Strategic Civil War Aims and the Resource Curse

Jack Paine*

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Abstract

Although rebel groups sometimes fight to capture the central government and sometimes to secede, existing theories do not explain strategic civil war aims. This impedes explaining empirical patterns such as the mixed oil-conflict curse: oil wealth correlates positively with separatist civil war onset but negatively with civil wars to capture the central government. I present a formal model with endogenous rebellion aims that addresses both sides of the conflict coin. Modes of economic production with high capital intensity and a fixed location (e.g., oil) exhibit a conflict-suppressing revenue effect and a conflict-inducing predation effect. Regional ethnic challengers that prefer separatist over center-seeking aims experience a larger predation effect for two reasons. First, a strategic selection mechanism: governments face more severe commitment problems toward small ethnic groups—who 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.

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*Assistant Professor, Department of Political Science, University of Rochester, jackpaine@rochester.edu.

Conventional conflict 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.).

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 (Walter, 2009; Lacina, 2015) or rebel tactics (Kalyvas and Balcells, 2010; Bueno de Mesquita, 2013; Wright, 2017; Leventoglu and Metternich, 2018), most theories do not address how rebels choose center-seeking versus separatist civil war aims. In addition to theoretical relevance, understanding rebels' strategic war aims is also crucial for conducting 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 empirical relationship between oil production and civil war onset exemplifies why these considerations are important. 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; Hunziker and Cederman 2017). Regression evidence presented in Appendix D shows that, since 1945, politically relevant ethnic groups with oil production in their territory have participated in separatist civil wars 2.2 times more frequently than oil-poor groups. Second, although oil production and aggregate civil war onset exhibit a null relationship at the country level (reviewed in Ross 2015, 251), oil-rich countries such as Saudi Arabia fight *fewer* center-seeking civil wars (Paine, 2016). The estimates in Appendix D show that increasing a country's annual oil income per capita from $0 to $1,000 decreases the predicted probability of center-seeking civil war onset by 48%. This pattern is consistent with broader anti-resource curse evidence (Menaldo, 2016; Liou and Musgrave, 2014).[1]

Existing theories do not convincingly explain the oil-conflict pattern because they either do not distinguish rebellion aims or propose an explanation that works for one side of the conflict coin but not the other. Among mechanisms proposed to link oil production to elevated conflict prospects, perhaps the most convincing mechanism is that governments create redistributive grievances by heavily taxing oil-producing regions (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 it is immobile, but also because oil is a capital-intensive, point-source resource (Le Billon, 2005, 34). Paine (2019) 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. Yet despite characterizing a core property of oil production that can potentially explain the empirical pattern for separatist civil wars, this mechanism cannot explain why oil-producing countries experience fewer center-seeking civil wars than oil-poor countries. Why are grievances over the distribution of resources not also severe for groups that would like to profit from oil production in the government's region—which they could obtain by capturing the center?

Other mechanisms link oil to lower conflict prospects. Theories of authoritarian stability, summarized in Ross (2001), focus overwhelmingly on rentier effects that facilitate massive patronage distribution and coercion spending, which may help to explain the rarity of center-seeking civil wars in oil-rich countries (Paine, 2016). But why does greater spending on patronage and armament afforded by more oil revenues not also deter separatist civil wars? Other arguments on oil and state weakness are also unsatisfactory because they anticipate oil production raising *center-seeking*, but not separatist, civil war incentives (Buhaug, 2006)—the opposite of the prevailing empirical pattern.

A convincing theory of the oil-conflict relationship must address both sides of the conflict coin by incorporating conflict-enhancing and conflict-prevention mechanisms, and then explain why they differ in magnitude

[1]The resource curse literature is too large to cite comprehensively, but recent contributions beyond civil war analyze outcomes such as state repression (Bell, Ritter and Wolford, 2017), accountability (Paler, 2013), and corruption (Mahdavi, 2019).

for center-seeking and separatist civil wars. In this paper, I pursue this goal by developing a general theory of civil war aims, focusing mainly on comparative statics predictions relevant for studying effects of oil production while discussing additional possible applications in the conclusion. I formally analyze a game in which a government accrues revenues from economic production in the region of the country where it resides and another region of the country where a challenger resides. The government allocates revenues to its military and offers transfers to the challenger, who can either accept, fight a center-seeking civil war, or fight a separatist civil war. In equilibrium, either type of civil war may occur because the distribution of power shifts over time and the government cannot perfectly commit to deliver future transfers to, or refrain from future taxation of, the challenger.

Including taxes, transfers, and endogenous arming in the model generates countervailing pressures for a civil war to occur in equilibrium. The ability of real-world governments to extract taxes varies across economic activities. Distinguishing features of oil production are its fixed location and high capital intensity, which enables governments to easily tax oil production. This *revenue effect* provides funds that the government can spend on the military and on transfers, which raises the likelihood that the government can buy off the challenger from initiating either type of civil war. However, increased oil production also heightens the challenger's desire to overthrow the government, either to eliminate government taxation of its oil production or to enable the challenger to predate oil produced in the government's region. This *predation effect* increases the challenger's expected utility to fighting either type of civil war relative to accepting a deal and maintaining the status quo regime in the future.

Thinking about empirical oil-conflict patterns in the context of these countervailing mechanisms and endogenous rebellion aims enables reframing the core puzzle. Why is the revenue effect larger in magnitude than the predation effect for center-seeking rebel groups, and vice versa for groups that attempt to secede?

Incorporating insights from research on ethnic geography and conflict to ground foundational assumptions about civil war aims produces two distinct explanations that each account for both sides of the oil-conflict coin. First, a strategic selection effect: the government's commitment ability explains whether civil war occurs or not, and the size of the challenging ethnic group explains rebellion aims. The government is less able to commit to provide transfers to and refrain from taxing a numerically small challenger, which increases the magnitude of the oil predation effect. Additionally, small groups are better able to win separatist rather than center-seeking campaigns, which determines the challenger's equilibrium war aims after additionally accounting for how the challenger strategically reacts to the government's military spending. Therefore, the groups for whom regional oil production should exhibit net conflict-inducing effects also tend to prefer separatism, consistent with the empirical pattern. By contrast, the government's greater commitment ability toward large groups diminishes the predation effect, implying that oil wealth enhances the government's ability to peacefully buy off a challenger that—had it fought—would have sought the center.

Second, the extent to which the government's military spending lowers the challenger's probability of winning a civil war also affects the magnitude of the revenue effect relative to the predation effect. Although larger oil revenues allow the government to afford a stronger military, substantive considerations about the geography of rebellion motivate a key assumption: improved coercive ability less strongly diminishes the challenger's prospects for winning a separatist than a center-seeking war. This implies that the predation effect is larger in magnitude when separatist rather than center-seeking rebellion is the binding war threat, also consistent with the empirical pattern.

These results yield several additional implications about oil and conflict that I assess empirically before concluding by discussing the implications of this theory of strategic civil war aims for other strands of the conflict literature. Additionally, relative to the formal theory literature, this paper offers a novel theoretical contribution by studying endogenous civil war aims and allowing the challenger to choose between two civil war types. Although the theoretical properties connecting commitment problems to conflict are well known, most existing formal studies assume that an actor has a single outside option to fight for a particular prize. This includes accruing territory from a neighboring country in models of international war (Fearon, 1995; Spaniel and Bils, 2018), capturing the central government in models of regime transitions (Acemoglu and Robinson, 2006; Meng, 2019) or civil war (Powell, 2012; Bell and Wolford, 2015), and fighting to separate (Gibilisco, 2017). Fearon (2004) discusses how key parameters in his model differ depending on exogenously specified rebellion aims, although rebels can choose only between accepting a bargaining offer and a single fighting option. Morelli and Rohner's (2015) model contains distinct types of civil war, but the possibility of war occurring in equilibrium in their model follows because the *government* rather than rebel leaders may get to choose the rebels' war aims, as opposed to my focus on *challengers* choosing their civil war aims. In reality, it is unclear how a 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.

1 A Model of Civil War Aims

I solve a general model of civil war aims before taking comparative statics on parameters that relate to oil production. The model builds off existing bargaining models of war, and the main new twist is to allow the challenger to choose its civil war aims. There are two players, a government and a regionally based challenger. Economic production occurs in regions occupied by each player, which are most naturally conceived of as distinct ethnic groups. Each player seeks to maximize its share of national output. The factors that directly affect the distribution of economic output between the government and challenger are taxes—which depend on the government's ability to commit to limit taxation and on the nature of economic production—and central transfers. The challenger's probabilities of winning each type of civil war create an indirect strategic effect that alters the distribution of economic output by shaping the bargaining offer that the government makes to the challenger. In turn, the probability that the challenger wins either a center-seeking or a separatist civil war depends on the government's endogenously set military spending and on exogenous parameters that capture the population size of the challenger's ethnic group and the geography of rebellion. Therefore, the government's and challenger's objectives interact to determine whether or not civil war occurs in equilibrium and, if so, what type.

1.1 Setup of Baseline Model

Two actors, a governing group (G) and a challenger (C) with non-overlapping territorial locations, 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 $\delta \in \big(\underline{\delta}, 1\big)$, for a lower bound $\underline{\delta} \in (0, 1)$ defined below. Total per-period economic production in each region equals 1.

Exogenously collected tax revenues in each period. In each period $t \geq 2$, G accesses a revenue endowment composed of exogenously collected taxes $1 - e_G$ from its own region and $\big(1-\theta\big) \cdot \big(1-e_C\big)$ from C's region, yielding per-period revenues:

$$R = 1 - e_G + \big(1 - \theta\big) \cdot \big(1 - e_C\big). \tag{1}$$

In every period, 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 remaining income in G's region, e_G.

Two substantive factors affect G's tax revenues, which can be interpreted as the maximum possible tax extraction given political and economic constraints. First, $\theta \in [0, 1]$ relates to C's degree of political clout in the central government which, in the real world, may be high because members of a non-ruling ethnic group hold cabinet positions or widespread membership in a powerful political party. The assumption that tax revenues from C's region strictly decrease in θ follows from the substantive idea that greater political access for the challenger improves G's ability to commit to not imposing an exploitative tax rate. Second, $e_i \in [0, 1]$ expresses the ability of producers to exit the formal economy in reaction to high tax rates, with $i \in \{G, C\}$. Substantively, certain types of economic production are very difficult to hide from the government, which provides a producer with minimal leverage to withhold revenues. This circumstance corresponds with low e_i. By contrast, for modes of economic production that producers can easily hide from the government or physically move out of the country, the fear of triggering economic exit limits government tax intake.

I also assume that θ and e_C substitute for each other, capturing the intuition that a challenger with a weak economic exit option can still constrain government taxation if it has political representation in the central government, and that a viable economic exit option guards against government exploitation for groups that lack effective political representation. The imposed functional form assumption implies that perfect commitment ability ($\theta = 1$) and a perfect exit option ($e_C = 1$) are individually sufficient for a 0 tax rate on C, whereas no commitment ability ($\theta = 0$) and no exit option ($e_C = 0$) are individually necessary and jointly sufficient for a tax rate of 1. Table 1 summarizes these considerations.

Table 1: Per-Period Taxes

	Low e_C	**High e_C**
Low θ	*High taxes*	*Low taxes*: C's economic exit option constrains G
High θ	*Low taxes*: political constraints on G	*Low taxes*: both factors

Strategic moves in period 1. In period 1, G allocates its revenues among military spending $m \geq 0$ and patronage transfers $x \geq \theta \cdot \big(1 - e_G\big)$, jointly subject to the budget constraint, $m + x \leq R$, for R defined in Equation 1. I omit time subscripts because G makes these choices only in period 1. This choice set implies that regardless of how much revenue G accrues from C's region, G can offer these revenues back to C—as well as offer revenues from its own region; or spend on the military, police, intelligence agency, and other repressive apparatuses. The patronage transfer captures a general decision over private transfers, welfare policies, public sector job provision, and other ways for a government to distribute benefits. The lower bound for the patronage transfer expresses that government commitment ability θ, introduced above for taxation, also affects transfers from the center because G is required to transfer at least θ percent of revenues from its region to C.

C decides among accepting G's offer, fighting a center-seeking civil war, and fighting to separate. Peaceful bargaining in period 1 yields contemporaneous consumption $R - x - m$ for G and $1 - (1 - \theta) \cdot (1 - e_C) + x$ 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 $p_c(m, \alpha, \beta_c) \in (0, 1)$ and a separatist civil war with probability $p_s(m, \alpha, \beta_s) \in (0, 1)$. These functions are indexed as $p_j(\cdot)$, for $j \in \{c, s\}$.

Three arguments affect the probability of winning functions. First, G's military spending m, which strictly lowers $p_j(\cdot)$.[2] Second, C's share of the country's population, $\alpha \in (0, 1)$. I assume that larger groups win any civil war with higher probability than smaller groups, but the effect of a bigger C group is larger in magnitude for center-seeking than for separatist civil wars. Later, Section 3.2 provides substantive grounding for Assumption 1. I also assume that larger group size diminishes the effect of military spending on lowering C's probability of winning: $\frac{\partial^2 p_j}{\partial m \partial \alpha} > 0$.

Assumption 1 (Ethnic group size and civil war aims)**.**

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 $m \geq 0$:

$$\frac{\partial p_c}{\partial \alpha}(m, \alpha, \beta_c) > \frac{\partial p_s}{\partial \alpha}(m, \alpha, \beta_s) > 0$$

Third, a coercive efficiency parameter. Higher values of $\beta_j \geq 0$, for $j \in \{c, s\}$, indicate greater coercive

[2] 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 $\lim_{m \to R} p_j'(m) = 0$. I also assume that the function exhibits diminishing marginal returns of a large enough magnitude: $p_j''(m) > \frac{[p_j'(m)]^2}{p_j(m)}$. Any function in which higher-order derivative functions become increasingly steep satisfy this second derivative condition, such as the standard ratio form contest function $\frac{1}{1+m}$ (assuming C's fighting capacity is normalized to 1).

effectiveness, $\frac{\partial p_j(\cdot)}{\partial \beta_j} < 0$, and the magnitude of the effect of higher military spending on decreasing C's probability of winning increases in G's coercive efficiency, $\frac{\partial^2 p_j(\cdot)}{\partial m \partial \beta_j} < 0$. Assumption 2 distinguishes these effects by civil war aims, and Section 4.1 provides substantive grounding for this assumption in the context of the geography of rebellion.

> **Assumption 2** (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,* $\beta_c > \beta_s$.

If C initiates a civil war rather than accepts the transfer, then each player consumes economic production from its region (and m is sunk for G) but also pays a fixed cost $d \in \left(0, \overline{d}\right)$ in period 1 that captures the destructiveness of fighting, for $\overline{d}$ defined below in Assumption 4. However, a war in period 1 does not impose costs in future periods. If C launches a war and it fails, then the status quo regime remains intact in $t \geq 2$. By contrast, success in either type of war yields future continuation values described below. Appendix Figure A.1 presents the stage game played in period 1 and Appendix Table A.1 summarizes notation.

Payoffs in future periods. No strategic moves occur in any period $t \geq 2$. If the status quo regime remains intact—because C accepts G's offer in period 1 offer or because C launches but loses a war—then C's and G's respective future continuation values are $V^C_{\text{s.q.}}$ and $V^G_{\text{s.q.}}$. Taxation proceeds in each period as described earlier, and G is assumed to transfer to C the lower-bound amount of revenues from its region in each period: $\theta \cdot \left(1 - e_G\right)$. Following a successful center-seeking civil war, in each period C consumes all production in its region (which equals 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 its regional production, but G retains all revenues from the "central" region, with future continuation values V^C_{sep} and V^G_{sep}. Table 2 summarizes the per-period future continuation values as well as G's and C's differences in consumption following a successful war (of either type) relative to the status quo.[3]

[3]The only consequential assumption for periods $t \geq 2$ is that C wins either type of war with probability 0. Given this assumption, even if in every period both actors faced the same strategic options as in period 1, C would accept any offer and G would optimally set $m_t = 0$ and $x_t = \theta \cdot \left(1 - e_G\right)$, yielding the same equilibrium outcomes as assumed here.

Table 2: Per-Period Future Continuation Values and Differences

	Government	**Challenger**
(1) **C wins center**	$(1-\delta)\cdot V^G_{\text{center}}=0$	$(1-\delta)\cdot V^C_{\text{center}}=2-e_G$
(2) **C secedes**	$(1-\delta)\cdot V^G_{\text{sep}}=1-e_G$	$(1-\delta)\cdot V^C_{\text{sep}}=1$
(3) **Status quo**	$(1-\delta)\cdot V^G_{\text{s.q.}}=$ $\big(1-\theta\big)\cdot\big(1-e_C\big)+\big(1-\theta\big)\cdot\big(1-e_G\big)$	$(1-\delta)\cdot V^C_{\text{s.q.}}=$ $\underbrace{1-\big(1-\theta\big)\cdot\big(1-e_C\big)}_{C\text{'s non-taxed income}}+\underbrace{\theta\cdot\big(1-e_G\big)}_{\text{Transfers from } G}$
(4) **Center – s.q.**	$(1-\delta)\cdot\Big(V^G_{\text{center}}-V^G_{\text{s.q.}}\Big)=$ $-\Big[\big(1-\theta\big)\cdot\big(1-e_C\big)+\big(1-\theta\big)\cdot\big(1-e_G\big)\Big]$	$(1-\delta)\cdot\Big(V^C_{\text{center}}-V^C_{\text{s.q.}}\Big)=$ $\big(1-\theta\big)\cdot\big(2-e_G-e_C\big)$
(5) **Sep. – s.q.**	$(1-\delta)\cdot\Big(V^G_{\text{sep}}-V^G_{\text{s.q.}}\Big)=$ $-\big(1-\theta\big)\cdot\big(1-e_C\big)+\theta\cdot\big(1-e_G\big)$	$(1-\delta)\cdot\Big(V^C_{\text{sep}}-V^C_{\text{s.q.}}\Big)=$ $\underbrace{\big(1-\theta\big)\cdot\big(1-e_C\big)}_{\text{Doesn't pay taxes}}-\underbrace{\theta\cdot\big(1-e_G\big)}_{\text{Doesn't get transfers}}$

1.2 Simplifying Assumptions and Summary of Extensions

Numerous simplifying assumptions enable focusing on relevant mechanisms for the primary empirical application, the mixed oil curse. One is that G exogenously accrues tax revenues, even in period 1. Alternatively, we could add two additional strategic moves at the beginning of the game: G proposes a tax rate and then C either accepts or exits. Assuming C's exit option equals $\big(1-\theta\big)\cdot\big(1-e_C\big)$, adding these moves would reproduce the exogenous revenue amounts assumed above. In the transfer and fighting part of the stage game, C treats taxes as a sunk cost. Because they do not affect actions later in the period, G proposes taxes to equal C's exit constraint and C accepts any tax level no greater than that.

Another simplifying assumption is that C can initiate a war only in the first period. This setup captures the main mechanism in formal models in which the distribution of power shifts over time: dynamic commitment problems cause costly fighting in equilibrium.[4] Although the strategic interaction ends after period 1, C's per-period consumption in future periods determines C's optimal civil war aims and whether or not the players peacefully bargain in period 1. The possibility of equilibrium bargaining failure arises because C's bargaining position permanently worsens after period 1, which creates incentives for C to initiate a civil war before the adverse power shift occurs. This is the limiting case of a model in which during every period of an infinite horizon there is a positive probability that C will win a war (for example, Acemoglu and Robinson's

[4]Fearon's (1995, 404-408) model with dynamic commitment inability also exhibits a one-time shift in power after period 1.

2006 model of political regime transitions). This would not be true if my model contained a finite number of periods, which motivates modeling an infinite horizon even though strategic moves occur only in period 1. Allowing power to shift only once yields qualitatively similar insights as a model in which power can shift in every period, but this simplification eliminates technical difficulties that modeling G's arming decision in every period would create (a strategic option omitted in Acemoglu and Robinson's 2006 and many other dynamic bargaining models; Paine 2016 details some of these technical issues).

Appendix B presents three extensions that relax other assumptions: parameterizing total production in each player's region rather than fixing it at 1, allowing civil wars to last multiple periods and for war aims to change over time, and allowing regional oil production to determine civil war aims.

1.3 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 A proves every formal statement.

1.3.1 Challenger's Civil War Aims

In period 1, C can choose to fight if G makes an unfavorable offer. Following a successful separatist war $\big(\mu = 0\big)$, C retains all future economic production in its region, but loses any future transfers it would have received from the central region. A successful center-seeking civil war $\big(\mu = 1\big)$ carries the additional benefit for C of capturing all 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 that of capturing the center, then C's binding fighting threat is separatist. The terms from Table 2 enable expressing whether C's binding war threat is center-seeking or separatist, given G's military spending m:

$$\mu^*(m) = \begin{cases} 0 & \text{if } p_c(m,\alpha,\beta_c) < \underbrace{\dfrac{(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)}{(1-\theta)\cdot(2-e_G-e_C)}}_{<1} \cdot p_s(m,\alpha,\beta_s) \\ [0,1] & \text{if } p_c(m,\alpha,\beta_c) = \frac{(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)}{(1-\theta)\cdot(2-e_G-e_C)} \cdot p_s(m,\alpha,\beta_s) \\ 1 & \text{if } p_c(m,\alpha,\beta_c) > \frac{(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)}{(1-\theta)\cdot(2-e_G-e_C)} \cdot p_s(m,\alpha,\beta_s) \end{cases} \tag{2}$$

Lemma 1 demonstrates that C's share of the population and G's military spending determine the binding civil war constraint. If C is very small, then it prefers separatism over center-seeking regardless of m (part a), whereas the opposite is true if C is very large (part c). These two results follow from Assumption 1 on ethnic group size and civil war aims, plus the following boundary condition assumption: the smallest possible C strictly prefers separatism and the largest possible C strictly prefers center-seeking.

Assumption 3 (Boundary conditions for civil war aims)**.**

$$\textbf{\textit{Part a.}} \quad p_c(m=0,\alpha=0,\beta_c) < \frac{(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)}{(1-\theta)\cdot(2-e_G-e_C)}\cdot p_s(m=0,\alpha=0,\beta_s)$$

$$\textbf{\textit{Part b.}} \quad p_c(m=R,\alpha=1,\beta_c) > \frac{(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)}{(1-\theta)\cdot(2-e_G-e_C)}\cdot p_s(m=R,\alpha=1,\beta_s)$$

If instead α is intermediate, then G's military spending influences the type of civil war that C prefers: center-seeking if m is low and separatist if m is high (part b of Lemma 1). This follows from Assumption 2, which assumes that military spending decreases C's probability of winning a center-seeking civil war by a greater magnitude than it decreases the probability of successful separatism.

Lemma 1 (Optimal civil war aims)**.** *There exist unique threshold values derived in the appendix, $0<\underline{\alpha}<\overline{\alpha}<1$ and $\hat{m}(\alpha)$, 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]*

1.3.2 Challenger: Accept or Fight?

C will accept if G's period 1 transfer yields expected utility at least as high as C would obtain from initiating its preferred type of civil war. Fighting reduces surplus in period 1 by imposing the fixed cost d on both players. However, by creating the possibility of dictating policy in the future, in expectation, C is better off in $t \geq 2$ by fighting at $t=1$.[5] Fixing m, Equation 3 states C's acceptance constraint, taking into account optimal civil war aims (Lemma 1) and calculations from Table 2: the difference in C's expected utility from

[5]Assuming (1) the status quo regime persists for $t \geq 2$ following a failed war and (2) actors pay d only in period 1 implies that fighting rather than accepting in period 1 weakly improves C's future-period utility.

winning a center-seeking civil war relative to the status quo (row 4) and the difference in C's expected utility from winning a separatist civil war relative to the status quo (row 5).

$$x \geq x^*(m) \equiv \frac{\delta}{1-\delta} \cdot \Bigg\{ \mu^*(m) \cdot \underbrace{p_c(m) \cdot (1-\theta) \cdot (2 - e_G - e_C)}_{\text{Center-seeking}}$$

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

Imposing Assumption 4 focuses the analysis on the strategically non-trivial parameter range in which C can credibly threaten to fight either type of war (i.e., Equation 3 is violated) if G does not arm and proposes the minimum transfer, $\theta \cdot (1 - e_G)$. Each term within brackets in part a is strictly bounded between 0 and 1, which implies that $\underline{\delta} \in (0, 1)$; and $\delta > \underline{\delta}$ implies that $\overline{d} > 0$.

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

Part a. $\delta > \underline{\delta} \equiv \min \Bigg\{ \dfrac{\theta \cdot (1 - e_G)}{p_c(0) \cdot (1-\theta) \cdot (2 - e_G - e_C) + \theta \cdot (1 - e_G)},$

$$\frac{\theta \cdot (1 - e_G)}{p_s(0) \cdot \big[(1-\theta) \cdot (1 - e_C) + \theta \cdot (1 - e_G)\big] + \theta \cdot (1 - e_G)} \Bigg\}$$

Part b. $d < \overline{d} \equiv \dfrac{\delta}{1-\delta} \cdot \min \Big\{ p_c(0) \cdot (1-\theta) \cdot (2 - e_G - e_C), p_s(0) \cdot \Big[(1-\theta) \cdot (1 - e_C) - \theta \cdot (1 - e_G)\Big] \Big\} - \theta \cdot (1 - e_G)$

1.3.3 Government's Strategic Choices

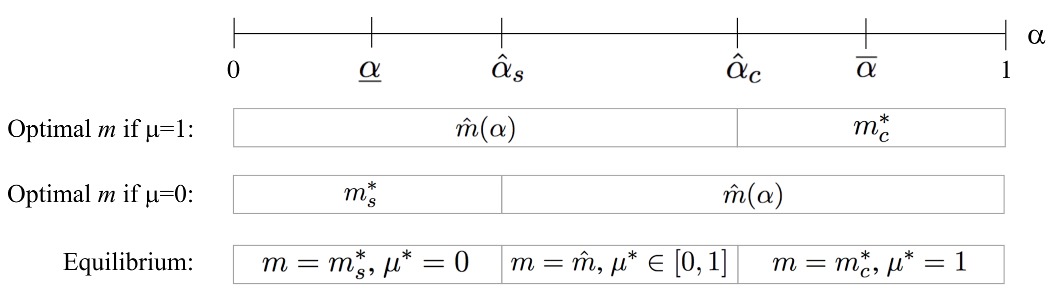
G chooses x and m in period 1 to maximize its lifetime expected utility, which requires satisfying Equation 3 with equality: strictly satisfying the inequality would transfer more than needed to buy peace, but violating the inequality would cause G to lose the surplus that it would pocket—since it makes the offer and fighting is costly—from peaceful bargaining.

G's military spending directly and indirectly affects C's calculus. The direct effect is that, for fixed civil war aims, greater armament decreases C's expected utility to initiating a war by lowering its probability of winning (see Equation 3). This mechanism diminishes the transfer amount that C can credibly demand. An indirect effect arises because G's military spending may influence C's civil war aims (see part b of Lemma 1). G chooses m to maximize lifetime expected utility, taking into account these two effects.[6]

$$m^* \equiv \arg\max \left\{ \underbrace{\max_{m \in [0, \hat{m}(\alpha)]} R - m - x^*(\mu = 1, m) + \delta \cdot V^G_{\text{s.q.}}}_{\text{Optimal arming against center-seeking constraint, } \mu=1}, \underbrace{\max_{m \geq \hat{m}(\alpha)} R - m - x^*(\mu = 0, m) + \delta \cdot V^G_{\text{s.q.}}}_{\text{Optimal arming against separatist constraint, } \mu=0} \right\} \quad (4)$$

This optimization problem yields a unique optimal arming amount for each value of C's group size, α. Figure 1 summarizes the intuition, and the appendix provides supporting technical details. At $m = \hat{m}$, C is indifferent between civil war aims (see Lemma 1), and C's binding constraint is a center-seeking civil war if $m < \hat{m}(\alpha)$ and separatist if $m > \hat{m}(\alpha)$, generating the two maximization problems stated in Equation 4. Each problem yields a unique interior solution, respectively, m_c^* for $\mu = 1$ (center-seeking) and m_s^* for $\mu = 0$ (separatist), as Appendix Lemma A.1 shows. Given the Inada-type conditions that rule out $m = 0$ and $m = R$ (see footnote 2), we can eliminate all $m \notin \left\{m_c^*, m_s^*, \hat{m}(\alpha)\right\}$ as possible maximizers.

Figure 1: Group Size and Equilibrium Military Spending



C's group size α determines the unique optimizer. If C is small, $\alpha \in \left(0, \hat{\alpha}_s\right)$, then G chooses $m = m_s^*$ and in equilibrium C's binding constraint is separatist. Part a of Lemma 1 states that if C is very small, $\alpha < \underline{\alpha}$, then C's binding civil war threat is separatist for any m, implying that G chooses $m = m_s^*$. If C is slightly larger, $\alpha \in \left(\underline{\alpha}, \hat{\alpha}_s\right)$, then the outcomes are unchanged. C's group size is still relatively small in this range. Therefore, given part b of Lemma 1, only very low military spending will tempt C to fight for the center because low α implies low $\hat{m}(\alpha)$. G would considerably sacrifice its coercive potential by choosing this low level of military spending, and therefore G prefers $m_s^* > \hat{m}(\alpha)$ and to face a separatist war threat.

[6] 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 its civil war aims at $\hat{m}$ implies that G's expenditures $\hat{m} + x^*(\mu, \hat{m})$ are constant in $\mu \in [0, 1]$.

The logic is identical (albeit inverted) for large C. If $\alpha \in \big(\hat{\alpha}_c, 1\big)$, then G chooses $m = m_c^*$ and in equilibrium C's binding constraint is center-seeking. Part c of Lemma 1 shows that if C is very large, $\alpha > \overline{\alpha}$, then C's binding civil war threat is center-seeking for any m, implying that G chooses $m = m_c^*$. If C is slightly smaller, $\alpha \in \big(\hat{\alpha}_c, \overline{\alpha}\big)$, then the outcomes are unchanged. C's group size is still relatively large in this range. Therefore, given part b of Lemma 1, only very high military spending will deter C from fighting for the center because high α implies high $\hat{m}(\alpha)$. The considerable resources that G would have to devote to prevent the center-seeking threat from binding causes it to prefer $m_c^* < \hat{m}(\alpha)$.

Finally, for intermediate-sized challengers $\alpha \in \big(\hat{\alpha}_s, \hat{\alpha}_c\big)$, G chooses $m = \hat{m}(\alpha)$, making C indifferent between civil war aims. In this range, m_s^* is low enough that $\mu^*(m_s^*) = 1$ (i.e., C's binding constraint would be center-seeking), and m_c^* is high enough that $\mu^*(m_c^*) = 0$ (i.e., C's binding constraint would be separatist). This leaves $\hat{m}(\alpha)$ as the only possible solution.

1.3.4 Equilibrium Strategy Profile

G maximizing its lifetime utility (Equation 4) is equivalent to maximizing net revenues in period 1 because—conditional on preventing war—its choices of m and x do not affect consumption after period 1. Furthermore, peaceful bargaining ensues if and only if G's budget constraint is satisfied in equilibrium:

$$B^* \equiv R - m^* - x^* = \underbrace{1 - e_G + \big(1-\theta\big)\cdot\big(1-e_C\big)}_{\text{Revenues, } R}$$
$$\underbrace{-\Bigg\{m^* + \frac{\delta}{1-\delta}\cdot\Big[\mu^*\cdot p_c(m^*)\cdot(1-\theta)\cdot(2-e_C-e_G) + (1-\mu^*)\cdot p_s(m^*)\cdot\Big[(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)\Big]\Big]\Bigg\}}_{\text{Expenditures, } m^*+x^*} > 0 \tag{5}$$

Along the equilibrium path, C will initiate a civil war if and only if Equation 5 is violated. This possibility arises because of G's limited commitment to transfers and to tax concessions in future periods when C cannot fight. To see that low θ is necessary for equilibrium fighting, suppose instead $\theta = 1$. In this case, C faces no taxes and receives maximum transfers in every future period in the status quo regime—identical to a successful center-seeking civil war. These conditions violate Assumption 4 and imply $m^* = 0$, and Equation 5 reduces to $2 - e_G + \frac{\delta}{1-\delta}\cdot(1-\mu^*)\cdot p_s(0)\cdot(1-e_G) > 0$. By contrast, if $\theta < 1$, then Equation 5 may be violated. Proposition 1 characterizes the unique subgame perfect Nash equilibrium strategy profile.

Proposition 1 (Equilibrium strategy profile)**.**

Part a. *If $B^* > 0$, then C accepts any $x \geq x^*(m)$. If $x < x^*(m)$, then C does not accept and Lemma 1 characterizes C's optimal war aims as a function of m. There exist unique thresholds $\hat{\alpha}_s$ and $\hat{\alpha}_c$ satisfying $\underline{\alpha} < \hat{\alpha}_s < \hat{\alpha}_c < \overline{\alpha}$, for $\underline{\alpha}$ and $\overline{\alpha}$ defined in Lemma 1, such that:*

- *If $\alpha < \hat{\alpha}_s$: G chooses $(m, x) = \big(m_s^*, x^*(m_s^*)\big)$, and C accepts on the equilibrium path.*
- *If $\alpha \in \big(\hat{\alpha}_s, \hat{\alpha}_c\big)$: G chooses $(m, x) = \big(\hat{m}, x^*(\hat{m})\big)$, and C accepts on the equilibrium path.*
- *If $\alpha > \hat{\alpha}_c$: G chooses $(m, x) = \big(m_c^*, x^*(m_c^*)\big)$, and C accepts on the equilibrium path.*

Part b. *If $B^* < 0$, then C does not accept any offer, and Lemma 1 characterizes C's optimal war aims as a function of m.*

- *If $\alpha < \hat{\alpha}_s$, then G chooses $m = m_s^*$ and is indifferent among all $x \in \big[\theta \cdot (1 - e_G), R - m_s^*\big]$; and C fights a separatist civil war on the equilibrium path, $\mu^* = 0$.*
- *If $\alpha \in \big(\hat{\alpha}_s, \hat{\alpha}_c\big)$, then G chooses $m = \hat{m}$ and is indifferent among all $x \in \big[\theta \cdot (1 - e_G), R - \hat{m}\big]$; and C fights a civil war but is indifferent among war aims, $\mu^* \in \{0, 1\}$.*
- *If $\alpha > \hat{\alpha}_c$, then G chooses $m = m_c^*$ and is indifferent among all $x \in \big[\theta \cdot (1 - e_G), R - m_c^*\big]$; and C fights a center-seeking civil war on the equilibrium path, $\mu^* = 1$.* *[Go to proof]*

2 Countervailing Effects of Oil Production

To introduce oil production into the model, assume that oil provides $O_i \in [0, 1)$ percent of total income in each region, for $i \in \{G, C\}$. Oil production is O_G in G's region ("government oil") and O_C in the region in which C resides ("regional oil"). Comparative statics on oil production disaggregate (1) a revenue effect that shrinks the range of parameter values in which a civil war occurs along the equilibrium path and (2) a predation effect that increases civil war likelihood. To highlight common mechanisms for both civil war types, this section fixes C's civil war aims before the next two sections endogenize civil war aims. Formally, the civil war aims indicator $\mu \in \{0, 1\}$ is a parameter in this section.

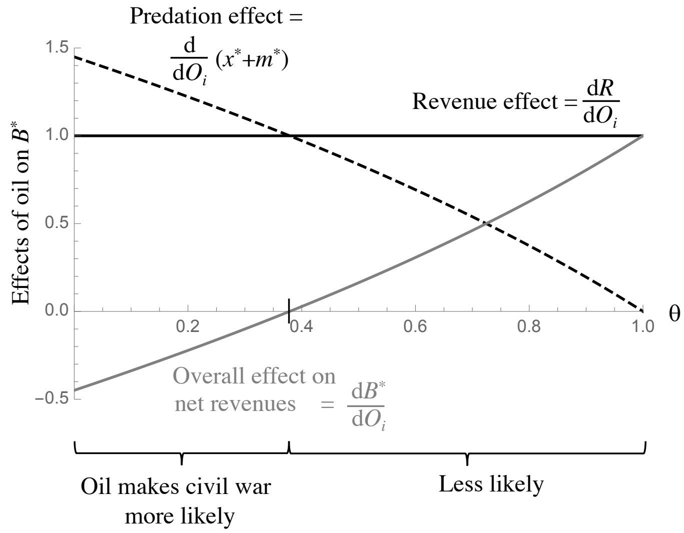
As the introduction discussed, the immobility and high capital intensity of oil production undermines producers' ability to exit the formal economy in reaction to high taxes—which facilitates easy government taxation. I assume that increasing oil production lowers the economic exit option parameter:

Assumption 5 (Oil production and economic exit option)**.**

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

Figure 2 depicts the effects of oil production as a function of the commitment parameter θ. The gray curve equals $\frac{dB^*}{dO_i}$, the overall effect of oil production on the equilibrium budget constraint in period 1 (see Equation 5). For parameter values in which the gray curve is negative, an increase in oil production makes civil war more likely, whereas the opposite is true if the gray curve is positive.

Figure 2: Countervailing Effects of Oil Production



Notes: Figure 2 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 production into two countervailing effects. The solid black line depicts the *revenue effect*. Because oil enables higher taxes than other types of economic activities (Assumption 5), an increase in either government or regional oil production raises G's available revenues to spend on transfers and coercion in period 1, which Equation 1 denotes as R. This increases the range of parameter values in which G has sufficient funds to offer to C to meet the budget constraint stated in Equation 5. Formally, this effect equals:

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

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

Oil production also creates a *predation effect* that increases C's incentives to fight. This is effect (1) stated in Equation 7, and captures C's incentives to predate government oil production and G's incentives to predate regional oil production.[7] An increase in government oil production enhances the prize of capturing

[7]For all $\alpha \in [0, \hat{\alpha}_s] \cup [\hat{\alpha}_c, 1]$, applying the envelope theorem to compute $\frac{d}{dO_i}(m^* + x^*)$ yields the term stated in Equation 7. The envelope theorem is applicable in this parameter range because G chooses an interior-optimal value of m. For $\alpha \in [\hat{\alpha}_s, \hat{\alpha}_c]$, G's military choice is not interior and $\frac{d}{dO_i}(m^* + x^*)$ contains

the center—in which case C consumes *all* revenues from G's region in future periods—relative to future transfers that C would receive in the status quo regime, which equal $1-\theta$ percent of revenues from G's region. An increase in regional oil production increases the value to C of winning either type of civil war relative to remaining in the status quo regime because a successful war enables C to consume *all* future production from its region. By contrast, it must give some of these revenues to G if the status quo regime remains—that is, oil provides opportunities for G to predate C—and the magnitude of this taxation is scaled by $1-\theta$. The dashed black line in Figure 2 depicts the predation effect, which works through G's expenditures x^*+m^* because increasing C's consumption following a successful war relative its consumption in the status quo raises the minimum amount of government spending on carrots and sticks that satisfies the budget constraint in Equation 5.

Predation effect:

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

The predation effect also 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 faces low fighting incentives if the predation effect is small in magnitude. If economic production in G's region cannot easily be taxed, then C's incentives to capture the central region are low. Similarly, if C has a strong economic exit option and G cannot easily tax economic production in C's region, then C pays low taxes even in the status quo regime—obviating the need to fight a war to prevent government predation. By contrast, easily extracted revenues such as those from oil production create a large predation effect.

Equation 7 highlights that an increase in oil production exerts similar effects for most combinations of oil location and C's civil war aims: if the oil is produced in C's region and/or if C's civil war aims are center-

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an additional indirect effect $\left(1+\frac{\partial x^*}{\partial m}\right)\cdot\frac{d\hat{m}}{dO_i}$. However, this parameter range—in which C is indifferent between civil war aims—is less substantively relevant than parameter values in which C strictly prefers one type of civil war in equilibrium. As Appendix D notes, 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). Appendix Section B.2 provides a more detailed discussion of non-constant civil war aims.

seeking. However, effect ② in Equation 7 highlights that if C's aims are separatist, then an increase in *government* oil does not exert a predation effect because winning a separatist war would not enable C to amass these additional revenues. Instead, if C aims to separate, then an increase in government oil strictly decreases C's incentives to fight: seceding would eliminate future transfers that C would receive under the status quo regime, which equal θ of revenues from G's region in each period.

Proposition 2 formalizes the countervailing effects from Equations 6 and 7. Higher B^* implies a narrower space of parameter values in which fighting will occur, hence decreasing equilibrium civil war prospects. By contrast, lower B^* corresponds with an increase in equilibrium civil war likelihood.[8]

Proposition 2 (Effect of oil production)**.** *An increase in oil production exerts both a revenue effect and a predation effect. Formally, for all $\alpha \in [0, \hat{\alpha}_s] \cup [\hat{\alpha}_c, 1]$, the overall effect of oil production on the equilibrium budget constraint in period 1 is:*

$$\frac{dB^*}{dO_i} = \underbrace{\frac{dR}{dO_i}}_{\textit{Revenue effect}} \underbrace{- \frac{d}{dO_i}(m^* + x^*)}_{\textit{Predation effect}},$$

for $i \in \{G, C\}$ and for the derivatives in Equations 6 and 7.

3 Explaining the Mixed Oil Curse: Ethnic Minorities Selection Effect

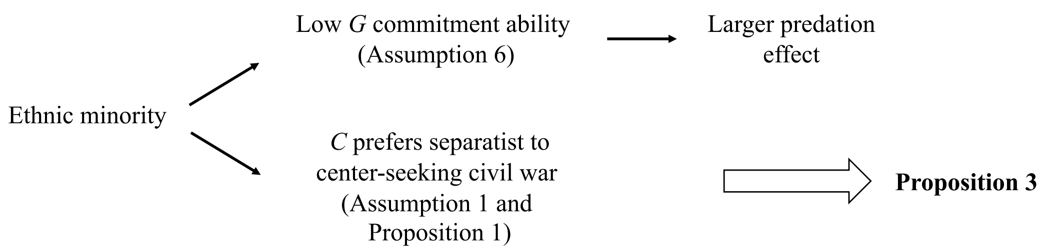
By endogenizing civil war aims, the model enables us to study how a conflict risk factor can exert countervailing effects on center-seeking and separatist civil war. Specifically, we need to analyze how the magnitude of the revenue effect relative to that of the predation effect correlates with the factors that determine C's civil war aims and likelihood of fighting in equilibrium.

The first result that can help to explain the mixed empirical relationship between oil production and different types of civil wars builds upon ideas in the voluminous literature on ethnicity and civil war. Although in principal the theoretical logic may apply to any geographically segregated identity groups, in the real world, ethnic groups are more likely to be able to organize rebellions—especially those that aim to separate—

[8]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.

than groups organized by class or political ideology. Appendix Section C.1 draws from existing ethnicity research to motivate this foundational point. To apply ideas about ethnicity to explain the mixed oil pattern, I focus specifically on the size of C's ethnic group. Before providing the formal logic, this section presents empirical evidence to ground the key assumptions that the commitment parameter θ is relatively small if C is an ethnic minority (Assumption 6), and minority groups face advantages to fighting separatist rather than center-seeking civil wars (Assumption 1). Combining these assumptions with the logic of the model implies that the predation effect of oil 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 to experience less extraction from their region and receive more transfers from the central region because of G's greater ability to commit to deals with large groups, diminishing the magnitude of the predation relative to revenue effect. Figure 3 summarizes the logic.

Figure 3: Oil, Ethnic Minorities, and Civil War Aims

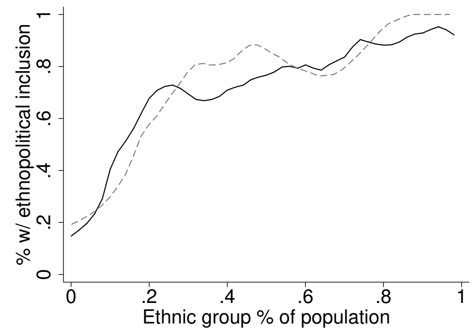


3.1 Motivation for Ethnic Group Size and Commitment Ability Assumption

The first key assumption that underpins the ethnicity-based explanation for the oil-conflict relationship is that a government has lower ability to commit to transfers and to refrain from exploitative taxes when bargaining with a numerically small ethnic group. This assumption is reasonable because, empirically, central governments exclude small ethnic groups from power relatively frequently. Recent ethnic conflict research focuses 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 arrangements at the center should improve a government's ability to commit to future transfers and tax concessions, which corresponds with higher θ in my model.

However, the ethnic conflict literature devotes less attention to explaining why some groups but not others command power in the central government. The black line in Figure 4 displays the relationship between group size and power access across a broad global sample of ethnic groups (see Appendix D). The horizontal axis expresses the ethnic group's national population share. The vertical axis expresses the percentage of ethnic groups with political representation in the central government. Specifically, the Ethnic Power Relations dataset, described in Appendix D, 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 4, 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 a similar pattern among ethnic groups with a giant oil field in their territory.

Figure 4: Group Size and Political Inclusion



Notes: Figure 4 summarizes the relationship between ethnic group percentage of the population and ethnopolitical inclusion with local polynomial functions. The black curve uses a broad global sample, and the dashed gray curve subsets this sample to ethnic groups with a giant oil field in their territory. Appendix D provides additional data details.

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, 2018), 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. Assumption 6 formalizes this premise.

Assumption 6 (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' for which G has corresponding commitment ability θ', and for any challenger of size $\alpha'' > \alpha'$ with corresponding θ'', we have $\theta'' > \theta'$.*

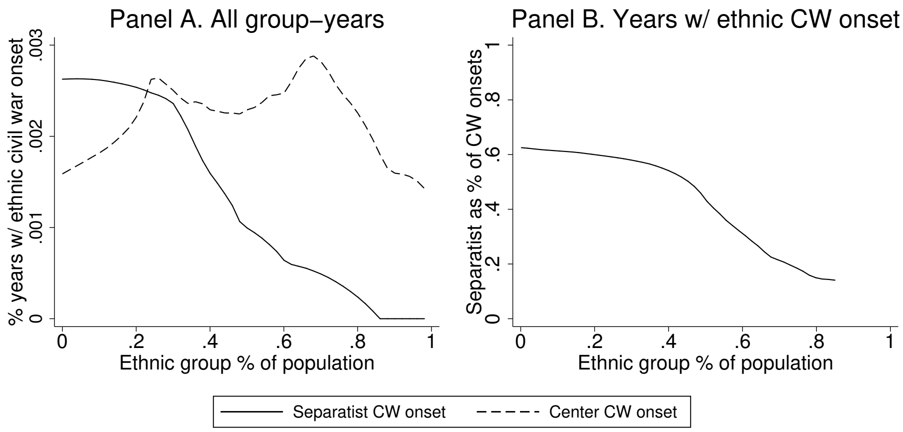
3.2 Motivation for Ethnic Group Size and Civil War Aims Assumption

Ethnic group size also influences civil war aims. Earlier I imposed Assumption 1: hypothetically increasing an ethnic group's size exerts a larger positive effect on its probability of winning a center-seeking civil war than on its probability of successfully seceding. Surprisingly, existing research pays little attention to the relationship between group size and civil war aims, and instead usually aggregates all civil wars: scholars have demonstrated that larger ethnic groups positively covary with *any* type of civil war onset (Buhaug et al. 2008, 544; Cederman et al. 2013, 73). These findings rest on the sensible premise that larger group size makes succeeding in a rebellion more feasible, but do not address divergent rebellion aims.

Figure 5 provides empirical evidence consistent with this assumption using the same ethnic group sample and civil war data as in Figure 4. 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 this 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

Figure 5: Ethnic Group Size and Civil War Aims



Notes: Figure 5 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 4, and the sample in Panel B only contains group-years with an ethnic civil war onset. Appendix D provides additional data details.

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.

3.3 Formal Logic

Given these assumptions, governments tend to have high commitment ability θ when interacting with challengers whose ethnic group is large and, therefore, prefer center-seeking over separatist civil war. Consequently, showing that θ positively affects $\frac{dB^*}{dO_i}$ (defined in Proposition 2) explains why oil production tends to exert a stronger conflict-inducing effect on small groups that prefer separatist over center-seeking civil wars than on larger groups that prefer center-seeking over separatist. Equation 8 formally evaluates comparative statics for the substantively interesting cases in which oil production generates a predation effect.[9] An increase in G's commitment parameter affects the magnitude of the oil effect in two ways. The direct effect decreases the magnitude of the predation effect (Equation 7) 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 reduce C's consumption in the status quo regime relative to fighting (see Table 1), which decreases the necessary transfer in period 1 to buy off C. Formally:

[9]Government oil production does not create a predation effect if C's aims are separatist (see Eq. 7).

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

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

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

There is also a countervailing indirect substitution effect that increases the magnitude of the predation effect. Because higher θ lessens C's fighting constraint, G lowers its equilibrium military spending m^* (see Appendix Equations A.6 and A.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 $p_j(\cdot)$ exhibits steep-enough diminishing marginal returns implies that the direct effect outweighs the indirect effect in magnitude—oil production does not cause G to substitute so much from military investments to counteract the negative direct effect of higher θ on the predation 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 the likelihood that a civil war occurs in equilibrium. Formally, if* $(1-\mu^*)\cdot(1-\gamma)=0$*, then for* $i\in\{G,C\}$ *and* $\frac{dB^*}{dO_i}$ *defined in Proposition 2:*

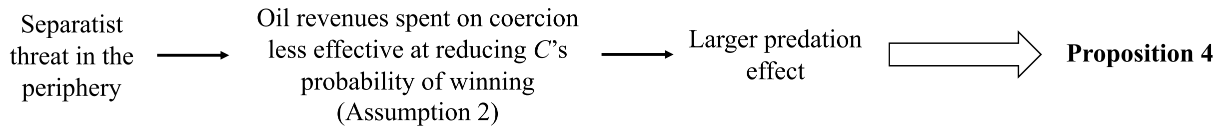
$$\frac{d^2B^*}{dO_i d\theta} > 0$$

[Go to proof]

4 Explaining the Mixed Oil Curse: Geography of Rebellion Effect

The geography of coercion and rebellion motivates a second explanation for the mixed oil-conflict pattern. Geographic factors related to civil war aims imply that governments exhibit lower coercive efficiency when facing a challenger who prefers to separate over seeking the center (Assumption 2). After presenting empirical evidence to motivate this key assumption, I combine this insight with the logic of the model to explain why the predation effect of oil is larger in magnitude for challengers that choose separatist aims, which links oil production to separatist but not center-seeking civil wars. Figure 6 summarizes the logic.

Figure 6: Oil, Geography of Rebellion, and Civil War Aims



4.1 Motivation for Geography of Rebellion Assumption

Many scholars examine geographical factors that affect the likelihood of civil war (Fearon and Laitin, 2003; Buhaug, Cederman and Rød, 2008; Buhaug, 2010; Roessler and Ohls, 2018), although most existing empirical tests aggregate conflicts. I build off these insights but apply them to studying disparate civil war aims by assuming that an increase in government military capacity lowers the probability of success for a center-seeking civil war by a greater magnitude than for a separatist civil war, formalized earlier as Assumption 2. Substantively, 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. Stated differently, 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 regimes with greater coercive strength 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 supports 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 C.2 presents regression results using data from Kalyvas and Balcells (2010) that support this contention. They 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. Appendix Table C.1 shows that adding an indicator for separatist aims to their regressions yields a negative and statistically significant correlation between separatism and conventional conflicts (as opposed to to irregular conflicts).

4.2 Formal Logic

Equation 9 evaluates comparative statics for β_j on $\frac{dB^*}{dO_i}$ (defined in Proposition 2) for the substantively interesting cases in which oil production generates a predation effect (see Equation 7). Increasing coercive effectiveness alters the magnitude of the oil effects in two ways. Directly, β_j decreases the magnitude of the predation effect because G more efficiently translates oil revenues into military capacity. This mechanism decreases C's probability of winning and, consequently, decreases the transfer amount needed to buy off C. The indirect substitution effect reinforces the direct effect. Higher β_j increases the marginal benefit of arming (see Appendix Equations A.6 and A.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.

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

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

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

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 the likelihood that a civil war occurs in equilibrium. Formally, if* $(1-\mu^*) \cdot (1-\gamma) = 0$*, then for* $i \in \{G, C\}$ *and* $\frac{dB^*}{dO_i}$ *defined in Proposition 2:*

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

[Go to proof]

5 Empirical Implications and Evidence

Although in broad strokes the theory can account for the mixed oil-conflict pattern, 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 presented in Appendix Section D.8 additionally supports the main mechanisms.

5.1 Conditional Hypotheses

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 a separatist civil war if present in regions populated by small ethnic groups, given the general tendency for members of small group to prefer separatism (see Figure 5) and to lack political representation in the central government (see Figure 4), which corresponds with low government commitment ability θ. By contrast, for minority groups that enjoy political representation at the center, higher θ alleviates the predation effect of oil production and eliminates incentives to secede. Although this prediction corresponds with existing arguments about the conditioning effect of ethnopolitical inclusion (Asal et al., 2016; Hunziker and Cederman, 2017), its theoretical basis differs. Whereas existing theories do not address both sides of the conflict coin, my theory explains why redistributive grievance effects of oil should affect separatist but not center-seeking civil wars as well as 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 empirical relationship between oil production and *center-seeking* civil wars.

> **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 Hypothesis 1. 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 the conditioning effect of 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 denied profits from their region's oil production lacks a 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 an independent state or autonomous region (very high β_s). Therefore, to reduce heterogeneity, the sample for the separatist civil war regressions excludes geographically dispersed ethnic groups. Appendix Section D.6 shows that the absence of geographic concentration nearly perfectly predicts the absence of separatist (but not center-seeking) civil wars.

The model also offers an intriguing *non*-implication about geography. Many existing resource curse theories focus on rebel finance and offer a prediction about the within-country location of oil reserves: because offshore oil production is difficult for rebels to loot, it should not cause separatist civil wars. By contrast, the present model expects offshore oil to exert similar effects as onshore oil because both cause a predation effect. Appendix Section D.7 discusses existing arguments in more depth and shows empirically that both onshore and offshore oil production positively covary with separatist civil war onset.

Center-seeking civil wars. Propositions 3 and 4 also suggest a conditional hypothesis for center-seeking civil wars. In contexts where a government is vulnerable (for reasons independent of oil wealth), it may lack consolidated control over any oil produced in its country. 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, despite the general ease that governments face to defending the capital relative to fighting in the periphery. In these vulnerability cases, low β_c yields a large-magnitude predation effect.

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

5.2 Evidence for Separatist Civil Wars

Appendix Figure D.2 establishes the core pattern that ethnic groups residing in oil-rich territories participate in separatist civil wars at elevated rates. Panel A of Figure 7 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. Almost every separatist civil war over an oil-rich territory has occurred in locations for which the theory anticipates that the predation 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). In the column for Hypothesis 1, "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.4 describes the data sources. All but two of the ethnic groups are both excluded and minorities,[10] and only Southerners in Yemen are neither. Yemen is exceptional because majority groups—oil-rich or not—almost never fight separatist civil wars. The war occurred four years after 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.

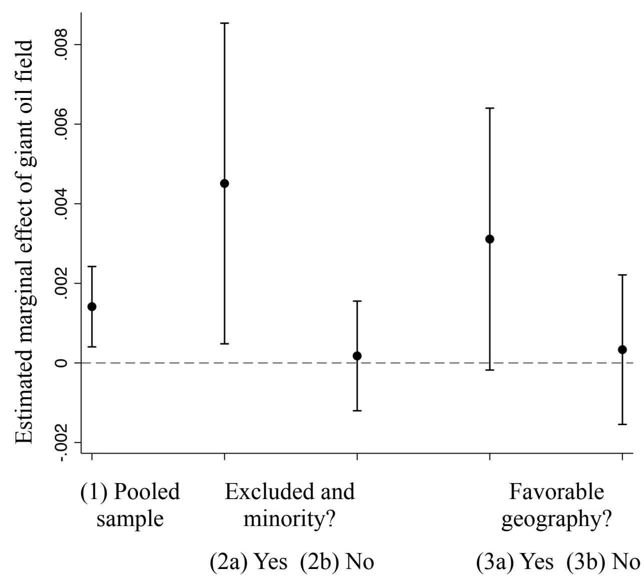
Figure 7: Oil and Separatist Civil War Onset

A. Oil-separatist civil war cases

Ethnic group	**Country**	**Onset year**	**Politically excl. minorities (H1)**	**Favorable sep. geog. (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%

*Only offshore oil

B. Regression estimates



Notes: The figure presents point estimates and 95% confidence intervals for a series of logit regressions described in Appendix Section D.4. The dependent variable is separatist civil war onset, and the unit of analysis is ethnic group-years. The table 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 Section D.4 discusses the data sources.

[10] See also Ross (2012, 155-6). Paine (2019) presents additional supportive evidence: in most oil-separatist cases, rebel groups espoused concerns specifically about unfair oil redistribution.

The column for Hypothesis 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 exhibit at least one favorable geography condition.

To statistically assess these conditional factors, Appendix Equation D.3 adds interaction terms to the statistical models that establish the positive correlation between oil wealth and separatist civil wars (see Appendix Figure D.2). Panel B of Figure 7 and Appendix Table D.3 show that the estimated marginal effect of oil on separatist civil war onset is between 2.4 and 2.9 times larger than in the baseline specification (Column 1) among politically excluded ethnic minority groups (Column 2a), or for groups with any favorable geography conditions (p-value is 0.06 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.3) or disaggregating onshore and offshore oil production (Appendix Figure D.5).

5.3 Evidence for Center-Seeking Civil Wars

Appendix Figure D.1 establishes the core country-level pattern that greater oil income per capita covaries with less frequent center-seeking civil wars. Panel A of Figure 8 lists cases that depart from the general pattern: the 16 center-seeking civil wars that began 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 low β_c, and therefore a large-magnitude predation effect (Hypothesis 3). Oil-rich governments can be vulnerable to center-seeking civil wars either because of societal organization that occurs independently of oil wealth or because the government lacks consolidated control over its oil revenues. Appendix Section D.5 details how I coded the following variables.

One proxy for government vulnerability is recent defeat in warfare and/or violent political transitions. Several oil-rich countries experienced these conditions within two years prior to their center-seeking civil war ("W" for war). Governments should face particular difficulties to deterring rebel groups in violent indepen-

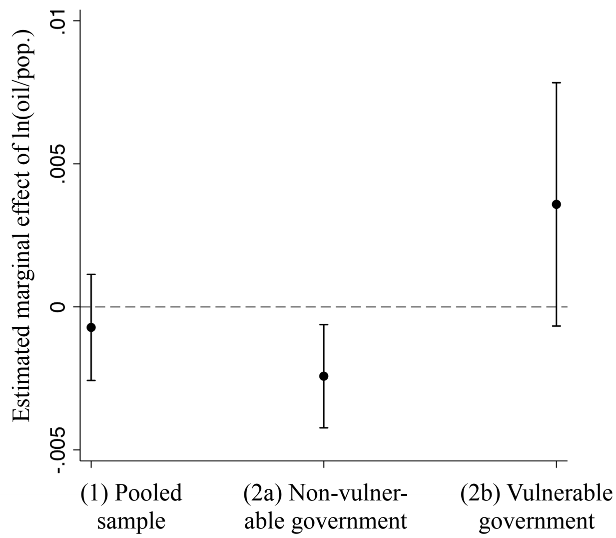
Figure 8: Oil and Center-Seeking Civil War Onset

A. Oil-center seeking civil war cases

Country	Onset year	Oil p.c.	Gov. 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

The table 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. The text describes the various symbols, and Appendix D.5 discusses the data sources.

B. Regression estimates



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

dence 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 the opposition to organize independent of the government's oil wealth, such as the Shi'a uprisings following Iraq's defeat in the Persian Gulf war in 1991. The Arab ("A") Spring uprisings across the Middle East and North Africa in 2011 similarly created a focal point for opposition organization even against governments whose oil revenues afforded a strong coercive apparatus, causing new center-seeking civil wars in Libya and Syria. Newly oil-rich governments also face difficulties consolidating their control over revenues (Bell and Wolford, 2015). Many countries experienced newfound oil wealth amid the major oil shock ("S") that lasted roughly a decade after the OPEC oil embargo of 1973. Peru crossed the $100 oil income per capita threshold the year before its war began, and Argentina and Syria (1979) within five years.

Appendix Equation D.4 adds an interaction term to the statistical models that establish the negative correlation between oil production and center-seeking civil wars (see Appendix Figure D.1). Panel B of Figure 8 and Appendix Table D.5 show that among countries lacking any vulnerability conditions, increasing annual oil and gas income per capita from $0 to $1,000 decreases the predicted probability of center-seeking civil war onset by 67%. This is larger in magnitude than the difference after subsetting the sample to pre-2011 years, as in Column 3 of Figure D.1. By contrast, there is a positive association between oil production and center-seeking civil war onset among countries that exhibit at least one of the vulnerability conditions. Appendix Figure D.4 demonstrates similar results for ethnic center-seeking civil wars only.

6 Conclusion

This paper presented a foundational theory of strategic civil war aims. The comparative statics analysis helps 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. Existing theories cannot account for this pattern because they do not address both sides of the conflict coin. Recapping the theoretical logic, imagine a country with two ethnic groups that reside in distinct regions. How does a mode of economic production that improves the government's ability to collect tax revenues—such as oil production—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 (revenue effect in Equation 6). On the other hand, there is more for the challenger's group to grab by taking the center and to protect by expelling the government from its region (predation 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. If the challenger's group is large, then its optimal civil war aims are center-seeking (Assumption 1 and Proposition 1). Two factors diminish the magnitude of the predation effect. First, the government can more credibly commit to transfers and tax concessions toward large groups (Assumption 6). This logic yields Proposition 3. Second, defending the center implies that the government can efficiently translate its revenues into a low probability of the challenger winning a civil war (Assumption 2 and Proposition 4). Therefore, oil production anywhere in the country diminishes the likelihood that a center-seeking civil war will occur in equilibrium. The converse of these claims applies if the group is small—in which case oil production in the group's region (but not elsewhere in the country) should spur separatist civil war.

Although here I focus mainly on applying the logic to address debates about the oil-conflict curse, beyond oil, the model draws mainly from two influential literatures—formal bargaining models of war, and ethnic grievances and civil war—that analyze causes of conflict but do not focus on civil war aims. Although many scholars explain contemporary ethnic grievances via 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. The formal bargaining literature links commitment inability to conflict. One insight of the present paper is that low commitment ability not only makes fighting more likely, but also correlates with rebels' strategically chosen civil war aims. One possible implication of my 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 groups that face a high risk of exclusion from power tend to prefer separatism.

This theory of strategic civil war aims also 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 more effectively deter center-seeking than separatist civil wars because of difficulties projecting power into the periphery, as I discussed. 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 yields easy government revenues, other economic causes of war exhibit different properties. For example, rebel groups can more easily loot alluvial diamonds than oil. Perhaps for this and other types of natural resources, the predation effect often outweighs the revenue 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 B.2 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 Proofs for Formal Results

Figure A.1: Stage Game in Period 1

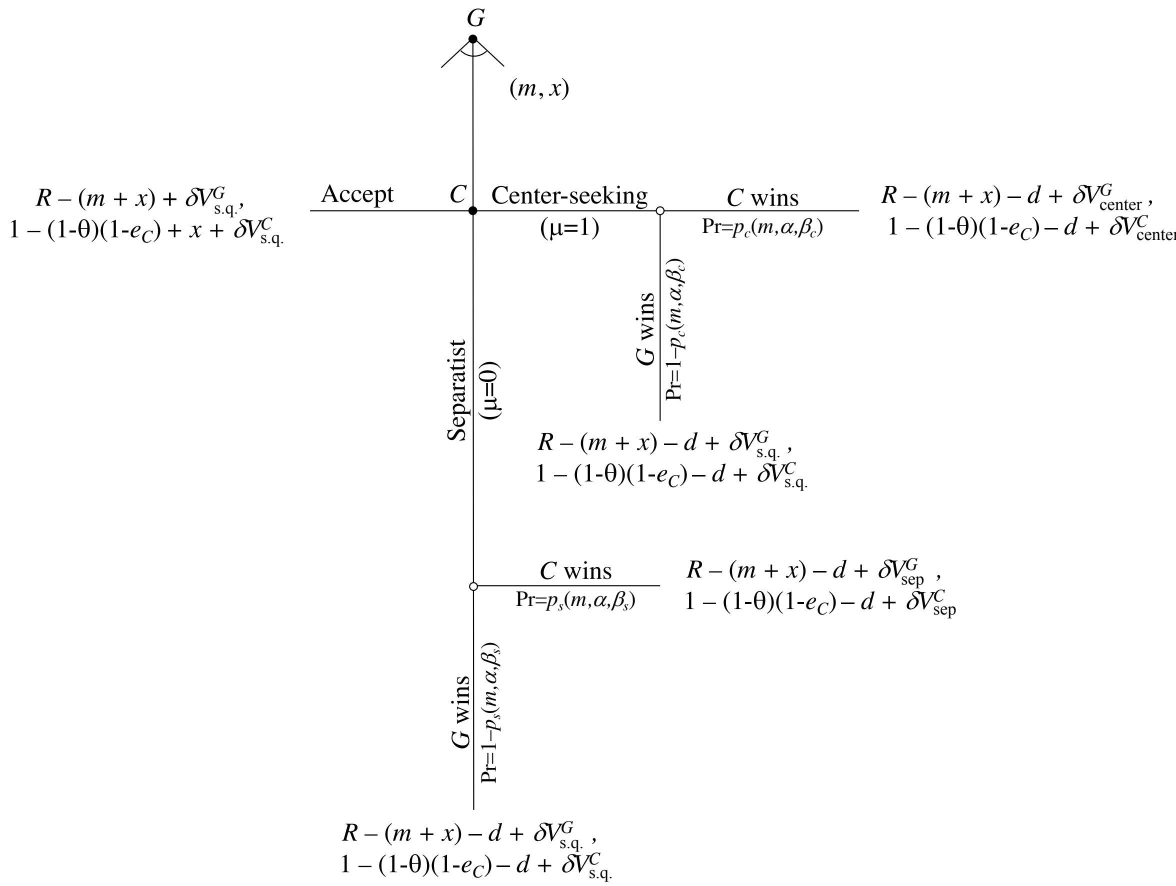


Table A.1: Summary of Parameters and Choice Variables

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 government revenues, equals $1 - e_G + \big(1-\theta\big) \cdot \big(1 - e_C\big)$ • γ: indicator for production in C's territory
Government's period 1 choices	• m: military spending • x: 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 • d: destructiveness of war
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

Proof of Lemma 1.

1. *Definition.* The term π_s expresses the fraction of C's consumption that is lost from winning a separatist civil war relative to winning a center-seeking civil war:

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

2. *Preliminary results.* The following two results will be used throughout the remainder of the proof. Assumption 1 implies that:

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

Assumption 2 implies that:

$$\frac{d}{dm}\Big[p_c(m,\alpha,\beta_c) - p_s(m,\alpha,\beta_s)\cdot\pi_s\Big] = \frac{\partial p_c}{\partial m} - \frac{\partial p_s}{\partial m}\cdot\pi_s < 0 \qquad \text{(A.2)}$$

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

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

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

- Assumption 3, part a states that $p_c(0,0,\beta_c) - p_s(0,0,\beta_s) \cdot \pi_s < 0$.
- Assumption 3, part b and step 2 imply that $p_c(0,1,\beta_c) - p_s(0,1,\beta_s) \cdot \pi_s > 0$.
- $p_c(\cdot)$ and $p_s(\cdot)$ are each assumed to be continuous in α.

Equation A.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:

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

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

- Assumption 3, part a and step 2 imply that $p_c(R,0,\beta_c) - p_s(R,0,\beta_s) \cdot \pi_s < 0$.
- Assumption 3, part b states that $p_c(R,1,\beta_c) - p_s(R,1,\beta_s) \cdot \pi_s > 0$.
- $p_c(\cdot)$ and $p_s(\cdot)$ are each assumed to be continuous in α.

Equation A.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:

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

To prove $\underline{\alpha} < \overline{\alpha}$, suppose instead $\underline{\alpha} \geq \overline{\alpha}$. Given this premise, Assumptions 1 and 2 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 A.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:

$$p_c(\hat{m},\alpha,\beta_c) - p_s(\hat{m},\alpha,\beta_s) \cdot \pi_s = 0 \tag{A.4}$$

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

- $p_c(0,\alpha,\beta_c) - p_s(0,\alpha,\beta_s) \cdot \pi_s > 0$ follows from $\alpha > \underline{\alpha}$.
- $p_c(R,\alpha,\beta_c) - p_s(R,\alpha,\beta_s) \cdot \pi_s < 0$ 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 A.4 demonstrates:

$$\frac{d\hat{m}}{d\alpha} = -\frac{\frac{\partial p_c}{\partial \alpha} - \frac{\partial p_s}{\partial \alpha} \cdot \pi_s}{\frac{\partial p_c}{\partial m} - \frac{\partial p_s}{\partial m} \cdot \pi_s} > 0, \tag{A.5}$$

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

Lemmas A.1 and A.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 A.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 A.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:

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

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:

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

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 A.6 and A.7 yields:

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

for $\omega = \frac{(1-\theta)\cdot(1-e_c) - \theta\cdot(1-e_G)}{(1-\theta)\cdot(2-e_G-e_C)}$. Assumption 2 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 A.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 A.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:

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

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 A.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 A.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 A.6:

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

where the sign follows from Equation A.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:

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

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 A.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 A.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 A.7:

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

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

Proof of part c. Combining Equations A.9 and A.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 A.1 and the second inequality follows because m_c^* strictly decreases in α (see part a of this proof). ■

Figure 1 visually summarizes the different α thresholds and optimal military spending amounts stated in Proposition 1 and Lemmas A.1 and A.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 $\alpha \in (\underline{\alpha}, \overline{\alpha})$, 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 $\alpha \in \big(\hat{\alpha}_s, \hat{\alpha}_c\big)$, 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.

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

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

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

The associated KKT conditions are:

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

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

- If $\alpha < \hat{\alpha}_c$, then one solution is $m = \hat{m}$ with associated multipliers $\lambda_1 = 0$ and $\lambda_2 = -\Big\{1 + \frac{\delta}{1-\delta} \cdot \big[p_c'(\hat{m}, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\big]\Big\}$. Part a of Lemma A.2 implies that $\hat{m} < m_c^*$ in this parameter range, and part a of Lemma A.1 establishes that $1 + \frac{\delta}{1-\delta} \cdot \big[p_c'(m, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\big] < 0$ 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 $1 + \frac{\delta}{1-\delta} \cdot \big[p_c'(m, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\big] < 0$ 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 A.1) with associated multipliers $\lambda_1 = 0$ and $\lambda_2 = 0$. Because part a of Lemma A.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 $1 + \frac{\delta}{1-\delta} \cdot \big[p_c'(m, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\big] < 0$ for any $m < m_c^*$.
- Part a of Lemma A.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 A.1 establishes that $1 + \frac{\delta}{1-\delta} \cdot \big[p_c'(m, \alpha, \beta_c) \cdot (1-\theta) \cdot (2 - e_G - e_C)\big] > 0$ for any $m > m_c^*$.

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

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

The associated KKT conditions are:

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

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

- If $\alpha < \hat{\alpha}_s$, then one solution is $m = m_s^*$ (see Lemma A.1) with associated multiplier $\lambda = 0$. Because part b of Lemma A.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 A.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 A.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 A.2 implies that $\hat{m} > m_s^*$ in this parameter range, and part b of Lemma A.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 A.2 implies the

need to examine three non-trivial parameter ranges: $\alpha \in (\underline{\alpha}, \hat{\alpha}_s)$, $\alpha \in (\hat{\alpha}_s, \hat{\alpha}_c)$, and $\alpha \in (\hat{\alpha}_c, \overline{\alpha})$.

- If $\alpha \in (\underline{\alpha}, \hat{\alpha}_s)$, 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, $\hat{m} + x^*(\mu = 1, \hat{m}) = \hat{m} + x^*(\mu = 0, \hat{m})$. Part 2 of this proof shows that $m_s^* + x^*(\mu = 0, m_s^*) < \hat{m} + x^*(\mu = 0, \hat{m})$, which implies m_s^* is the unique optimal solution.
- If $\alpha \in (\hat{\alpha}_s, \hat{\alpha}_c)$, then parts 1 and 2 of this proof show that $m = \hat{m}$ is the unique optimizer.
- If $\alpha \in (\hat{\alpha}_c, \overline{\alpha})$, 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, $\hat{m} + x^*(\mu = 1, \hat{m}) = \hat{m} + x^*(\mu = 0, \hat{m})$. Part 1 of this proof shows that $m_c^* + x^*(\mu = 1, m_c^*) < \hat{m} + x^*(\mu = 1, \hat{m})$, which implies m_c^* is the unique optimal solution.

4. Show that G cannot profitably deviate to (x, m) such that $R - m - x < 0$. Using the terms from Table 2 yields the following expression for G's lifetime expected utility if C initiates a civil war in period 1:

$$1-e_G+(1-\theta)\cdot(1-e_C)-m-d+\frac{\delta}{1-\delta}\cdot\Big\{\mu^*(m)\cdot\big[1-p_c(m)\big]\cdot\big[(1-\theta)\cdot(1-e_C)+(1-\theta)\cdot(1-e_G)\big]$$

$$+\big[1-\mu^*(m)\big]\cdot\Big[p_s(m)\cdot(1-e_G)+\big[1-p_s(m)\big]\cdot\big[(1-\theta)\cdot(1-e_C)+(1-\theta)\cdot(1-e_G)\big]\Big]\Big\}$$

Split the term in braces into the following:

$$\begin{aligned}&\mu^*(m)\cdot\big[(1-\theta)\cdot(1-e_C)+(1-\theta)\cdot(1-e_G)\big]\\&-\mu^*(m)\cdot p_c(m)\cdot\big[(1-\theta)\cdot(1-e_C)+(1-\theta)\cdot(1-e_G)\big]\\&+\big[1-\mu^*(m)\big]\cdot\big[(1-\theta)\cdot(1-e_C)+(1-\theta)\cdot(1-e_G)\big]\\&-\big[1-\mu^*(m)\big]\cdot p_s(m)\cdot\big[(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)\big]\end{aligned}$$

Combining the first and third lines, simplifying those terms, and simplifying the term on the second line yields:

$$\begin{aligned}&(1-\theta)\cdot(2-e_C-e_G)\\&-\mu^*(m)\cdot p_c(m)\cdot(1-\theta)\cdot(2-e_C-e_G)\\&-\big[1-\mu^*(m)\big]\cdot p_s(m)\cdot\big[(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)\big]\end{aligned}$$

Therefore, the overall expression is:

$$1-e_G+(1-\theta)\cdot(1-e_C)-m-d$$

$$\underbrace{-\frac{\delta}{1-\delta}\cdot\Big\{\mu^*(m)\cdot p_c(m)\cdot(1-\theta)\cdot(2-e_C-e_G)+\big[1-\mu^*(m)\big]\cdot p_s(m)\cdot\big[(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)\big]\Big\}}_{x^*(m)+d}$$

$$+\underbrace{\frac{\delta}{1-\delta}\cdot(1-\theta)\cdot(2-e_C-e_G)}_{\delta\cdot V^G_{s.q.}} \tag{A.11}$$

Subtracting this term from G's lifetime expected utility to buying off C with G's most-preferred transfer that satisfies Equation 3, $R-m-x^*(m)+\delta\cdot V^G_{s.q.}$, equals $2d>0$.

Part b. Equation A.11 shows that G's objective function if $B^*<0$ is an affine transformation of its objective function 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:

$$p_j(m^*)>p_j'(m^*)\cdot\frac{dm^*}{d\theta}\cdot(1-\theta) \tag{A.12}$$

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 A.6 or A.7 as:

$$\frac{\delta}{1-\delta}\cdot\big[-p_j'(m^*)\big]\cdot(1-\theta)\cdot(1-e_i)=1 \tag{A.13}$$

Applying the implicit function theorem to Equation A.13 yields:

$$\frac{dm^*}{d\theta}=\frac{p_j'(m^*)}{p_j''(m^*)\cdot(1-\theta)} \tag{A.14}$$

Substituting Equation A.14 into Equation A.12 and rearranging yields:

$$p_j''(m^*)>\frac{\big[p_j'(m^*)\big]^2}{p_j(m^*)}, \tag{A.15}$$

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 the direct and indirect effects in Equation 9 are each strictly positive. The strict positivity of the direct effect follows directly from assuming $\frac{\partial p_j}{\partial\beta_j}<0$. The strict positivity of the indirect effect follows from assuming $p_j'(m)<0$ and from applying the implicit function to Equation A.13, 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 $p_j''(m)>0$. ∎

B Model Extensions

B.1 Large Prize of Winning

Another argument from the literature is that oil production contributes to civil war by creating a *large prize of winning*. 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.

These claims can easily be addressed through a simple alteration of my model. Assume economic production in each region is Y_i, for $i \in \{G, C\}$, replacing the assumption from the core model that production equals 1. Also assume that an increase in oil production O_i strictly increases Y_i. This extension produces mechanisms identical to the revenue effect and predation effect from the core model—implying that, contrary to existing arguments, a larger prize does not unambiguously raise the equilibrium likelihood of conflict.

In this extension, the equilibrium budget constraint changes from Equation 5 to:

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

with the corresponding equilibrium interior transfer amount changing from Equation 3 to:

$$x^*(m; Y_i) \equiv \frac{\delta}{1-\delta} \cdot \Bigg[\mu^*(m) \cdot p_c(m) \cdot \underbrace{(1-\theta) \cdot \Big[\big(1 - e_G\big) \cdot Y_G + \big(1 - e_C\big) \cdot Y_C\Big]}_{\approx \text{Predation effect (center-seeking)}}$$

$$+ \big[1 - \mu^*(m)\big] \cdot p_s(m) \cdot \underbrace{\Big[(1-\theta) \cdot (1 - e_C) \cdot Y_C - \theta \cdot (1 - e_G) \cdot Y_G\Big]}_{\approx \text{Predation effect (separatist)}}\Bigg] - d \tag{B.2}$$

It is straightforward to see from these two equations that taking the derivative with respect to Y_i would produce mechanisms identical to the revenue effect and to the predation effect in the core model. Therefore, parameterizing production yields the same insights as the core model, contrary to existing arguments that the spoils of predation effect of oil should unambiguously cause civil war.

B.2 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.

B.2.1 Setup

Consider a setup with the following alterations from the core model:

- If C initiates either type of civil war in period 1, with probability $\kappa \in (0,1)$, the war stalemates after the first period. If this occurs, then fighting necessarily occurs again in period 2, but C chooses civil war aims again (this is the only strategic move in period 2 if a non-decisive war occurs in period 1). The possible war outcomes in period 2 are identical to those in the core model.
- C's group size α_t is a function of time. If C does not fight in period 1 or if the war is decisive after period 1, then $\alpha_t = \alpha_1$ for all t. If instead C fights and the war stalemates, then Nature chooses α_2 from a Bernoulli distribution: α_{low} with probability $q \in (0,1)$ and α_{high} with probability $1-q$. 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 try to capture the center.
- The probability of C winning either type of civil war is a function only of α_t, and G does not make an arming choice. Therefore, I will denote C's probability of winning terms as $p_c(\alpha_t)$ and $p_s(\alpha_t)$. This simplification of the core model does not alter the intuitions from this extension because the logic does not depend on G's arming decision.

B.2.2 Analysis

Lemma B.1 restates Lemma 1 for the special case considered here in which G's military capacity is exogenous.

Lemma B.1. *Small groups' optimal civil war aims are separatist and large groups' optimal civil war aims are center-seeking. Formally, there exists a unique threshold $\tilde{\alpha} \in (0,1)$ such that:*

Part a. *If $\alpha < \tilde{\alpha}$, then C's preferred civil war aims are separatist.*

Part b. *If $\alpha > \tilde{\alpha}$, then C's preferred civil war aims are center-seeking.*

This threshold is implicitly defined as:

$$p_c(\tilde{\alpha}) = \frac{(1-\theta)\cdot(1-e_C) - \theta\cdot(1-e_G)}{(1-\theta)\cdot(2-e_G-e_C)} \cdot p_s(\tilde{\alpha})$$

If a war occurs and stalemates after period 1, then C chooses civil war aims in period 2. Its expected utility functions are:

$$E\big[U_C(\text{center},\alpha_2)\big] = 1-(1-\theta)\cdot(1-e_C) - d + \delta\cdot\Big\{p_c(\alpha_2)\cdot V^C_{\text{center}} + \big[1-p_c(\alpha_2)\big]\cdot V^C_{\text{s.q.}}\Big\} \quad \text{(B.3)}$$

$$E\big[U_C(\text{separatist},\alpha_2)\big] = 1-(1-\theta)\cdot(1-e_C) - d + \delta\cdot\Big\{p_s(\alpha_2)\cdot V^C_{\text{sep}} + \big[1-p_s(\alpha_2)\big]\cdot V^C_{\text{s.q.}}\Big\}, \quad \text{(B.4)}$$

for the continuation values defined in Table 2 (recall that fighting is necessarily decisive in period 2). The only necessary alteration is to rewrite α as α_t in those functions. Because this structure is identical to that in the core model, Lemma B.1 characterizes C's optimal civil war aims. Assumption 7 focuses the analysis on the substantively interesting parameter range in which there is a positive probability of C proclaiming either center-seeking $\big(\text{if } \alpha_2 = \alpha_{high}\big)$ or separatist civil war aims $\big(\text{if } \alpha_2 = \alpha_{low}\big)$ following a stalemate in period 1.

Assumption 7. $\alpha_{low} < \tilde{\alpha} < \alpha_{high}$

Following a stalemated war, given the Nature draw over α_2, C's expected continuation value is:

$$V^C_{\text{stale}} = 1 - (1-\theta)\cdot(1-e_C) - d$$
$$+\delta\cdot\Bigg\{q\cdot\Big[p_c(\alpha_{high})\cdot V^C_{\text{center}} + \big[1-p_c(\alpha_{high})\big]\cdot V^C_{\text{s.q.}}\Big] + (1-q)\cdot\Big[p_s(\alpha_{low})\cdot V^C_{\text{sep}} + \big[1-p_s(\alpha_{low})\big]\cdot V^C_{\text{s.q.}}\Big]\Bigg\} \quad \text{(B.5)}$$

This, in turn, enables writing C's expected utility to its three choices in period 1. Note that the utility to accepting is unchanged from the core model.

$$E\big[U_C(\text{accept } x; \alpha_1, \theta)\big] = 1 - \big(1-\theta\big)\cdot\big(1-e_C\big) + x + \delta\cdot V^C_{s.q.} \quad \text{(B.6)}$$

$$E\big[U_C(\text{center}; \alpha_1, \theta)\big] =$$
$$1 - \big(1-\theta\big)\cdot\big(1-e_C\big) - d + \delta\Big\{\kappa\cdot\Big[p_c(\alpha_1)\cdot V^C_{\text{center}} + \big[1-p_c(\alpha_1)\big]\cdot V^C_{\text{s.q.}}\Big] + (1-\kappa)\cdot V^C_{\text{stale}}\Big\} \quad \text{(B.7)}$$

$$E\big[U_C(\text{separatist}; \alpha_1, \theta)\big] =$$
$$1 - \big(1-\theta\big)\cdot\big(1-e_C\big) - d + \delta\Big\{\kappa\cdot\Big[p_s(\alpha_1)\cdot V^C_{\text{sep}} + \big[1-p_s(\alpha_1)\big]\cdot V^C_{\text{s.q.}}\Big] + (1-\kappa)\cdot V^C_{\text{stale}}\Big\} \quad \text{(B.8)}$$

Equations B.7 and B.8 show that adding the additional possibility of stalemates does not alter C's calculus for preferring center-seeking over separatist, and therefore Lemma B.1 characterizes C's optimal civil war aims (for $\alpha = \alpha_1$). Equation B.9 implicitly defines the equilibrium transfer proposal $x^*(\theta)$. This expression can be algebraically rearranged to resemble Equation 3, with the difference that it contains additional terms for the possibility of a stalemate.

$$E\big[U_C(\text{accept } x^*(\theta); \alpha_1, \theta)\big] = \max\Big\{E\big[U_C(\text{center}; \alpha_1, \theta)\big], E\big[U_C(\text{separatist}; \alpha_1, \theta)\big]\Big\} \quad \text{(B.9)}$$

Rather than analyze all possible cases, I highlight the two cases in which we observe C switching civil war aims. As in the core model, low enough θ is necessary to cause C to initiate either type of war.

Proposition B.1. *There exists a unique threshold $\tilde{\theta}$ such that if $\theta < \tilde{\theta}$, then $x^*\big(\tilde{\theta}\big) < R$. If $\theta < \tilde{\theta}$, then:*

> ***Switch from separatist to center-seeking.*** *If $\alpha_1 < \tilde{\alpha}$, the war stalemates after period 1, and $\alpha_2 = \alpha_{high}$, then C initiates a separatist civil war in period 1 and switches to center-seeking aims in period 2.*

Switch from center-seeking to separatist. *If $\alpha_1 > \tilde{\alpha}$, the war stalemates after period 1, and $\alpha_2 = \alpha_{low}$, then C initiates a center-seeking civil war in period 1 and switches to center-seeking aims in period 2.*

B.2.3 Application to Empirical Cases

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 distinct 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 (a 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.[11] 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, merging together distinct separatist movements to create a large center-seeking movement corresponds with an increase in α_t 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 of switching war aims: 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 in the model. 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.[12]

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_t during the conflict, but instead the realization of α_2 was α_{low} rather than α_{high}. Why was Garang's expectation at the outset of the war reasonable? 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

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

[12] 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.

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. In-fighting among southern groups further exacerbated organizational difficulties.[13] 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 that the comprehensive peace agreement of 2005 yielded a "New Sudan," but the agreement lacked provisions that could have generated true national integration (Young, 2005).

Ethiopia and Sudan are exceptional cases. No other intra-state war in my dataset is classified as containing dual civil war aims. 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 separatist aims. This model extension also provides insight into why rebel groups rarely switch war aims or harbor both. Ethiopia combined two rare conditions. First, multiple regions experienced both the 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 13 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.6)—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.

B.3 Does Oil Production Influence Civil War Aims?

In the core model, I characterize C's equilibrium civil war aims in terms of the size of its ethnic group's population size (Proposition 1). Although Equation 2 shows that the amount of production in each region affects C's relative preference for each type of civil war, regardless of the amount of taxable production in C's region relative to G's region, for identical probabilities of winning, C prefers center-seeking to separatism because center-seeking yields strictly more resources to consume in future periods.

Altering the setup creates the possibility that an oil-rich C would prefer separatist aims even if the probability of winning is identical to that for center-seeking. 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

[13] 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.

wars that would have occurred if secession was not possible. However, combining the theoretical logic with empirical evidence casts doubt on this possibility.

B.3.1 Setup

Consider a setup with the following alterations to the core model:

- Denoting G's commitment ability in the status quo regime as $\theta_{\text{s.q.}}$, if C wins a center-seeking civil war, the commitment parameter increases to $\theta_{\text{center}} > \theta_{\text{s.q.}}$. This implies that C's per-period consumption following a successful center-seeking civil war is now $1 - \big(1 - \theta_{\text{center}}\big) \cdot \big(1 - e_C\big) + \theta_{\text{center}} \cdot \big(1 - e_G\big)$. That is, the structure of C's consumption following center-seeking victory is identical to that as in the status quo regime, except θ increases. This contrasts with the setup in the core model in which C captures all revenues following a center-seeking victory, $2 - e_G$. All other future-period terms stated in Table 2 are the same as in the core model.
- For simplicity, I assume that the probability that C wins either type of civil war is fixed at $p \in (0, 1)$. Correspondingly, G's only strategic choice is a transfer amount, and it does not invest in the military. This simplification enables isolating the main finding that arises from changing the structure of C's consumption following a center-seeking victory.

B.3.2 Analysis

Given these alterations, we can write C's expected utility to each of its three options:

$$E\big[U_C(\text{accept } x)\big] = 1 - \big(1 - \theta_{\text{s.q.}}\big) \cdot \big(1 - e_C\big) + x + \delta \cdot V^C_{\text{s.q.}} \tag{B.10}$$

$$E\big[U_C(\text{center})\big] = 1 - \big(1 - \theta_{\text{s.q.}}\big) \cdot \big(1 - e_C\big) - d + \delta \cdot \Big[p \cdot V^C_{\text{center}} + (1-p) \cdot V^C_{\text{s.q.}}\Big] \tag{B.11}$$

$$E\big[U_C(\text{separatist})\big] = 1 - \big(1 - \theta_{\text{s.q.}}\big) \cdot \big(1 - e_C\big) - d + \delta \cdot \Big[p \cdot V^C_{\text{sep}} + (1-p) \cdot V^C_{\text{s.q.}}\Big], \tag{B.12}$$

for:

$$(1-\delta) \cdot V^C_{\text{s.q.}} = 1 - \big(1 - \theta_{\text{s.q.}}\big) \cdot \big(1 - e_C\big) + \theta_{\text{s.q.}} \cdot \big(1 - e_G\big) \tag{B.13}$$

$$(1-\delta) \cdot V^C_{\text{center}} = 1 - \big(1 - \theta_{\text{center}}\big) \cdot \big(1 - e_C\big) + \theta_{\text{center}} \cdot \big(1 - e_G\big) \tag{B.14}$$

$$(1-\delta) \cdot V^C_{\text{sep}} = 1 \tag{B.15}$$

Rather than analyze all possible cases, the substantively interesting findings arise for parameter values in which C prefers either type of civil war over accepting G's maximum transfer. This is true if and only if:

$$\frac{\delta}{1-\delta} \cdot p \cdot \min\Big\{\big(\theta_{\text{center}} - \theta_{\text{s.q.}}\big) \cdot (2 - e_C - e_G),\ (1 - \theta_{\text{s.q.}}) \cdot (1 - e_C) - \theta_{\text{s.q.}} \cdot (1 - e_G)\Big\} - d > 1 - e_G + \big(1 - \theta_{\text{s.q.}}\big) \cdot \big(1 - e_C\big) \tag{B.16}$$

In the core model, if C faces the same probability of winning for center-seeking and separatist civil wars, then it prefers center-seeking. However, this may not be true in the present extension. Separating enables C to consume all production from its territory, whereas it has to share some of these resources with G

if it captures the center (unlike in the core model). C prefers separatism to center-seeking if and only if production in its region is sufficiently easy to tax, which increases the opportunity cost of remaining in the same country as G. The preceding equations show that the inequality is:

$$e_C < 1 - \frac{\theta_{\text{center}}}{1 - \theta_{\text{center}}} \cdot \left(1 - e_G\right) \tag{B.17}$$

High regional oil production corresponds with parameter values in which Equation B.17 holds because Assumption 5 states that e_C strictly decreases in O_C. Proposition B.2 presents the main result.

Proposition B.2. *Assume that Equation B.16 holds. There exists a unique threshold $\tilde{e}_C$ such that if $e_C < \tilde{e}_C$, then a separatist civil war occurs in equilibrium; if and if $e_C > \tilde{e}_C$, then a center-seeking civil war occurs in equilibrium.*

Under the conditions stated in Proposition B.2, oil production causes separatist civil wars to substitute for center-seeking civil wars. If C's region does not produce oil, then we would observe a center-seeking civil war in equilibrium; but if it produces oil, we would instead observe a separatist civil war.

B.3.3 Application to Empirical Cases

Although the model alteration highlights the theoretical possibility that oil can cause separatist civil wars to substitute for center-seeking wars, analyzing empirical cases suggests that the scope conditions in which this occurs are not applicable. Specifically, 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 Panel A of Figure 7, only six involve fighting by groups with at least 10% of their national population share, and all but one are below the rough threshold in Figure 5 of 25% below which groups are more likely to secede than to seek the center. Furthermore, anecdotal considerations about the three largest groups in Panel A of Figure 7 suggest that center-seeking was not a viable option—or, at least, historical precedents favored secession. In addition to Yemen's southerners, discussed in the text, Nigeria's southeast region (Igbo) was governed as a separate territory from the north (which 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.

C Supporting Information for Applying Theory to Mixed Oil Curse

C.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 provide the organizational basis for rebel groups—especially those that seek to separate—than groups 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 (2019*b*) have discussed historical and strategic factors that motivate exclusion along ethnic lines, and the discussion of Assumption 6 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 problem that both center-seeking and separatist rebellions pose. As Section D.6 discusses, territorial concentration is a particularly important factor for enabling a group to launch a separatist civil war.

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 membership in distinct ethnic groups.

C.2 Supporting Information for Assumption 2

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 D.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 C.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 C.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 C.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 C.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. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

D Supporting Empirical Information

D.1 Summary of Motivating Empirical Puzzle: The Mixed Oil-Conflict Relationship

Considerable research analyzes the relationship between oil production and civil war onset, producing a diversity of 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 countries with greater oil wealth tend to experience relatively few center-seeking civil wars (at least, before 2011), oil-rich ethnic groups fight separatist civil wars at elevated rates. Because existing research usually examines these patterns independently, or overlooks them by aggregating civil wars, here I present regression results that establish the motivating empirical puzzle using a common sample and dataset. The country-level specifications relate most closely to those in Paine (2016), and the ethnic group-level specifications to those in Morelli and Rohner (2015) and Hunziker and Cederman (2017). As discussed below, the civil war onset variable that I use here—which draws from Fearon and Laitin's (2003) measure—has advantages over UCDP/PRIO conflict data (used in Hunziker and Cederman 2017 and many related publications) because it uses rigorous criteria for coding civil war "onset" as well as excludes minor conflicts.

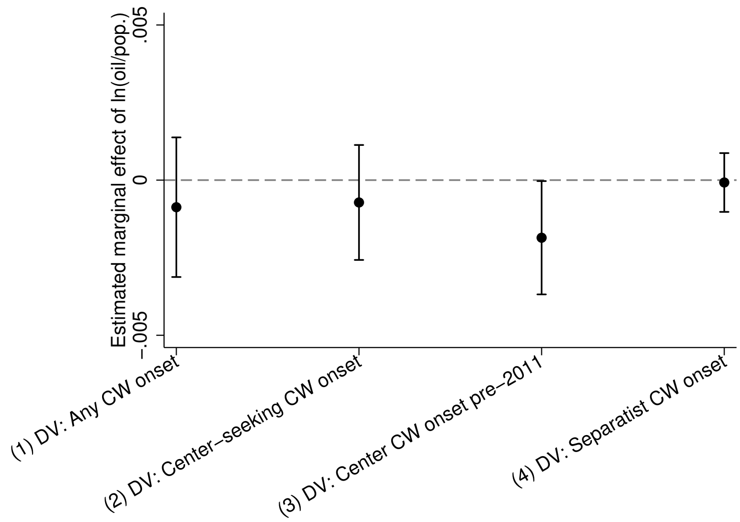
Figure D.1 summarizes a series of logit regressions with country-years as the unit of analysis between 1946 and 2013 among 150 independent non-Western European countries. The civil war onset variables draw from Fearon and Laitin's (2003) dataset on major civil war onsets (at least 1,000 battle deaths; often denoted "major" civil wars), updated through 2013 along with other alterations described below. Every specification in Figure D.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. The dependent variable is any type of civil war onset in model 1, center-seeking civil war onset in models 2 and 3, and separatist civil war onset in model 4.

Empirically, almost all post-1945 civil wars enable relatively unambiguous codings about center-seeking versus separatist goals. For the present civil war variables, I 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: the SPLM/A in Sudan, and the EPRDF and constituent groups in Ethiopia. More frequently, center-seeking and separatist civil wars occur simultaneously within the same *country*—including Angola, Burma, and India—but each *rebel group* in these conflicts pursued either center-seeking or separatist aims but not both. Below I detail how I coded civil war aims, and Section B.2 examines Sudan and Ethiopia in more depth.

Model 1 of Figure D.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, model 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. Model 3 estimates the same specification prior to the Arab Spring in 2011 and shows a large-magnitude and statistically significant negative marginal effect estimate—suggesting, perhaps, a resource blessing.[14] Holding the temporal dependence controls at their means in model 3, 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, model 4 shows no correlation for separatist civil wars.

[14] The theory and subsequent data analysis discuss why the Arab Spring and related events should weaken the negative relationship between oil production on center-seeking civil wars (see the empirical evaluation of Hypothesis 3). Unreported specifications show that no other findings in Figures D.1 and D.2 qualitatively differ when truncating the sample to pre-2011.

Figure D.1: Country-Level Correlations



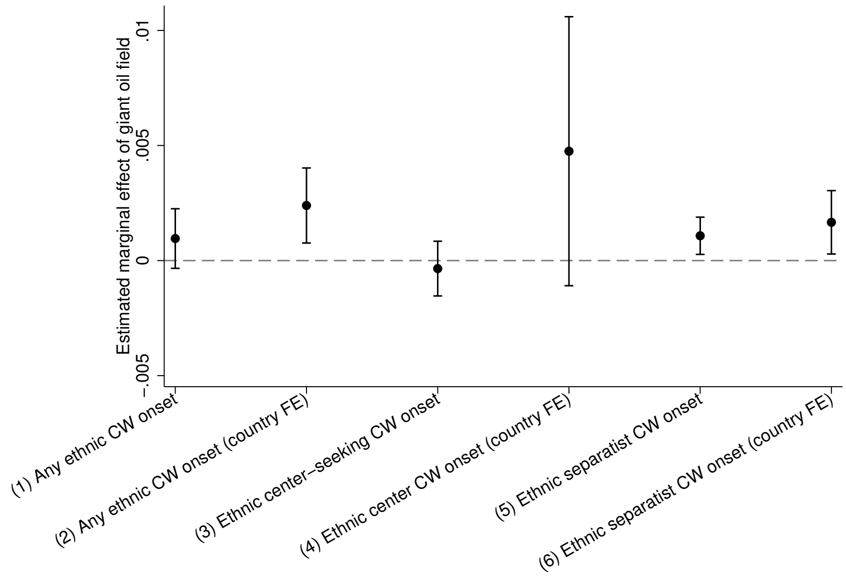
Notes: Figure D.1 shows point estimates for the marginal effect of logged oil production on civil war onset in logit models with 95% confidence intervals. The unit of analysis is country-years. Section D.2 presents the corresponding regression model and table.

Figure D.2 summarizes a similar set of logit regressions, except the unit of analysis is ethnic group-years. 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 as Figure D.1. I 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 models 1 and 2, ethnic center-seeking onset in models 3 and 4, and ethnic separatist onset in models 5 and 6.

Models 1 and 2 of Figure D.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 model 5 specification, holding temporal dependence controls at their means, the annual predicted 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 models 3 and 4.[15]

[15] Model 4 is imprecisely estimated because adding country fixed effects to the logit models drops many ethnic groups (see Table D.2). Unreported estimates from linear models do not alter the statistical significance or lack thereof in any model, but decrease the standard error estimates in model 4.

Figure D.2: Ethnic Group-Level Correlations



Notes: Figure D.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. Section D.3 presents the corresponding regression model and table.

D.2 Country-Level Data and Regressions (Figure D.1)

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

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

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 D.1: Regression Table for Figure D.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 D.1 estimates Equation D.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 civil war data draw from Fearon and Laitin's (2003), updated through 2013. 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 paper), 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 B.2 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.

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, which often leads scholars to code the same long-running, low-intensity civil wars as multiple onsets. Paine (2016, 2019*b*) provides more details on these issues and how Fearon and Laitin's (2003) dataset improves upon these problems.

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.

D.3 Ethnic Group-Level Data and Regressions (Figure D.2)

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

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

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 D.2: Regression Table for Figure D.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 D.2 estimates Equation D.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. Paine (2019*b*) assigns civil wars from Fearon and Laitin's (2003) to EPR ethnic groups in Sub-Saharan Africa, and discusses the advantages of this procedure over existing codings of civil war at the ethnic group level based on translating the ACD's incidence data into onsets. I extended Paine's (2019*b*) coding for the global sample used here. 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.

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), Flanders Marine Institute (2016) provides the maritime boundary spatial data, and Section D.7 discusses differences between onshore and offshore oil. 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.

D.4 Conditional Results for Separatist Civil Wars (Figure 7)

Sample. The sample differs slightly from that in Figure D.2. Because Figure 7 focuses only on separatist civil wars, it excludes ethnic groups without a concentrated territory to minimize heterogeneity in the estimates (see Section D.6).

The conditioning factors examined in Figure 7 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 4 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. I coded an indicator for EPR ethnic groups that reside in territory that is noncontiguous 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.3 is:

$$\ln\left(\frac{Y_{it}}{1-Y_{it}}\right) = \beta_0 + \beta_O \cdot Oil_{it} + \beta_C \cdot Cond_{it} + \beta_{OC} \cdot Oil_{it} \cdot Cond_{it} + \boldsymbol{T}'_{it} \cdot \beta_T + \epsilon_{it}, \qquad \text{(D.3)}$$

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

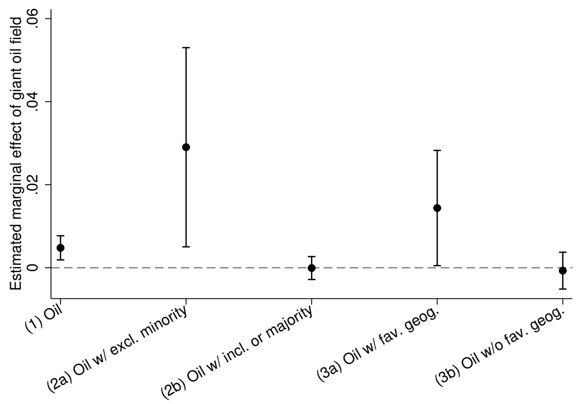
Table D.3: Regression Table for Figure 7

	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.3 estimates Equation D.3. 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.3 and Table D.4 estimate a regression equation identical to Equation D.3 except a country-specific intercept β_j replaces the constant intercept β_0.

Figure D.3: Figure 7 with Country Fixed Effects



Notes: Figure D.3 presents point estimates and 95% confidence intervals for a series of logit regressions described in Equation D.3 with an country-level intercept added, and Table D.4 provides the corresponding regression table.

Table D.4: Regression Table for Figure D.3

	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.4 estimates Equation D.3 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.5 Conditional Results for Center-Seeking Civil Wars (Figure 8)

The government vulnerability variable used in Figure 8 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 paper); 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:

$$\ln\left(\frac{Y_{jt}}{1-Y_{jt}}\right) = \beta_0 + \beta_O \cdot ln(oil/pop)_{jt} + \beta_V \cdot V_{jt} + \beta_{OV} \cdot ln(oil/pop)_{jt} \cdot V_{jt} + \beta_P \cdot ln(pop)_{jt} + \boldsymbol{T}'_{jt} \cdot \beta_T + \epsilon_{jt}, \tag{D.4}$$

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

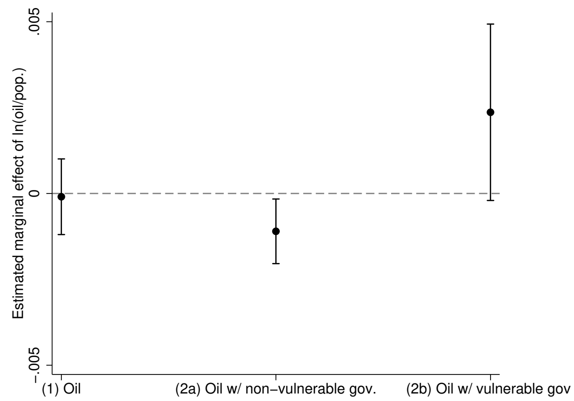
Table D.5: Regression Table for Figure 8

	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.4. 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 D.1).$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

The center-seeking civil war measure used in Figure 8 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, Figure D.4 shows that the marginal effect estimates are similar to those in Figure 8 when only analyzing ethnic center-seeking civil wars. The regression equation for Figure D.4 and Table D.6 is identical to Equation D.4, 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.4: Figure 8 with Ethnic Center-Seeking Civil Wars



Notes: Figure D.4 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.4

	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.4 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.6 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.7 presents two specifications. Using the same ethnic group sample as Figure D.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.7: Territorial Concentration and Civil War Aims

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.7 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.7 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, 2019*a*). 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.

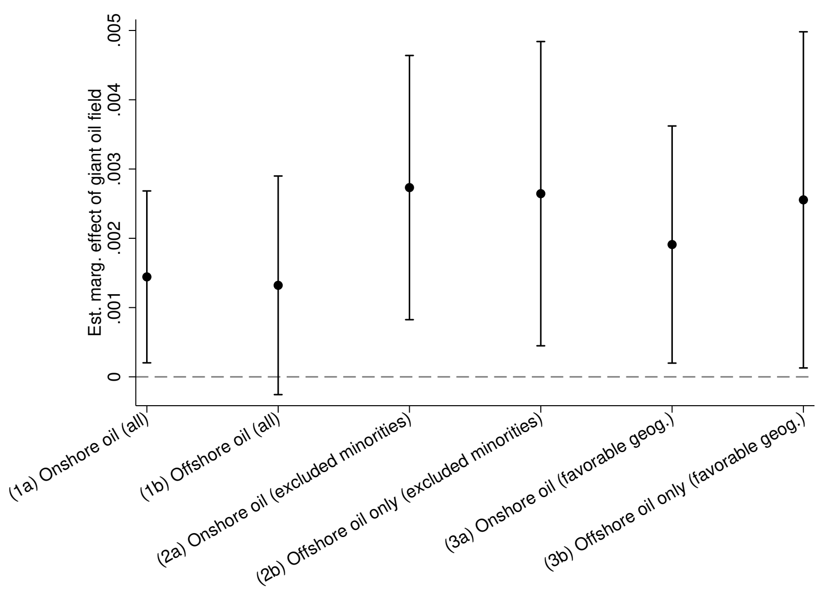
One different implication between the present theory and rebel finance theories that can be assessed statistically arises from distinguishing onshore versus offshore oil. The present theory suggests that this distinction should not matter because both should generate distributional grievances and separatist 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.8) 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.5 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.5 and Table D.8 is:

$$\ln\left(\frac{Y_{it}}{1-Y_{it}}\right) = \beta_0 + \beta_N \cdot Onshore_{it} + \beta_F \cdot Offshore_{it} + \boldsymbol{T}'_{it} \cdot \beta_T + \epsilon_{it}, \qquad \text{(D.5)}$$

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

Figure D.5: Figure 7 with Disaggregated Onshore and Offshore Oil



Notes: Figure D.5 presents point estimates and 95% confidence intervals for a series of logit regressions described in Equation D.5, and Table D.8 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.5 and Table D.8, Column 1 uses the same sample as in Figure 7, and Columns 2 and 3 consider more theoretically relevant samples by subsetting the data, respectively, to either excluded minorities (Hypothesis 1) or favorable separatist geography (Hypothesis 2). 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.5 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 Figure 7). 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.8: Regression Table for Figure D.5

	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.8 estimates Equation D.5. 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.8 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. Yet 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 a large percentage 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).

The theory also provides insight into a deviant aspect of Saudi Arabia: the absence of major separatist civil wars in its 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 Figure 7—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.

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 Hypothesis 1. 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). These failed promises support the presumption 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 (Hypothesis 2) 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), therefore attacking a vulnerable government.

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.5. 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).

Regarding a deviant aspect of the case, 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.

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