)	(0.00112)	(0.00124)
Ethnic group-years	24,552	14,824	14,692
Ethnic groups	488	355	280
Time controls?	YES	YES	YES
Sample	Full	Excluded minorities	Favorable geography

Notes: Table D.4 estimates Equation D.2. It summarizes a series of logit regressions by presenting the coefficient estimate for the substantive variables, and ethnic group-clustered standard errors in parentheses. Every regression contains peace years and cubic splines generated from the last year in which a separatist civil war was ongoing for each ethnic group, and a lagged country-level civil war incidence variable. The unit of analysis is ethnic group-years. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

D.4 Center-Seeking Civil Wars: Table 3 and Figure 10

The government vulnerability variable used in Figure 10 is coded as follows.

Government vulnerability variable. A country-year is scored as 1 on the government vulnerability variable if any of the following three conditions are true, and 0 otherwise:

- *Lost war or violent independence.* This variable equals 1 if any of the following are true within the previous two years: defeat in international war (Correlates of War; Dixon and Sarkees (2015)); executive turnover caused by government defeat in a center-seeking civil war (coded by author drawing from the list of civil wars used throughout the article); government defeat in a separatist civil war, meaning rebels get significant autonomy concessions, de facto autonomy, or an independent state (coded from Fearon and Laitin's (2003) dataset); or independence from foreign occupation in which an internal war (i.e., war fought within the country's territory) occurred in the lead-up to independence (coded by author).
- *Oil shock decade.* Any year between 1973 and 1982, inclusive.

- *Arab Spring.* Any country in the Middle East and North Africa in 2011.

Regression equation. The regression equation for Column 2 in Table D.5 is:

$$\ln\left(\frac{Y_{jt}}{1-Y_{jt}}\right) = \beta_0 + \beta_O \cdot ln(oil/pop)_{jt} + \beta_V \cdot V_{jt} + \beta_{OV} \cdot ln(oil/pop)_{jt} \cdot V_{jt} + \beta_P \cdot ln(pop)_{jt} + \boldsymbol{T}'_{jt} \cdot \beta_T + \epsilon_{jt}, \tag{D.3}$$

where V_{jt} is an indicator variable for government vulnerability.

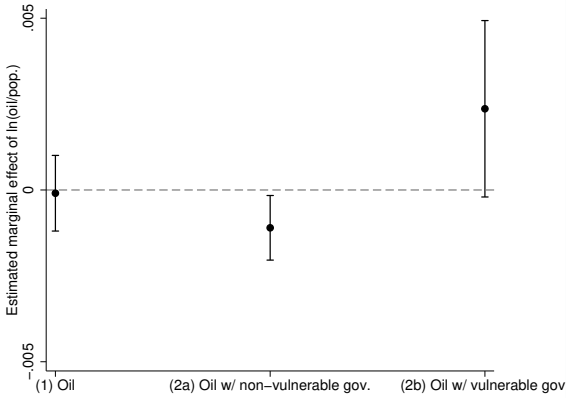
Table D.5: Regression Table for Figure 10

	DV: Center-seeking CW onset	
	(1)	(2)
ln(Oil & gas p.c.)	-0.0345	-0.163**
	(0.0457)	(0.0691)
Vulnerable		0.465
		(0.363)
ln(Oil & gas p.c.)*Vulnerable		0.250***
		(0.0894)
ln(Population)	0.187***	0.209***
	(0.0536)	(0.0560)
Country-years	6,828	6,828
Countries	150	150
Time controls?	YES	YES
	Marginal effects	
ln(Oil & gas p.c.), unconditional	-0.000721	
	(0.000945)	
ln(Oil & gas p.c.) | Vulnerable=0		-0.00242***
		(0.000921)
ln(Oil & gas p.c.) | Vulnerable=1		0.00358*
		(0.00217)

Notes: Table D.5 estimates Equation D.3. It summarizes a series of logit regressions by presenting the coefficient estimates for the substantive variables, with country-clustered standard errors in parentheses. Every regression contains peace years and cubic splines generated from the last year in which a center-seeking civil war was ongoing. The unit of analysis is country-years. The bottom of the table reports semi-elasticity marginal effects (because oil is logged) for different values of the conditioning variables, evaluated at coefficient means (note that the marginal effect estimate in Column 1 is identical to that in Column 2 of Table A.1).***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

The center-seeking civil war measure used in Figure 10 includes both ethnic—i.e., the rebel group made claims for and selectively recruited from a particular ethnic group—and non-ethnic center-seeking civil wars. Although the theoretical framework concentrates mainly on identity-based rebellions, the country-level implications are similar even for rebellions not organized around ethnicity: greater oil wealth provides the government with revenues it can use to spend on coercion and patronage. However, Appendix Figure D.3 shows that the marginal effect estimates are similar to those in Figure 10 when only analyzing ethnic center-seeking civil wars. The regression equation for Figure D.3 and Table D.6 is identical to Equation D.3, except the dependent variable is ethnic center-seeking civil war onset, and the peace years and cubic splines are generated from this variable.

Figure D.3: Ethnic Center-Seeking Civil War Onset



Notes: Figure D.3 presents point estimates and 95% confidence intervals for a series of logit regressions. Table D.6 is the corresponding regression table.

Table D.6: Regression Table for Figure D.3

	DV: Ethnic center CW onset	
	(1)	(2)
ln(Oil & gas p.c.)	-0.0121	-0.248**
	(0.0719)	(0.123)
Vulnerable		0.451
		(0.460)
ln(Oil & gas p.c.)*Vulnerable		0.389**
		(0.152)
ln(Population)	0.173**	0.219**
	(0.0841)	(0.0927)
Country-years	7,271	7,271
Countries	150	150
Time controls?	YES	YES
		Marginal effects
ln(Oil & gas p.c.), unconditional		-9.48e-05
		(0.000562)
ln(Oil & gas p.c.) | Vulnerable=0		-0.00110**
		(0.000480)
ln(Oil & gas p.c.) | Vulnerable=1		0.00236*
		(0.00131)

Notes: Table D.6 estimates Equation D.3 with the dependent variable changed to ethnic center-seeking civil war onset. It summarizes a series of logit regressions by presenting the coefficient estimates for the substantive variables, with country-clustered standard errors in parentheses. Every regression contains peace years and cubic splines generated from the last year in which an ethnic center-seeking civil war was ongoing. The unit of analysis is country-years. The bottom of the table reports semi-elasticity marginal effects (because oil is logged) for different values of the conditioning variables, evaluated at coefficient means.***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

D.5 Additional Evidence for Saudi Arabia and Angola

Offshore oil in Cabinda. Another intriguing aspect of the Cabinda case is that nearly all its oil is produced offshore (Le Billon 2007, 106; Porto 2003, 4), consistent with the findings in Figure D.2. In fact, the offshore location of Angola's oil may have been crucial for facilitating government control, given the country's major center-seeking civil war between independence in 1975 and 2002, by "insulat[ing] the industry from local communities and hostilities" (Le Billon, 2007, 106).

"Deviant" aspects of Angola. In additional to the "typical" aspects of the cases, Angola and Saudi Arabia also represent seemingly deviant patterns that the theory can help to reconcile. Angola was relatively oil-rich at independence, at $543 in oil income per capita, but experienced a center-seeking war. However, considering vulnerable governments' difficulties to accruing oil revenues to deter and buy off challengers (Hypothesis 3), the theory expects that oil will be ineffective at preventing attacks on the center. Various Angolan rebel groups fought Portugal for independence between 1961 and 1974. Although these groups struck a brief truce at independence, the opposition group UNITA never disarmed (Warner, 1991, 38-9), and major hostilities resumed after independence in 1975—in essence, continuing the decolonization struggle. Further contributing to government vulnerability, UNITA received considerable support from neighboring countries, including South Africa.

"Deviant" aspects of Saudi Arabia. The theory also provides insight into the absence of major separatist civil wars in Saudi Arabia's eastern province, which has produced the overwhelming majority of the country's oil wealth since discovery in the 1930s (Jones, 2010, 91-92). Although the region lacks any of the favorable geography conditions from Table 2—suggesting inherent difficulties to organizing a rebellion—the Shi'a are a politically excluded minority, which should encourage separatism. Despite theoretically ambiguous predictions—because Hypothesis 1 anticipates fighting but Hypothesis 2 does not—a closer look reveals considerable support for key model mechanisms. Failed labor strikes in the 1950s preceded widespread protests and demonstrations in 1979 and 2011 (Matthiesen, 2012). Jones (2010, 138-216) details how the unequal distribution of the country's oil wealth provided a central catalyst. For example, "Both before and after the [1979] uprising, oil and the Shiites' exclusion from oil wealth dominated the political discourse" (185). However, despite these grievances—as anticipated by political exclusion—the central government commanded considerable coercive ability in the region that dampened prospects for a broader rebellion, as anticipated by unfavorable geography for rebellion. "Although it is unlikely that local anxieties about the dislocations and failures of modernization had faded" during the peaceful period between the 1950s and 1979, "[t]he Saudi state became increasingly proficient at rooting out and oppressing dissenters" (176), including arresting and exiling many Shi'a political activists. Similarly, in 1979, the government used "overwhelming force to crush the Shiites" and responded by bolstering its police and intelligence forces—causing dozens of deaths among the thousands of protesters (218-9). Although the Iranian revolution in 1979 (led by Iranian Shi'a) and the Arab Spring in 2011 provided coordination devices that enabled temporary mobilization by Saudi Arabia's Shi'a to protest their frustrations over oil, repressive strength afforded by extracting oil revenues from the region enabled the government to prevent a major war.

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