Strategic Civil War Aims and the Resource Curse

Jack Paine*

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Abstract

Despite extensive debate, important questions remain regarding if, or under what conditions, oil wealth hinders prospects for societal peace. This article analyzes a conflict bargaining model in which a challenger strategically chooses civil war aims. I apply the model to reconcile two important observations about the conflict resource curse. (1) Empirical evidence of an oil-conflict curse is limited to separatist civil wars, whereas oil-rich countries experience fewer center-seeking civil wars. (2) The fact that governments easily accrue revenues from capital-intense oil production creates countervailing theoretical effects: a conflict-suppressing revenue effect (more money for the government) and a conflict-enhancing predation effect (more for the rebels to capture). In the model analysis, I highlight two reasons that the predation effect of oil is larger in magnitude for regional ethnic challengers that prefer separatist over center-seeking aims. First, a strategic selection effect for ethnic minorities: governments face more severe commitment problems toward small ethnic groups—who prefer separatist over center-seeking civil war. Second, a geography of rebellion effect: oil-funded repression more effectively deters center-seeking challenges than peripheral insurgencies.

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

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

Despite directly boosting per capita wealth and government revenues, many scholars argue that oil production can make countries poorer, less democratic, and more susceptible to civil conflict. This article focuses on the latter claim about a *conflict resource curse*, which scholars have analyzed extensively over the past two decades. Whereas early influential articles established evidence for a conflict resource curse (Fearon and Laitin, 2003; Collier and Hoeffler, 2004), more recent empirical research based on innovative research designs and new data collection yields inconsistent findings for oil (Ross, 2012; Cotet and Tsui, 2013; Dube and Vargas, 2013; Bazzi and Blattman, 2014; Lei and Michaels, 2014; Bell and Wolford, 2015). Despite extensive debate, important questions remain regarding if, or under what conditions, oil wealth hinders prospects for societal peace. Oil production is a commonly cited economic motive for civil war, and assessing its effects is crucial for understanding domestic conflict more broadly.

Two observations, one empirical and one theoretical, motivate the present article. Empirical evidence of an oil-conflict *curse* is limited to separatist civil wars, in which rebels seek to create an autonomous region or independent state. Despite recent critiques of the aggregate relationship, statistical and qualitative evidence consistently demonstrates that ethnic groups in oil-rich regions often take up arms against the government and fight to create an independent state or autonomous region (Ross, 2004*a*,*b*; Collier and Hoeffler, 2005; Sorens, 2011; Morelli and Rohner, 2015; Hunziker and Cederman, 2017), such as the oil-rich Cabinda region in Angola. However, evidence for center-seeking civil wars—in which rebel groups seek to overthrow the government in the capital—points in the opposite direction, as countries with higher per capita oil production experience *fewer* center-seeking civil wars (Paine, 2016). The Arabian Gulf monarchies, where vast oil wealth has coincided with broad societal peace, exemplify this pattern. Thus, one key puzzle about oil and conflict is why *the empirical pattern is mixed and varies by civil war aims*. In Appendix B, I show that these patterns do not merely reflect differences in data sources and statistical models across disparate publications. Using a common sample and dataset, I replicate the mixed oil-conflict pattern by showing a positive relationship between oil and separatist civil war onset (ethnic groups as unit of analysis) and negative relationship with center-seeking civil war onset (country units).

The motivating theoretical observation for this article is that oil production exerts various effects that create countervailing incentives for challengers to initiate a civil war. I juxtapose two mechanisms that each follow from the fact that oil production—an immobile, capital-intensive, point-source resource—is a particularly easy economic activity for governments to tax.[1] On the one hand, oil production yields a *revenue effect* that boosts government revenues. Giving more money to the state should enable it to take actions such as dispensing patronage and building a strong coercive apparatus that lessen the desire and opportunity for societal actors to take up arms. On the other hand, easy government accrual of oil revenues creates a *predation effect* by raising the value of capturing the central government or of seceding. Thus, a second key puzzle about oil and conflict is theoretical: *under what conditions does each mechanism dominate*?

This article provides new insights into causes of domestic conflict, and the conflict resource curse specifically, by showing the intimate connection between these empirical and theoretical puzzles. I first construct and analyze a general formal model of strategic civil war aims, building on canonical models of wars triggered by commitment problems. A government arms endogenously and distributes patronage to a regional challenger who can accept, fight a center-seeking civil war, or fight a separatist civil war. If a rebellion occurs, the probability of success depends in part on each actor's *coercive input*: endowed group size for the challenger, and endogenous military spending for the government. I also assume that the marginal effect of each coercive input is higher for the center-seeking than the separatist contest function, motivated by research on ethnic conflict and the geography of rebellion. For the challenger, numerically small groups face considerable hurdles to capturing the capital, but separatism is often a viable alternative for small groups by facilitating guerrilla tactics and other advantages of fighting in the periphery. For the government, deploying more soldiers or buying additional tanks is more effective when used to defend the capital than to fight in the periphery. Civil war occurs in equilibrium only if the government's ability to commit to future transfers is low, and equilibrium civil war aims depend on the size of the challenger's ethnic group: separatist if small, center-seeking if large, and indifferent if intermediate. Government military spending affects not only the opposition's reservation value for a fixed type of civil war, but also the opposition's preferred civil war aims, which yields these three regions.

I use this foundation for studying strategic civil war aims to conduct comparative statics on an oil parameter. After formalizing the *revenue* and *predation* effects, I derive two implications that account for why the countervailing oil mechanisms align with civil war aims in accordance with the mixed empirical pattern—specifically, why the revenue mechanism should dominate for center-seeking civil wars, and the predation

[1]See Ross (2003), Le Billon (2005, 34), and Paine (2019*a*, 251-52). These properties also distinguish oil from many other types of natural resources.

mechanism for separatist civil wars.

First, a strategic selection effect for ethnic minorities. (a) Although governments can easily tap oil revenues, they retain discretion over where to spend these revenues. Governments distribute more to groups (often defined in ethnic terms) that are represented in the central government, and discriminate against other groups. Historical factors and strategic considerations have, empirically, led governments to often disfavor ethnic *minority* groups in the central government while favoring members of larger ethnic groups. (b) When they rebel, small challengers typically fight to secede. Combining these two factors yields a strategic selection effect whereby ethnic minority groups tend to receive an unfavorable distribution of oil wealth—which makes the predation effect large in magnitude—and their preferred remedy is to fight a separatist civil war. By contrast, larger ethnic groups typically receive a more favorable distribution of oil wealth. This undermines their incentives to rebel—although, if they rebelled, they would seek the center.

Second, a geography of rebellion effect. Additional military spending afforded by oil wealth drives down the challenger's probability of winning a center-seeking civil war more than for a separatist civil war, which creates a discrepancy in the magnitude of the predation effect for each type of civil war. Thus, the main conflict-diminishing effect of oil wealth is more effective against center-seeking campaigns.

After deriving the theoretical logic, I present suggestive empirical evidence that corresponds with additional observable implications of these two theoretical rationales for the mixed oil curse. The conclusion discusses how the general strategic framework for studying civil war aims could be applied to studying how oil wealth affects political regimes and to topics beyond the resource curse.

These findings contribute to extensive debates about the conflict resource curse. The predation effect in my model relates to arguments about how governments create redistributive grievances by heavily taxing oil-producing regions without providing corresponding benefits (Ross 2003, 2004*a*, 2004*b*, 2012; Sorens 2011; Asal et al. 2016; Hunziker and Cederman 2017). However, these accounts do not clearly explain why the oil-induced predation effect would cause *separatist* civil wars only. There are two implicit scope conditions in these arguments. (a) The government cannot commit to a favorable distribution of resources toward some region A—otherwise, the actors could negotiate a settlement rather than engage in costly fighting. (b) The government is unable to use oil revenues to amass considerable coercive strength—otherwise, the predation effect would not exceed the revenue effect in magnitude. These premises imply that if oil production occurs somewhere *outside* of region A within the country, then the government will redistribute little oil wealth to region A. This should create grievances that residents of region A could resolve by capturing the *center*. For example, Collier and Hoeffler (2005, 44) posit that oil production should spark separatist wars because of "the lure of capturing resource ownership permanently if the rebellion is victorious," but this motive should also stimulate center-seeking civil wars. Arguments that can account for the positive empirical relationship with separatist civil wars cannot explain the negative relationship with center-seeking civil wars.

Fewer theories incorporate a variant of the revenue effect. Theories of authoritarian stability, summarized in Ross (2001), focus on rentier effects that facilitate massive patronage distribution and coercion spending, and Paine (2016) argues that this mechanism helps to explain the rarity of center-seeking civil wars in oil-rich countries. However, existing arguments about the revenue effect also cannot explain the empirical and theoretical puzzles that motivate this article—why does greater spending on patronage and armament afforded by more oil revenues not also deter separatist civil wars? Alternative arguments about 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.

Instead of incorporating an analog to the revenue effect, most conflict resource curse theories provide greater insight into the strategic calculus of rebel groups than of governments (although see Colgan 2015). For example, Dal Bó and Dal Bó (2011) enrich the rebels' tradeoff but omit the government as a strategic actor. This is a reasonable simplification for certain empirical settings, but not to provide a general explanation for oil and conflict. In their model of trade and conflict, raising income levels has two effects: increasing conflict incentives because of (using my terminology) the predation effect, but decreasing conflict incentives because of a *labor opportunity effect* in which higher income raises the value of supplying labor to a productive sector relative to an extractive sector. They predict that the net effect of a shock in oil prices raises conflict prospects because capital-intense oil production creates a low opportunity cost to supplying labor to the extractive sector. Dube and Vargas (2013) show supportive evidence for this implication using data on oil shocks during Colombia's civil war. Despite providing a compelling analysis of cases like Colombia in which the government could not prevent rebels from accessing oil finance, as I discuss later, rebel looting of oil is quite rare empirically. Instead, governments almost always capture the overwhelming share of oil revenues, which motivates the empirical relevance of the revenue effect in my model.

This article also offers a novel formal-theoretic contribution by endogenizing civil war aims. 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, 2020*a*). 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. Among other relevant theoretical and empirical contributions, several examine causes of separatist civil wars (Walter, 2009; Lacina, 2015) or of rebel tactics (Kalyvas and Balcells, 2010; Bueno de Mesquita, 2013; Leventoglu and Metternich, 2018; Wright, 2020), but do not address strategic civil war aims.

Two closely related formal models are Morelli and Rohner (2015) and Esteban et al. (2020), which each incorporate center-seeking and separatist civil war aims. However, we differ in our microfoundations for key strategic choices and empirical implications. One difference is that, in my model, the government arms endogenously, and therefore can use oil revenues to drive down the challenger's reservation value to fighting. This anticipates why oil wealth can reduce prospects for conflict. My model otherwise overlaps with elements of the contest functions for each type of civil war in Morelli and Rohner (2015), but the underlying mechanism that drives war differs. In Morelli and Rohner (2015), war can occur along the equilibrium path only because the *government* rather than rebel leaders may get to choose the rebels' war aims. A substantive concern with this setup, however, is that it is unclear how a government can make a group pursue less-preferred aims, for example, forcing a small group to fight for the center if the group would rather secede. This, in turn, implies that small groups should fight center-seeking rather than separatist civil wars, contrary to my implications.[2] In Esteban et al. (2020), group size does not affect the challenger's probability of winning, which is a single exogenous parameter; and challengers decide between seceding and taking the center *after* winning a war. Group size instead affects incentives for war by altering each group member's per-capita transfer. Within larger groups, each group member gains a lower per-capita transfer when out of power, and the government is limited in how much it can offer because holding office confers non-transferrable club-good rents. Consequently, larger groups are more likely to fight *either* type

[2] A distinct key contribution in their article is the introduction of an oil Gini measure that captures the countrywide dispersion of oil production.

of civil war, not just center-seeking. Although their setup creates analytic tractability to generate numerous additional implications, I differ by emphasizing how ethnic group size and government military spending influence the probability of success at each type of war *and* which war aims the challenger prefers.

General Model of Strategic Civil War Aims

This section sets up a general model of endogenous civil war aims. I introduce oil production later when I perform comparative statics exercises. The model features two players, a government and a regionally based challenger, who are naturally conceived as representative agents of distinct ethnic groups. A fixed amount of economic production occurs in regions occupied by each player. The government captures an exogenously determined fraction of the challenger's production as taxes, parameterized by the ease of hiding the economic activity from the government. Each player's objective is to maximize their share of national output. The government's strategic choices are to allocate revenues to its military and offer transfers to the challenger; who can either accept, fight a center-seeking civil war, or fight a separatist civil war. Although a shadow of the future exists, strategic moves occur only in period 1. In future periods, exogenous political institutions determine the government's ability to commit to low taxes and high transfers. At the end of the section, I substantively motivate key assumptions about the civil war contest functions.

Formally, 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 $\delta \in (0, 1)$. In each period, economic production occurs exogenously and equals 1 in each region. Appendix Table A.1 summarizes notation.

Government's Exogenous Revenues and Choices in Period 1

Prior to its strategic moves in period 1, G gains a revenue endowment of $1 - e_G$ from its own region and $1 - e_C$ from C's region, for total revenues:

$$R \equiv 2 - e_G - e_C. \tag{1}$$

Modeling government revenues in this reduced-form way creates tractability for studying other strategic choices, although the economic exit parameters e_i, with $i \in \{G, C\}$, incorporate some important considerations about how various modes of economic production influence government revenues. The period 1 revenues equal total economic production in the country minus revenues lost from the economic exit option by (unmodeled) producers in each region. Economic activities that are easier to either hide from the government or for which actors have a viable flee option correspond with higher e_i, which diminishes G's revenue endowment. Later, when I introduce oil production into the model, I explain how various types of economic production influence the economic exit option.

G strategically allocates its revenues among military spending $m_G \geq 0$ and patronage transfers $x \geq 0$, jointly subject to the budget constraint, $m_G + x \leq R$. 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 agencies, and other repressive apparatuses. The patronage transfer captures a general decision to provide benefits such as private transfers, welfare policies, and public-sector job provision.

Challenger's Choices in Period 1

C decides among accepting G's offer, fighting a center-seeking civil war, and fighting to separate.

Acceptance. Peaceful bargaining in period 1 yields contemporaneous consumption $R - x - m_G$ for G and $e_C + x$ for C, and the status quo regime remains intact in periods $t \geq 2$ with future continuation values described below. Notably, a higher-valued economic exit option for C, e_C, increases how much economic production it retains from its region.

Rebellion. If C rebels in period 1, then its probability of winning depends on which civil war aims it chooses: $\mu \in \{0, 1\}$ equals 1 if C chooses center-seeking aims and 0 if separatist. C wins a center-seeking civil war with probability $p_c(\beta \cdot m_G, m_C) \in (0, 1)$ and a separatist civil war with probability $p_s(\beta \cdot m_G, m_C) \in (0, 1)$. These are smooth functions indexed as $p_j(\cdot)$, for $j \in \{c, s\}$. The coercive input for the government is its military spending, m_G, multiplied by an efficiency parameter, $\beta \geq 1$.[3] C's coercive input is endowed and equals $m_C > 0$. I primarily conceive of m_C as the size of C's ethnic group.

[3]The efficiency parameter β is unnecessary to characterize equilibrium existence, but facilitates the comparative statics exercise that pertains to the geography of rebellion and anticipates the subsequent empirical findings about vulnerable governments.

I impose standard assumptions for the first and second derivatives of each civil war contest function. C's probability of winning strictly decreases in m_G and strictly increases in m_C: $\frac{\partial p_j}{\partial m_G} < 0$ and $\frac{\partial p_j}{\partial m_C} > 0$.[4] Each contest function also exhibits strictly diminishing marginal effects in each input: $\frac{\partial^2 p_j}{\partial m_G^2} > 0$ and $\frac{\partial^2 p_j}{\partial m_C^2} < 0$.[5] Two further assumptions about β follow immediately: higher military efficiency more greatly affects the center-seeking contest function, $-\frac{\partial p_c}{\partial \beta} > -\frac{\partial p_s}{\partial \beta}$; and m_G and β are complements, $-\frac{\partial^2 p_j}{\partial m_G \partial \beta} > 0$.

I assume that the marginal effect of each coercive input is higher for the center-seeking than the separatist contest function, motivated by research on ethnic conflict and the geography of rebellion. Therefore, the functions satisfy the strict monotone likelihood ratio property in each of m_C and m_G:

$$\frac{\partial}{\partial m_G}\left[\frac{p_c(m_G, m_C)}{p_s(m_G, m_C)}\right] < 0 \text{ for all } m_C > 0 \qquad \text{and} \qquad \frac{\partial}{\partial m_C}\left[\frac{p_c(m_G, m_C)}{p_s(m_G, m_C)}\right] > 0 \text{ for all } m_G \geq 0 \quad (2)$$

Additionally, the likelihood ratios at boundary values of m_C satisfy:

$$\frac{p_c(m_G, 0)}{p_s(m_G, 0)} = 0 \qquad \text{and} \qquad \lim_{m_C \to \infty} \frac{p_c(m_G, m_C)}{p_s(m_G, m_C)} = 1 \quad (3)$$

For example, the following functions satisfy all these assumptions:[6]

$$p_c(m_G, m_C) = \frac{m_C}{m_C + m_0 + \beta \cdot m_G}$$

$$p_s(m_G, m_C) = \frac{m_0 + \beta \cdot m_G}{m_C + m_0 + \beta \cdot m_G} \cdot p_0 + \frac{m_C}{m_C + m_0 + \beta \cdot m_G} \quad (4)$$

For center-seeking, this is a ratio-form contest function with an intercept term, $m_0 > 0$, for G's military strength. The separatist function is similar, except there is a lower bound on C's probability of winning, $p_0 \in (0, 1)$,[7] which flattens the slope for each input.

[4]To generate interior optimal military spending amounts, in Appendix Equations A.2 and A.4, I impose additional assumptions on the bounds $\frac{\partial p_j(0, m_C)}{\partial m_G}$ and $\frac{\partial p_j(R, m_C)}{\partial m_G}$.

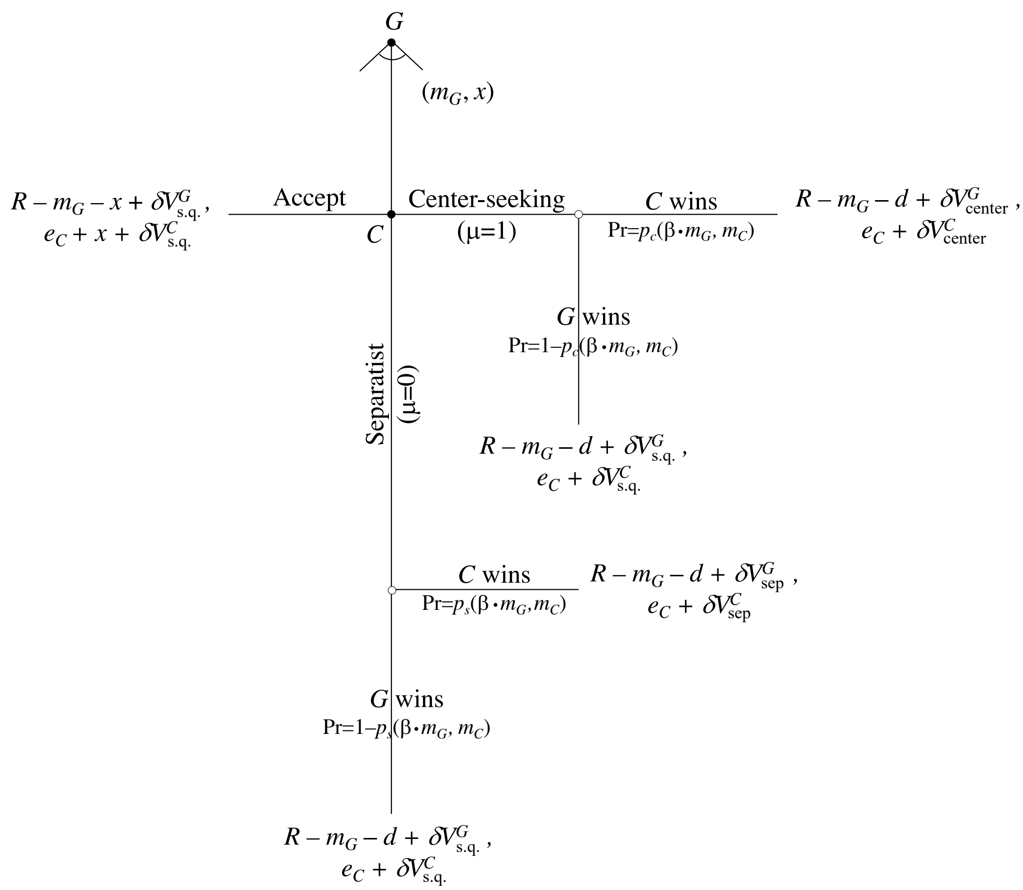
[5]Some results require an additional assumption about the steepness of diminishing marginal returns for m_G (see Appendix Equations A.6, A.8, A.13, and A.14).

[6]Only $\frac{\partial^2 p_j}{\partial m_G \partial \beta} < 0$ does not hold for all parameter values, although I verify that it holds for the parameter ranges shown in Figure 6, which plots outcomes while varying β.

[7]The additional parameters m_0 and p_0 appear only in these example functional forms.

If C initiates a civil war, then in period 1, G consumes $R - m_G - d$ and C consumes e_C. In addition to the sunk cost of arming m_G, G pays an additional cost $d > 0$ in period 1 that captures the destructiveness of fighting.[8] However, a war in period 1 does not impose costs in future periods. If C launches a war that fails, then the status quo regime remains intact in $t \geq 2$. By contrast, success in either type of war yields the future continuation values described below. Figure 1 summarizes strategic actions in period 1.

Figure 1: Strategic Actions in Period 1



PAYOFFS IN FUTURE PERIODS

No strategic moves occur in any period $t \geq 2$.[9] The status quo regime remains intact if either C accepts G's offer in period 1, or C launches but loses a war. In either case, C's and G's respective per-period

[8]The results are qualitatively identical if C incurs a cost to rebelling, assuming that δ is high enough—otherwise, C would lack a credible threat to fight, creating a strategically trivial interaction.

[9]In Appendix C.1, I discuss the role of the infinite time horizon despite modeling no strategic moves after period 1.

future continuation values are $(1-\delta) \cdot V^C_{\text{s.q.}}$ and $(1-\delta) \cdot V^G_{\text{s.q.}}$, and multiplication by $1-\delta$ denotes the per-period average. A political commitment parameter $\theta \in [0,1]$ dictates how much G transfers to C and constrains how much revenue G takes from C's region.[10] High commitment ability corresponds with real-world cases in which members of an outsider faction hold important positions in the cabinet or the ruling party. Specifically, in each future period, G exogenously *transfers* a fraction θ of revenues from its region to C, for a total per-period transfer of $\theta \cdot \big(1-e_G\big)$. Regarding production from C's region, not only does C's economic exit option enable it to retain a fraction e_C of its output, but the political commitment constraint also enables C to retain a fraction θ of its remaining production, $1-e_C$, that the government would otherwise seize. Thus, G accrues exogenous *tax revenues* of $(1-\theta)\cdot(1-e_C)$ from C's region in each period. Overall, if the status quo regime remains intact, then in each future period, G and C respectively consume:

$$(1-\delta) \cdot V^G_{\text{s.q.}} = \underbrace{\big(1-\theta\big) \cdot \big(1-e_G\big)}_{\text{Non-transferred revenues from } G\text{'s own region}} + \underbrace{\big(1-\theta\big) \cdot \big(1-e_C\big)}_{\text{Revenue from } C} = (1-\theta) \cdot (2-e_G-e_C) \quad (5)$$

$$(1-\delta) \cdot V^C_{\text{s.q.}} = \underbrace{e_C + \theta \cdot \big(1-e_C\big)}_{C\text{'s non-taxed income}} + \underbrace{\theta \cdot \big(1-e_G\big)}_{\text{Transfers from } G} = e_C + \theta \cdot (2-e_G-e_C) \quad (6)$$

By construction, θ and e_C substitute for each other. This captures the intuition that a challenger with an ineffective economic exit option can still constrain government taxation if it has political representation in the central government, and a viable economic exit option guards groups that lack effective political representation against government exploitation. Perfect commitment ability ($\theta = 1$) and a perfect exit option ($e_C = 1$) are individually sufficient for G to not extract any revenues from C, whereas no commitment ability ($\theta = 0$) and no exit option ($e_C = 0$) are individually necessary and jointly sufficient for G to predate all of C's production in every future period.

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:

$$(1-\delta) \cdot V^G_{\text{center}} = 0 \quad (7)$$

$$(1-\delta) \cdot V^C_{\text{center}} = 2-e_G \quad (8)$$

[10] Besley and Persson (2011) use a similar approach to modeling exogenous political institutions.

Following successful secession, C consumes all its regional production, but G retains all revenues from the "central" region:

$$(1-\delta) \cdot V^G_{\text{sep}} = 1 - e_G \tag{9}$$

$$(1-\delta) \cdot V^C_{\text{sep}} = 1 \tag{10}$$

Assumptions for Contest Functions

Before solving the model, I motivate two new assumptions about the center-seeking and separatist contest functions. I defer discussing model choices that pertain specifically to oil production—specifically, why only the government endogenously arms and why regional production is normalized to 1—until presenting the comparative statics results.

Ethnic group size. One key assumption for the contest functions is that smaller challengers have a comparative advantage in separatist insurgencies. Specifically, I assume that the positive marginal effect of the challenger's endowed coercive capacity, m_C, on the probability of winning is greater in the center-seeking than in the separatist contest function.

The most natural conception of m_C is the size of C's ethnic group. Although in principle 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). A successful rebellion requires aggrieved actors to create a private military and defeat the state military in battle. Members of small ethnic groups face difficulties to mustering sufficient support against numerically superior government forces to win control of the capital, and face additional difficulties to defending their control of the central government even if they take over. By contrast, greater knowledge of terrain and local support may enable small rebel groups to survive protracted guerrilla wars in the periphery (Jenne, Saideman and Lowe, 2007). 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 them from organizing an ethnic rebellion that could feasibly capture the capital city of Luanda.

Figure 2 presents empirical patterns consistent with this assumption based on a broad global sample of ethnic groups (see Appendix B). In Panel A, the unit of analysis is all ethnic group-years in the sample, whereas

Panel B restricts the sample to group-years with ethnic civil war onset. The horizontal axis is ethnic group fraction of the population, with five bins of roughly equal size.[11] The vertical axis in Panel A presents the frequency of ethnic civil war onset, disaggregating wars into center-seeking and separatist, whereas Panel B shows the fraction of civil war onsets with separatist aims.

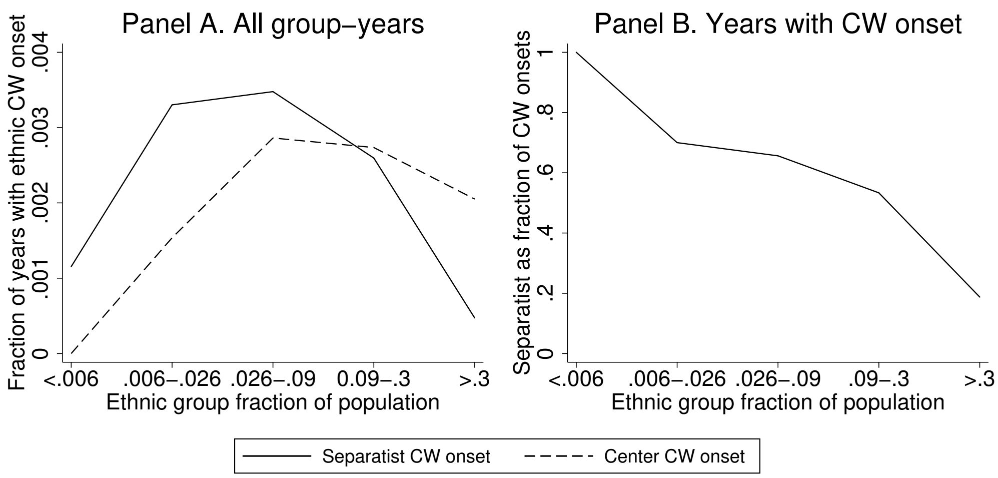
Existing research demonstrates that larger ethnic groups positively covary with *any* civil war onset (Buhaug et al. 2008, 544; Cederman et al. 2013, 73). I partially replicate this finding by showing that moving from the first to the third quantile (<0.6% to 2.6-9.0% of the national population) raises the propensity of both types of civil war. Important for the present purposes, the increase is larger in magnitude for center-seeking civil wars because very small ethnic groups almost never initiate center-seeking civil wars. However, for larger increases in ethnic group size, the frequency of either type of civil war decreases—and the frequency of separatist civil wars falls faster than that for center-seeking, which Panel B shows clearly. In my sample, only two ethnic majority groups fought separatist civil wars: Bengalis in Pakistan in 1971, and Southerners in Yemen in 1994.[12]

Ethnic group size is not destiny for controlling the government. Among the sample used in Figure 2, in 15.7% of country-years, the ruling ethnic group was small (20% of the population or less). The vast majority of these regimes, however, did not come to power by winning a center-seeking civil war. As I discuss in Appendix D.2, only in eight cases have members of small ethnic groups won a center-seeking rebellion and established a regime governed by members of their ethnic group. Instead, regimes governed by small ethnic groups have gained power via diverse alternative means, including coups d'etat (19 of the 59 small ethnic group regimes), decolonization (13 cases), and elections (nine cases).

[11]Ethnic group size is heavily left-skewed, which inhibits interpreting even flexible fits of the raw data (see Appendix Figure B.2). This motivates averaging over five bins with a similar number of observations.

[12]In general, it is difficult to precisely distinguish evidence for assumptions from evidence for equilibrium implications (Lorentzen, Fravel and Paine, 2017). These plots support the *assumption* that larger group size increases the feasibility of center-seeking relative to separatist civil wars. Yet civil wars are themselves an equilibrium *outcome* in my model. Later, I discuss how members of larger ethnic groups typically have greater access to the central government in the form of controlling the executive or lucrative cabinet positions. This countervailing factor for particularly large groups might help to explain why they fight fewer wars despite (presumably) having greater ability to win.

Figure 2: Ethnic Group Size and Civil War Aims



Notes: Figure 2 summarizes the relationship between ethnic group fraction of the population and ethnic civil war onset (disaggregated by civil war aims). I group observations into five bins of roughly equal size and plot the average value for each (N=31,891, which yields about 6,378 observations per bin). Appendix B provides additional data details on the full sample used in Panel A, and the sample in Panel B contains only group-years with an ethnic civil war onset.

Geography of rebellion. Another key assumption in the contest functions is that higher government military spending is more effective against center-seeking campaigns: the magnitude of the marginal effect of m_G on decreasing the rebel's probability of winning a center-seeking civil war exceeds the corresponding magnitude for separatism. This assumption draws from research on how geography affects the projection of state power. If the government builds military strongholds, deploys tanks, and sends a large army into the field, then rebel groups should face great difficulties defeating the government in the capital. However, these same military tools are less effective against 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 stand a chance against strong regimes only by fighting in areas that minimize power differential.

Divergent military aims of center-seeking and separatist campaigns also support this logic. Whereas center-seeking rebels usually need to actively engage the government to capture specific targets, separatist rebels can use classic irregular guerrilla tactics such as hit-and-runs and ambushes to avoid direct confrontation with a larger and better-equipped government military. Analyzing data from Kalyvas and Balcells (2010) supports 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. Adding an indicator for separatist aims to their regression specifications yields a negative and statistically significant correlation between separatism and conventional conflicts (Appendix D.3).

EQUILIBRIUM ANALYSIS

If we fix the government's military spending and the challenger's civil war aims, then the mechanisms are standard for conflict bargaining models: the government chooses a transfer amount that holds the challenger down to its fighting reservation value, and, in equilibrium, fighting occurs only if the government has minimal ability to commit to low taxes and high transfers in the future. However, incorporating endogenous civil war aims yields new considerations. The challenger faces the following tradeoff: although winning a center-seeking civil war delivers a larger prize (all the country's output), winning a separatist civil war may be more feasible. The government takes this into account when choosing military spending, which also influences the challenger's optimal civil war threat. In equilibrium, the challenger's preferred civil war aims depend on the size of the challenger: separatist if small, center-seeking if large, and indifferent if intermediate.

Formally, I solve backward on the period 1 subgame to characterize subgame perfect Nash equilibria. Appendix A proves every formal statement.

CHALLENGER: ACCEPT OR REBEL?

For fixed military spending m_G, C accepts with probability 1 any patronage offer x that weakly exceeds the expected utility to fighting its preferred type of civil war, and accepts with probability 0 otherwise:[13]

$$\underbrace{e_C + x + \delta \cdot V^C_{\text{s.q.}}}_{\mathbb{E}[U_C(\text{accept})]} \geq \begin{cases} e_C + \delta \cdot \Big[p_c(m_G) \cdot V^C_{\text{center}} + \big(1 - p_c(m_G)\big) \cdot V^C_{\text{s.q.}}\Big] & \text{if } \mu^* = 1 \\ e_C + \delta \cdot \Big[p_s(m_G) \cdot V^C_{\text{sep}} + \big(1 - p_s(m_G)\big) \cdot V^C_{\text{s.q.}}\Big] & \text{if } \mu^* = 0 \end{cases} \tag{11}$$

If C prefers center-seeking over separatist civil war (given G's actions), then $\mu^* = 1$; and otherwise $\mu^* = 0$. In equilibrium, as shown next, C's optimal civil war aims are a function of m_G. We can rewrite Equation

[13]As is standard, any equilibrium requires C to accept with probability 1 if indifferent because otherwise G faces an open set problem when deciding x.

11 to state that C accepts if and only if $x \geq x^*(m_G)$, for:

$$x^*(m_G) \equiv \delta \cdot \Big[\underbrace{\mu^*(m_G) \cdot p_c(m_G) \cdot \big(V^C_{\text{center}} - V^C_{\text{s.q.}}\big)}_{\text{Center-seeking}} + \underbrace{\big(1 - \mu^*(m_G)\big) \cdot p_s(m_G) \cdot \big(V^C_{\text{sep}} - V^C_{\text{s.q.}}\big)}_{\text{Separatist}} \Big], \qquad (12)$$

and:[14]

$$V^C_{\text{center}} - V^C_{\text{s.q.}} = (1 - \theta) \cdot (2 - e_G - e_C) > 0 \qquad (13)$$

$$V^C_{\text{sep}} - V^C_{\text{s.q.}} = \underbrace{(1 - \theta) \cdot (1 - e_C)}_{\text{Secession eliminates taxes}} - \underbrace{\theta \cdot (1 - e_G)}_{\text{Secession eliminates central transfers}} \qquad (14)$$

These equations highlight why, if we fix the challenger's civil war aims, the mechanisms are standard for conflict bargaining models. For C, the expected benefit of rebelling is that it can dictate policy in the future, hence consuming either V^C_{center} or V^C_{sep} instead of $V^C_{\text{s.q.}}$. The opportunity cost of rebelling is that C does not receive a transfer, x, in period 1. Higher military spending m_G decreases the expected utility to rebelling by lowering the probability of success (Equation 12), and higher government commitment ability θ increases the opportunity cost of rebelling by raising the value of $V^C_{\text{s.q.}}$ (Equations 13 and 14). To focus on substantively interesting parameter ranges, I assume that G's commitment ability is not so high that C lacks a viable threat to secede, which is possible because seceding eliminates transfers it would receive from the center under the status quo regime. That is, I assume Equation 14 is strictly positive.

Assumption 1 (Credible separatist threat)**.**

$$\theta < \frac{1 - e_C}{2 - e_G - e_C} \in (0, 1)$$

Challenger's Preferred Civil War Aims

A novel consideration in this model is to assess C's preferred outside option. C's expected utility is higher upon winning a center-seeking than separatist rebellion, $V^C_{\text{center}} > V^C_{\text{sep}}$. Seceding enables C to retain all future economic production in its region, but taking the center carries the additional benefit of capturing all future taxable output from G's region.[15] However, if $p_s(m_G, m_C)$ sufficiently exceeds $p_c(m_G, m_C)$, then

[14]Equations 13 and 14 follow directly from Equations 6, 8, and 10.

[15]Appendix C.4 changes the setup so that C may strictly prefer to win a separatist rather than center-seeking civil war. In the revised setup, if C captures the center, then in future periods it shares spoils with

C's binding fighting threat is separatist. Comparing C's expected utility to each type of war enables solving for C's preferred outside option, given G's military spending m_G:

$$\mu^*(m_G) = \begin{cases} 0 & \text{if } \frac{p_c(m_G, m_C)}{p_s(m_G, m_C)} < \pi_s \\ \{0, 1\} & \text{if } \frac{p_c(m_G, m_C)}{p_s(m_G, m_C)} = \pi_s \\ 1 & \text{if } \frac{p_c(m_G, m_C)}{p_s(m_G, m_C)} > \pi_s, \end{cases} \tag{15}$$

and $\pi_s \equiv \frac{(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)}{(1-\theta)\cdot(2-e_G-e_C)} < 1$ is the fraction of spoils that C wins from seceding rather than capturing the center.[16]

Lemma 1 demonstrates that m_C and m_G determine the binding civil war constraint. Higher m_C raises $\frac{p_c(m_G, m_C)}{p_s(m_G, m_C)}$, which pushes C toward center-seeking over secession; and higher m_G decreases $\frac{p_c(m_G, m_C)}{p_s(m_G, m_C)}$, which deters C from fighting for the center (Equation 2). These assumptions combined with the boundary assumptions (Equation 3) generate two regions in which C's preferred outside option is independent of G's actions—separatist if m_C is small (part a) and center-seeking if m_C is large (part c)—and an intermediate region of m_C values in which G's military spending influences the type of civil war that C prefers: center-seeking if m_G is low and separatist if m_G is high (part b).

Lemma 1 (Preferred civil war aims)**.** *Unique threshold values* $\overline{m}_C \in \mathbb{R}_{++}$, $\underline{m}_C \in \big(0, \overline{m}_C\big)$, *and* $\hat{m}_G(m_C) \in (0, R)$ *exist such that:*

Part a. *If* $m_C < \underline{m}_C$*, then* $\mu^*(m_G) = 0$ *for all* $m_G \geq 0$.

Part b. *If* $m_C \in (\underline{m}_C, \overline{m}_C)$*, then:*

- *If* $m_G < \hat{m}_G(m_C)$*, then* $\mu^*(m_G) = 1$.
- *If* $m_G > \hat{m}_G(m_C)$*, then* $\mu^*(m_G) = 0$.
- $\hat{m}_G(m_C)$ *strictly increases in* m_C.

Part c. *If* $m_C > \overline{m}_C$*, then* $\mu^*(m_G) = 1$ *for all* $m_G \leq R$.

---

the former governing actor.

[16]This expression follows from substituting the continuation values into the expected utility terms for each type of war, shown on the right-hand side of Equation 11.

GOVERNMENT'S STRATEGIC CHOICES

G chooses x and m_G in period 1 to maximize its lifetime expected utility. For fixed m_G, a necessary condition is that x satisfies Equation 12 with equality, a standard condition in conflict bargaining models. By contrast, *strictly* satisfying the inequality would entail transferring more than needed to buy peace; and in Appendix A, I discuss why (if possible) G satisfies Equation 12 and prevents a rebellion (see the discussion just prior to the proof of Proposition 1).

Military investment decreases C's probability of winning, yielding a *direct* effect that lowers C's reservation value, $x^*(m_G)$. If we fix C's preferred outside option, then G faces a straightforward optimization problem to maximize its lifetime expected utility, which is equivalent to minimizing expenditures in period 1. However, m_G also *indirectly* affects G's utility by influencing C's preferred civil war aims (see part b of Lemma 1), a novel component of my model. Equation 16 presents G's maximization problem (assuming it is possible to buy off C), which incorporates the direct and indirect effects. This optimization problem yields a unique optimal arming amount for each value of m_C.[17]

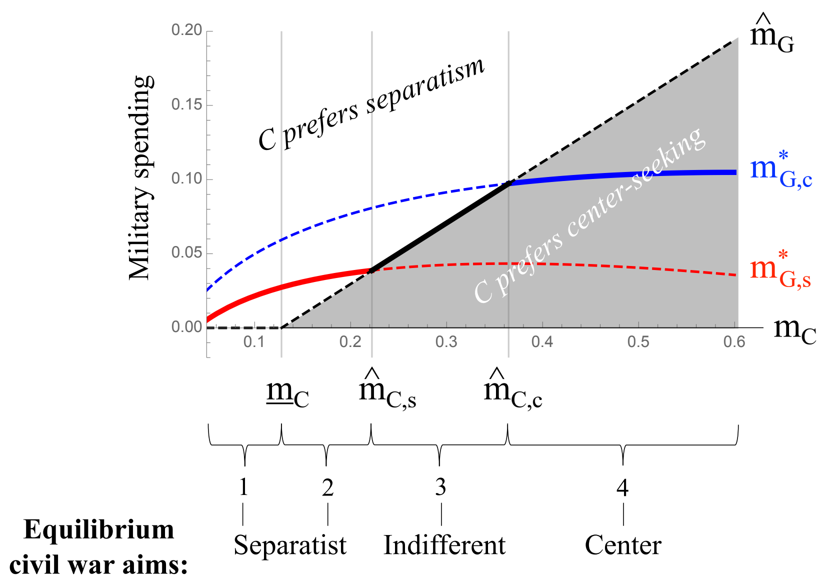
$$m_G^* \equiv \arg\max \Bigg\{ \underbrace{\max_{m_G \in [0, \hat{m}_G(m_C)]} R - m_G - x^*(\mu = 1, m_G) + \delta \cdot V_{\text{s.q.}}^G}_{\text{Optimal arming against center-seeking constraint, } \mu=1}, \underbrace{\max_{m_G \geq \hat{m}_G(m_C)} R - m_G - x^*(\mu = 0, m_G) + \delta \cdot V_{\text{s.q.}}^G}_{\text{Optimal arming against separatist constraint, } \mu=0} \Bigg\} \tag{16}$$

We can narrow the possible solutions to a set with three elements. The first two are interior optima. For the first term in Equation 16, I denote as $m_{G,c}^*$ the optimal interior military spending amount if C's civil war aims are fixed at center-seeking (see part a of Appendix Lemma A.1). For the second term in Equation 16, I denote as $m_{G,s}^*$ the optimal interior military spending amount if C's civil war aims are fixed at separatist (see part b of Appendix Lemma A.1). The third possibility is the boundary value $\hat{m}_G(m_C)$ at which C is indifferent between civil war aims (see part b of Lemma 1). Restrictions on the marginal effect of m_G rule out corner solutions $m_G = 0$ or $m_G = R$ (Appendix Equations A.2 and A.4).

[17] Regarding the inclusive $\hat{m}_G$ boundary for the two constituent optimization problems, combining Equation 15 and Lemma 1 shows that $\mu^*(\hat{m}_G) \in \{0, 1\}$. C's indifference over its civil war aims at $\hat{m}_G$ implies that G's expenditures $\hat{m}_G + x^*(\mu, \hat{m}_G)$ are constant in $\mu \in [0, 1]$.

In equilibrium, C's binding civil war threat is separatist if m_C is small, center-seeking if m_C is large, and C is indifferent if m_C is intermediate. Figure 3 visualizes the intuition, and Appendix Figure A.1 depicts the equilibrium offer and budget surplus for these parameter values. Figure 3 plots the three possible optimal choices of m_G as a function of m_C: $m^*_{G,c}$ in blue, $m^*_{G,s}$ in red, and $\hat{m}_G$ in black. Each curve is solid for parameter values at which it equals the equilibrium amount of military spending, and dashed otherwise. If (m_C, m_G) lies in the gray region, then C prefers center-seeking to separatist civil war, and vice versa in the white region. The gray region is equivalent to the parameter range described in Lemma 1.

Figure 3: Equilibrium Military Spending and Civil War Aims



Notes: Figure 3 uses the functional forms for the contest functions from Equation 4 and the following parameter values: $\theta = 0.3$, $e_C = 0.5$, $e_G = 0.9$, $\delta = 0.6$, $\beta = 3.8$, $m_0 = 0.2$, and $p_0 = 0.2$. For these parameter values, $\overline{m}_C = 1.22$ (not depicted).

In region 1, G's optimization problem is straightforward because $m_C < \underline{m}_C$ implies that C prefers separatist over center-seeking aims independently of m_G (part a of Lemma 1). Thus, to solve Equation 16, we need only to consider the direct effect. G chooses $m^*_{G,s}$ because, by definition, this is the choice of m_G that maximizes G's utility when C's binding outside option is separatism. Conversely, for $m_C > \overline{m}_C$, C prefers center-seeking over separatist aims independently of m_G (part c of Lemma 1; not depicted in Figure 3, although given the numbering scheme, this would be region 5). Clearly, G chooses $m^*_{G,c}$ in that range.

For intermediate values $m_C \in \left(\underline{m}_C, \overline{m}_C\right)$, we need to also consider the indirect effect of m_G on C's preferred outside option. Higher m_G enhances C's preference for separatist over center-seeking aims because government military spending is less effective at driving down the probability of a successful separatist insurgency (part b of Lemma 1). In region 2, m_C exceeds—but only slightly—the threshold $\underline{m}_C$ below which C prefers separatism to center-seeking for *any* choice of m_G. Thus, in region 2, C prefers separatism to center-seeking unless m_G is *really* low, and spending $m^*_{G,s}$ on the military is high enough that C prefers separatism. The strategic actions in regions 1 and 2 are identical: G chooses $m_G = m^*_{G,s}$ and C's binding civil war threat is separatist. The figure shows that region 2 ends at $m_C = \hat{m}_{C,s}$ (see Appendix Lemma A.2), the point at which the red curve intersects the black line.

The logic for region 4 is similar. Here, m_C is lower than—but only slightly—the threshold $\overline{m}_C$ above which C prefers center-seeking to separatism for *any* choice of m_G. Thus, in region 4, C prefers center-seeking to separatism unless m_G is *really* high, and $m_G = m^*_{G,c}$ is low enough that this choice of military spending does not deter C from preferring center-seeking. The strategic actions in regions 4 and (not pictured) 5 are identical: G chooses $m_G = m^*_{G,c}$ and C's binding civil war threat is center-seeking. The figure shows that region 4 ends at $m_C = \hat{m}_{C,c}$ (see Appendix Lemma A.2), the point at which the black line intersects the blue curve.

The logic for regions 2 and 4 anticipates the surprising result in region 3: G chooses $\hat{m}_G$, which means that in equilibrium, C is indifferent between war aims. *By choosing an interior-optimal amount of military spending for a particular type of rebellion, G causes C to prefer the other type of rebellion.* In region 3, $m^*_{G,s}$ is low enough that if G spends this amount on the military, then C's binding rebellion aims are center-seeking (red curve is below black line); and $m^*_{G,c}$ is high enough that if G spends this amount on the military, then C's binding rebellion aims are separatist (blue curve is above black line). Given the inability to achieve an interior optimum, G wants to set the minimum level of m_G that induces C to prefer separatist—or, equivalently, the maximum level of m_G that induces C to prefer center-seeking. As Equation 16 shows, this is $\hat{m}_G$, which makes C indifferent between civil war aims. Lemma 2 summarizes this result.

Lemma 2 (Equilibrium military spending and civil war aims)**.** *Unique thresholds $\hat{m}_{C,s}$ and $\hat{m}_{C,c}$ exist that satisfy $\underline{m}_C < \hat{m}_{C,s} < \hat{m}_{C,c} < \overline{m}_C$, for $\underline{m}_C$ and $\overline{m}_C$ defined in Lemma 1, such that for m^*_G defined in Equation 16:*

Part a. *If $m_C < \hat{m}_{C,s}$, then $m^*_G = m^*_{G,s}$ and $\mu^* = 0$.*

Part b. *If $m_C \in [\hat{m}_{C,s}, \hat{m}_{C,c}]$, then $m^*_G = \hat{m}_G$ and $\mu^* \in \{0, 1\}$.*

Part c. *If $m_C > \hat{m}_{C,c}$, then $m^*_G = m^*_{G,c}$ and $\mu^* = 1$.*

EQUILIBRIUM

Civil war occurs in equilibrium if G would need to spend more than its entire budget in period 1 to buy off C. The possibility of C rebelling along the equilibrium path arises because of G's limited commitment to offer transfers and to not overtax in future periods when C cannot fight. Formally, peaceful bargaining is possible in equilibrium if and only if the budget constraint in period 1, $B^* \geq 0$, is satisfied, for:

$$B^* \equiv R - m_G^* - x^*, \tag{17}$$

with R defined in Equation 1; m_G^* characterized in Lemma 2; and (with slight abuse of notation), $x^* \equiv x^*(m_G^*)$, for $x^*(m_G)$ defined in Equation 12. To see why low commitment ability θ is necessary for equilibrium fighting, suppose instead $\theta = 1$. Then C pays no taxes and receives maximum transfers in every future period in the status quo regime—identical to a successful center-seeking civil war. Additionally, $m_G^* = 0$, and Equation 17 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 17 may be violated. Proposition 1 characterizes the subgame perfect Nash equilibrium strategy profile, which is unique with respect to payoff equivalence.

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

> ***Part a.*** *Suppose $B^* \geq 0$. G chooses $(x, m_G) = (x^*, m_G^*)$. C accepts any $x \geq x^*(m_G)$. If $x < x^*(m_G)$, then C rebels and Lemma 1 characterizes C's optimal war aims as a function of m_G. Along the equilibrium path, C accepts x^*.*
>
> ***Part b.*** *Suppose $B^* < 0$. G chooses $m_G = m_G^*$, and is indifferent among all feasible x. C rebels in response to any offer, and Lemma 1 characterizes C's optimal war aims as a function of m_G. Along the equilibrium path, C rebels and Lemma 2 characterizes civil war aims.*

COMMENT ABOUT INDIFFERENCE REGION FOR CIVIL WAR AIMS

One surprising implication of the model is the intermediate region of m_C values in which, in equilibrium, G chooses to make C indifferent between civil war aims. Although mixing regions are sometimes dismissed as uninteresting technical impediments in models, they can carry important empirical implications (Gibilisco, 2020*b*). I mostly leave this as an open question for future research on strategic civil war aims because, for the remainder of the analysis, I assume that m_C lies in parameter ranges in which G chooses an interior optimal military spending amount, $m_C \in (0, \hat{m}_{C,s}) \cup (\hat{m}_{C,c}, \infty)$. However, in two empirical cases in my dataset, a rebel group switched aims during its rebellion: EPRDF in Ethiopia and SPLA in Sudan. Appendix C.3 discusses these cases in the context of a model extension with multiple war periods in which the rebel group can switch aims in between periods, although these cases are also consistent with equilibrium mixing.

Countervailing Effects of Oil Production

Oil production generates countervailing pressures for a civil war to occur along the equilibrium path. In the real world, governments' ability 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 decreases incentives for the challenger to initiate a civil war. However, the easy-tax properties of oil production also create a *predation effect* that heightens the challenger's desire to rebel—either to eliminate predatory government taxation of its oil production or for C to itself predate oil produced in the government's region. These effects are (with one exception) invariant to the challenger's civil war aims, and in the next section I consider the interaction between these two mechanisms and civil war aims.

Incorporating Oil Production into the Model

To facilitate comparative statics on oil production, I introduce the following new parameters and assumptions. Oil production constitutes a fraction $O_i \in [0, 1)$ of total economic output in each region (which equals 1), for $i \in \{G, C\}$. Oil production is O_G in G's region ("government oil") and O_C in C's region ("regional oil"). Another new parameter, γ, indicates regions: $\gamma = 0$ for G's region and $\gamma = 1$ for C's region.

In the real world, oil production facilitates easy government taxation. I capture this in the model by assuming that oil production lowers the economic exit option parameter:

$$\frac{de_i}{dO_i} < 0. \tag{18}$$

Oil is a point-source resource because it is "exploited in small areas by a small number of capital-intensive operators" (Le Billon, 2005, 34). Ross (2012, 46) shows the capital-to-labor ratio in the oil and gas industry exceeds that in any other major industry for U.S. businesses operating overseas (see also Ross 2003). Because governments can relatively easily enforce military control over oil fields—relative to output produced in a non-concentrated area—extracting this point-source resource requires minimal bureaucratic capacity (Dunning, 2008, 40). Local producers cannot threaten to move immobile oil reserves outside the government's reach if taxed at unfavorable rates. Paine (2019*a*) compares oil production to other types of economic activities that producers can more easily hide from the government, concluding that the oil production yields a particularly low exit option for local producers, i.e., low e_i.[18] By contrast, resources like alluvial diamonds correspond with higher e_i. Their geographic dispersion is wider and their mining process is labor intensive, which creates easier opportunities for societal actors to loot these resources.

These key features of oil production also motivate why—in addition to making the model more tractable—only the government makes an endogenous arming choice, whereas the challenger's military capacity is endowed. Consequently, only the government can use oil wealth to build its military capacity. In the real world, regardless of the location of a country's oil wealth, governments are better-situated than societal groups to gain control over the preponderance of oil revenues because oil production is highly capital intensive and fixed in location. Thus, the government but not societal groups can use oil revenues to fund a bigger military. Some scholars argue 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; Dube and Vargas, 2013). Although this has occurred in some exceptional cases—e.g., ISIS in Iraq and Syria, the Niger Delta in the 2000s, and Colombia—overall, rebel groups have rarely engaged in large-scale looting of oil production to finance an insurgency (Colgan 2015; Paine 2016, 2019*a*).

A final notable assumption is that total economic production in each region equals 1. Normalizing *total* production means that the only effect of oil production in the model arises from Equation 18. Many scholars instead focus on the large absolute size of oil production—hence creating a lucrative prize to capture—rather than specifically its effect on producers' economic exit option. In Appendix C.2, I parameterize total production in each region and assume that producing oil corresponds with higher overall production. Contrary to arguments that the large-prize mechanism unambiguously makes conflict more likely, I instead show that this mechanism creates countervailing effects that are qualitatively similar to the revenue and

[18]In that article, I explicitly model a strategic choice for the challenger to either pay taxes to the government or exit from the formal economy, and I directly model parameters that express the deleterious effect of regional oil on the challenger's economic exit option. Given the new moving parts I add here to study strategic civil war aims, I omit these microfoundations.

predation effects derived in the core model.

Revenue and Predation Effects

An increase in oil production exerts two effects on B^*, defined in Equation 17. First, a *revenue effect*. Because oil enables greater tax revenues than other economic activities (Equation 18), an increase in either government oil 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 is able to meet the budget constraint. Formally, this effect equals:

$$\textbf{Revenue effect: } \frac{dR}{dO_i} = -\frac{de_i}{dO_i} > 0. \tag{19}$$

Second, the same easy-revenue properties of oil production create a *predation effect* that raises C's incentives to fight. This is the top row on the right-hand side of Equation 20, which is strictly positive.[19] Oil diminishes the ability of (unmodeled) producers in G's region to exit the formal economy, which boosts the revenues from G's territory in each period, $1-e_G$. Winning a center-seeking war enables C to gain *all* these revenues, rather than only the fraction θ that C would accrue as exogenous transfers under the status quo regime. C also wants to guard its regional oil production against predation by G, which creates similar motives. Oil production increases the per-period revenues that C provides to G in the status quo regime, $(1-\theta)\cdot(1-e_C)$, by diminishing C's ability to exit the formal economy, whereas winning either type of war would enable C to consume *all* production from its region. The predation effect works through G's expenditures $x^* + m_G^*$ because, by increasing C's consumption following a successful war relative to the status quo, oil production raises the minimum amount of government spending on sticks and carrots that satisfies the budget constraint in Equation 17.

Predation effect:

$$\frac{d}{dO_i}(m_G^* + x^*) = \frac{\delta}{1-\delta}\cdot\left(-\frac{de_i}{dO_i}\right)\cdot\begin{cases}(1-\theta)\cdot p_j(m_G^*) & \text{if } (1-\mu^*)\cdot(1-\gamma)=0\\ -\theta\cdot p_s(m_G^*) & \text{if } (1-\mu^*)\cdot(1-\gamma)=1\end{cases} \tag{20}$$

[19] For all $m_C \in (0, \hat{m}_{C,s}) \cup (\hat{m}_{C,c}, \infty)$, applying the envelope theorem to compute $\frac{d}{dO_i}\left(m_G^* + x^*\right)$ yields the terms stated in Equation 20. The envelope theorem is applicable in this parameter range because G chooses an interior-optimal value of m_G.

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-seeking. However, the bottom row in Equation 20 highlights that if C prefers separatism, then an increase in *government* oil does not exert a predation effect because seceding would not enable C to amass these additional revenues. Instead, an increase in government oil strictly *diminishes* C's incentives to fight because seceding would eliminate future transfers that C would receive under the status quo regime, which equal a fraction θ of revenues from G's region in each period.

Proposition 2 presents the net effect of oil production on the equilibrium budget constraint, B^*, by incorporating the countervailing effects from Equations 19 and 20. Higher B^* implies a narrower range of parameter values in which fighting occurs, hence decreasing equilibrium civil war prospects, whereas the converse is true for lower B^*.

Proposition 2 (Effect of oil production)**.** *An increase in oil production exerts both a revenue effect and a predation effect. Formally, for all* $m_C \in (0, \hat{m}_{C,s}) \cup (\hat{m}_{C,c}, \infty)$*, the overall effect of oil production on the equilibrium budget constraint in period 1 is:*

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

for $i \in \{G, C\}$ *and for the terms in Equations 19 and 20.*

Theoretical Implications for the Mixed Oil Curse

Combining endogenous rebellion aims with the countervailing oil mechanisms enables rephrasing the mixed empirical relationship between oil production and civil war onset. Why is the revenue effect larger in magnitude than the predation effect for challengers that prefer center-seeking aims, and vice versa for those that prefer secession? This section proposes two main theoretical implications that each account for the puzzle. The inherently conditional nature of these propositions yields additional empirical implications about cases in which oil wealth should "curse" prospects for peace, which I state as explicit hypotheses before taking them to data in the next section.

ETHNIC MINORITIES SELECTION EFFECT

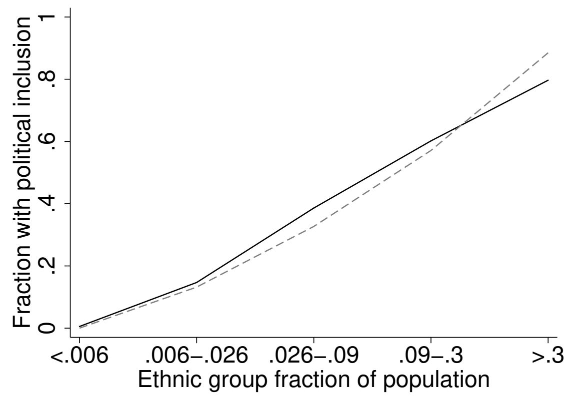
Formally, I show that an increase in the government commitment parameter, θ, diminishes the magnitude of the predation effect of oil. Although this relationship holds regardless of whether C's preferred civil war aims are center-seeking or separatist, empirically, θ tends to be lower for members of small ethnic groups. This creates a selection effect for ethnic minority groups: producing oil in their territory exerts a net effect that *increases* their incentives to rebel; and because they are small, their aims are separatist (see Lemma 2). I present the formal result after substantiating the key empirical affinity that underpins the selection effect.

Ethnic minorities and ethnopolitical exclusion (low θ). Various historical and strategic reasons anticipate why members of smaller ethnic groups typically have less influence in central governments, which empirically operationalizes low θ. Larger ethnic groups were more likely to either control historical states that persisted until independence from European colonialism, or dominate parties that won elections at the end of the colonial period (Wucherpfennig, Hunziker and Cederman, 2016; Paine, 2019*b*). Strategically, whoever controls the state has greater incentives to devolve more power to members of larger ethnic groups since they pose a greater rebellion threat to overthrowing the government if excluded from power (Francois, Rainer and Trebbi, 2015; Roessler and Ohls, 2018). Figure 4 shows empirically that governments indeed tend to exclude ethnic minority groups from positions of power. The sample of ethnic groups as well as the horizontal axis are the same as in Figure 2. Here, the vertical axis expresses the fraction of ethnic groups with political representation in the central government, which incorporates data from the Ethnic Power Relations project (see Appendix B). They code 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, I coded group-years with a power access status of "monopoly," "dominant," "senior partner," or "junior partner" as politically included, whereas groups with any other power access status are excluded. The black curve demonstrates the positive association between ethnic group size and political inclusion, and the dashed gray curve shows a similar pattern among ethnic groups with a giant oil field in their territory.

Formal analysis. An increase in θ affects the magnitude of the oil effect, $\frac{dB^*}{dO_i}$, in two ways.[20] The direct effect decreases the magnitude of the predation effect (Equation 20) because, in future periods, G can commit

[20]Proposition 3 evaluates comparative statics for the substantively interesting cases in which oil produc-

Figure 4: Ethnic Group Size and Political Inclusion



Notes: Figure 4 summarizes the relationship between ethnic group fraction of the population and ethnopolitical inclusion. I disaggregate the sample into five bins of roughly equal size and plot the average value for each quantile (N=31,891, which yields about 6,378 observations per bin). 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 B provides additional data details.

to transfer more government oil to C and to tax regional oil at lower levels. This raises the opportunity cost of rebelling. Surprisingly, a countervailing indirect substitution effect *increases* the magnitude of the predation effect. Higher θ diminishes G's marginal benefit to arming by reducing C's threat to rebel, which lowers equilibrium military spending m_G^* (see Appendix Equations A.1 and A.3). This substitution effect increases C's equilibrium probability of winning, $\mu^* \cdot p_c(m_G^*) + (1-\mu^*) \cdot p_s(m_G^*)$. A sufficient assumption for the direct effect to outweigh the substitution effect in magnitude is that the contest functions exhibit steep-enough diminishing marginal returns. This assumption holds for commonly used contest functions, including those in Equation 4. I elaborate on this intuition in Appendix A prior to proving the proposition.

Proposition 3 (Ethnic minorities selection effect mechanism)**.** *If* $(1-\mu^*) \cdot (1-\gamma) = 0$*, then for* $i \in \{G, C\}$ *and* $\frac{dB^*}{dO_i}$ *defined in Proposition 2:*

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

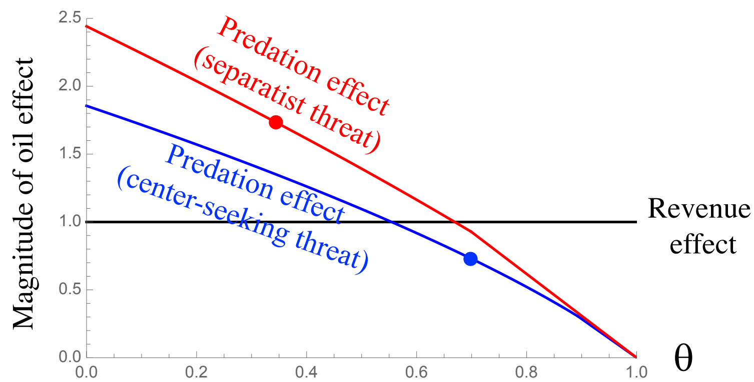
$$\underbrace{- \left[\mu^* \cdot \frac{\partial p_c(m_G^*)}{\partial m_G} \cdot \frac{dm_G^*}{d\theta} + (1-\mu^*) \cdot \frac{\partial p_s(m_G^*)}{\partial m_G} \cdot \frac{dm_G^*}{d\theta} \right] \cdot (1-\theta)}_{\textit{Indirect effect}} \Bigg\} \cdot \left(-\frac{de_i}{dO_i} \right) > 0$$

---

tion generates a predation effect. If C's aims are separatist, then increasing O_G does not create a predation effect (see Equation 20).

Figure 5 visually highlights the selection effect by plotting the relationship derived in Proposition 3. At low θ, the predation effect exceeds the revenue effect in magnitude—hence the net effect of increasing oil production is to raise prospects for a civil war to occur in equilibrium—whereas the opposite is true at high θ because raising θ decreases the magnitude of the predation effect.[21] The dots shown in the figure are typical empirical cases, which becomes apparent when we consider that ethnic group size affects prospects for political inclusion (Figure 4) and civil war aims (Lemma 2). Groups toward whom government commitment ability is low typically prefer separatist over center-seeking aims (red dot), whereas high commitment ability covaries with preferences for center-seeking over separatist aims (blue dot). This generates an empirical affinity between oil creating a net conflict-enhancing effect and the challenger preferring separatist aims, consistent with the mixed empirical oil-conflict pattern.

Figure 5: Ethnic Minorities Selection Effect



Notes: Figure 5 uses the functional forms for the contest functions from Equation 4 and the following parameter values: $e_C = 0.5$, $e_G = 0.9$, $\delta = 0.8$, $\beta = 3.8$, $m_0 = 0.2$, $p_0 = 0.2$, and $m_C = 0.5$. The takeaway from the figure would be qualitatively identical if I plotted different values of m_C for each curve.

Although small ethnic groups *typically* lack political representation in the central government (see Figure 4), in cases where a minority group enjoys political representation (high θ), the predation effect of oil should not be large in magnitude, which blunts incentives to secede. This yields a specific implication about the ethnic groups for whom local oil production should most likely trigger separatism.[22]

[21] This relationship is qualitatively the same regardless of C's civil war aims, although the slopes vary slightly for center-seeking and separatist conflicts because of the differences shown in Equation 20.

[22] Unlike existing arguments that posit a conditioning effect of ethnopolitical inclusion (Asal et al., 2016; Hunziker and Cederman, 2017), my model provides microfoundations for why oil production and ethnic

Hypothesis 1 (Politically excluded minorities)**.** *Only among ethnic groups who are politically excluded (low θ) should regional oil wealth raise separatist civil war propensity.*

GEOGRAPHY OF REBELLION EFFECT

The second implication from the model that helps to explain the mixed oil curse is a geography of rebellion effect. Even a moderately capable government can translate high military spending into a low probability that a challenger can capture the center. However, when combating a separatist insurgency in the periphery, the same government faces greater impediments to translating its revenues into a high probability of defeating the challenger. This enhances the predation effect of oil when C's binding civil war threat is separatist rather than center-seeking.

I formalize this intuition by taking comparative statics on β, the efficiency with which G translates military spending into coercive units in the contest function. Increasing β more greatly diminishes the magnitude of the predation effect of oil production if C's binding rebellion threat is center-seeking rather than separatist, that is, β positively affects $\frac{dB^*(m^*_{G,c},\mu=1)}{dO_i} - \frac{dB^*(m^*_{G,s},\mu=0)}{dO_i}$. Note the difference from the previous formal result. Here, I assess how β differentially affects each type of civil war, rather than posit a selection effect whereby β simply tends to be higher for challengers whose preferred aims are center-seeking—which is why, in Proposition 3, I examine the effect of θ without specifying civil war aims.

Proposition 4 shows that, as in the previous proposition, oil production exerts both a direct effect and an indirect substitution effect. Directly, β enhances G's advantage more when facing a center-seeking rather than separatist threat. The key assumption undergirding this effect is tantamount to why buying tanks more greatly helps a government defend the center than to fight in the periphery, which I discussed when motivating assumptions about the contest functions. This mechanism decreases C's probability of winning a center-seeking civil war relative to its probability of winning a separatist civil war, which creates a corresponding discrepancy in the transfer amount required for G to buy off C. The indirect substitution effect

exclusion exert *complementary* effects on conflict, as opposed to *substituting* for the importance of each other. In my model, complementarities arise because oil production exerts a net conflict-inducing effect only if θ is low. By contrast, when θ is high, the overall effect of increasing oil production diminishes incentives for conflict—which anticipates the negative empirical relationship between oil production and *center-seeking* civil wars.

reinforces the direct effect. Higher β increases the marginal benefit of arming (see Appendix Equations A.1 and A.3), which increases G's equilibrium military spending m_G^* and therefore decreases C's equilibrium probability of winning. This effect is larger for center-seeking civil wars because raising m_G more greatly affects that contest function.

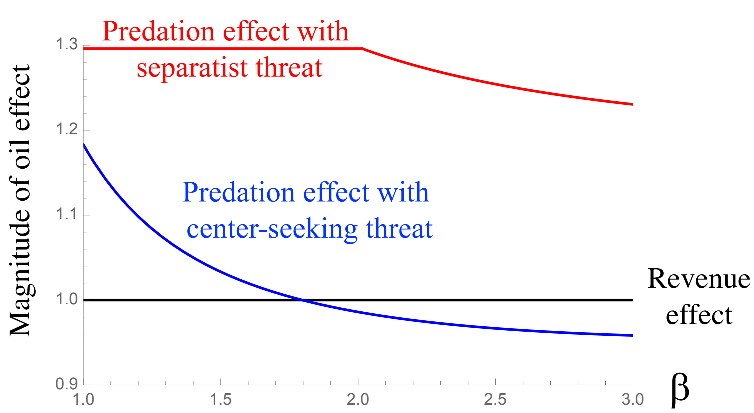
Proposition 4 (Geography of rebellion mechanism). *If* $(1-\mu^*)\cdot(1-\gamma)=0$, *then for* $i \in \{G, C\}$ *and* $\frac{dB^*}{dO_i}$ *defined in Proposition 2:*

$$\frac{d^2B^*(m_{G,c}^*,\mu=1)}{dO_i d\beta} - \frac{d^2B^*(m_{G,s}^*,\mu=0)}{dO_i d\beta} =$$

$$\frac{\delta}{1-\delta}\cdot(1-\theta)\cdot\Bigg[\underbrace{\frac{\partial p_s(m_{G,s}^*)}{\partial\beta} - \frac{\partial p_c(m_{G,c}^*)}{\partial\beta}}_{\text{Direct effect}} + \underbrace{\frac{\partial p_s(m_G)}{\partial m_G}\cdot\frac{dm_{G,s}^*}{d\beta} - \frac{\partial p_c(m_G)}{\partial m_G}\cdot\frac{dm_{G,c}^*}{d\beta}}_{\text{Indirect effect}}\Bigg]\cdot\left(-\frac{de_i}{dO_i}\right) > 0$$

Figure 6 depicts this result. With the parameter values in the figure, high-enough β causes the magnitude of the predation effect drop below the revenue effect only if C's aims are center-seeking. Thus, for a government with $\beta = 2.5$, the net effect of an increase in regional oil wealth is conflict-inducing if the binding rebellion threat is separatist, but conflict-suppressing if center-seeking. Unlike with the previous figure that highlighted a selection effect, here I compare the slopes of the red and blue lines rather than consider where along each curve we would expect to find empirical cases.

Figure 6: Geography of Rebellion Effect



Notes: Figure 6 uses the functional forms for the contest functions from Equation 4 and the following parameter values: $\theta = 0.58$, $e_C = 0.5$, $e_G = 0.9$, $\delta = 0.8$, $m_0 = 0.2$, $p_0 = 0.2$, and $m_C = 0.5$. With these parameter values, $\frac{\partial^2 p_c}{\partial m_G \partial\beta} < 0$ holds for any $\beta < 3.89$ and $\frac{\partial^2 p_s}{\partial m_G \partial\beta} < 0$ holds for any $\beta < 8.06$.

In addition to comporting with the aggregate mixed oil-conflict relationship, this logic also generates specific expectations for which cases should fit the general empirical pattern. For an ethnic group that faces particularly difficult geography for seceding, then, in effect, β is high.

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

Conversely, a government that is vulnerable for reasons independent of oil wealth may lack consolidated control over any oil produced in its country, resulting in low β. Vulnerable governments are hard-pressed to translate oil wealth into a low probability for a challenger to win a center-seeking civil war, thus negating governments' general advantages when defending the center.

> **Hypothesis 3** (Non-vulnerable governments)**.** *Only in countries where governments have consolidated control over oil revenues (high β) should oil wealth diminish center-seeking civil war propensity.*

Where Do We Find a Resource Curse?

Propositions 3 and 4 provide broad theoretical implications consistent with the mixed empirical oil-conflict pattern, and also underpin the logic for more specific hypotheses about cases in which oil wealth should "curse" prospects for peace. This section summarizes cases in which civil wars occurred in oil-rich regions or countries, and presents simple interactive regression models. This first-pass look at empirical evidence shows that the conditional implications have face validity and deserve additional consideration in future empirical research. Qualitative evidence from Saudi Arabia and Angola presented in Appendix D.6 provides an additional plausibility probe for the main mechanisms.

Separatist Civil Wars

Appendix Figure B.1 establishes that ethnic groups residing in oil-rich territories participate in separatist civil wars at elevated rates. What variation drives this correlation? Panel A of Figure 7 provides a transparent look at the data by listing 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 (as posited in 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. All but two of the ethnic groups are both excluded and minorities.[23] 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.

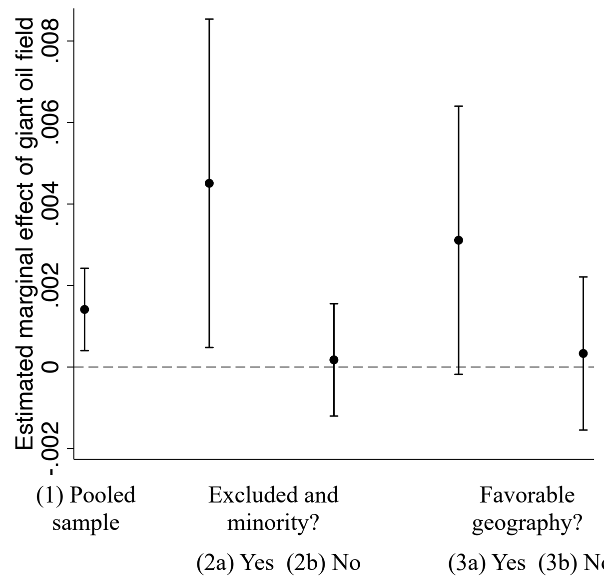
Figure 7: Conditional Results for Oil and Separatist Civil Wars

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(0.9%), E	M%,D
Chechens	Russia	1999	m(0.9%), 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 (calculated from two-sided hypothesis tests) for a series of logit regressions described in Appendix B. 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 B provides supporting information.

Panel B of Figure 7 directly assesses Hypotheses 1 and 2 by estimating relative frequencies across the full

[23] Ross (2012, 155-6) highlights a similar pattern. Appendix B.4 describes the data sources.

sample of ethnic group-years.[24] Appendix Equation B.3 adds interaction terms to the statistical models used to establish the positive correlation between oil and separatism (see Appendix Figure B.1). 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, among groups lacking either condition, the relationship is null.[25]

Disaggregating onshore and offshore oil production yields similar support for the two hypotheses (Appendix D.5). This finding is intriguing because some existing theories posit the importance of oil profits financing rebel groups. In these theories, *offshore* oil production should not cause separatist civil wars because it is difficult for rebels to loot. By contrast, my model expects similar effects for offshore and onshore oil because both cause a predation effect, which is consistent with empirical patterns.

Appendix D.6 discusses a typical case (separatist civil war in the Cabinda region of Angola) and a deviant case (no separatist rebellion in the Shi'a region of Saudi Arabia). Although the political marginalization of Shi'a in Saudi Arabia has inspired temporary anti-government movements, the regime's coercive strength—funded by oil revenues—has enabled them to dominate a region with poor geography for rebellion. By contrast, similar grievances about predation have provoked war in Cabinda, a region with more favorable geography for separatism.

Center-Seeking Civil Wars

Appendix Figure B.1 establishes that greater oil income per capita covaries with less frequent center-seeking civil wars at the country level. Despite the difference in relative frequencies, in sixteen cases, a center-

[24]Groups without a concentrated territorial location cannot feasibly secede because they lack a natural territory from which to create an independent state or autonomous region. To reduce heterogeneity, the sample for these regressions omits geographically dispersed ethnic groups. Geographic dispersion nearly perfectly predicts the absence of separatist, but not center-seeking, civil wars (my calculation using Ethnic Power Relations dataset, see Appendix D.4).

[25]The correlations are similar when modeling country fixed effects (available upon request). Paine (2019*a*) presents additional supportive evidence: in most oil-separatist cases, rebel groups espoused concerns specifically about unfair oil redistribution, which is consistent with the posited predation mechanism.

seeking civil war began between 1946 and 2013 in a country producing at least $100 in oil income per capita in the previous year, which Panel A of Figure 8 lists. Hypothesis 3 anticipates that exceptions to the general pattern should arise when governments are vulnerable to attack, independent of oil wealth. 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 B.5 details how I coded the following three vulnerability conditions.

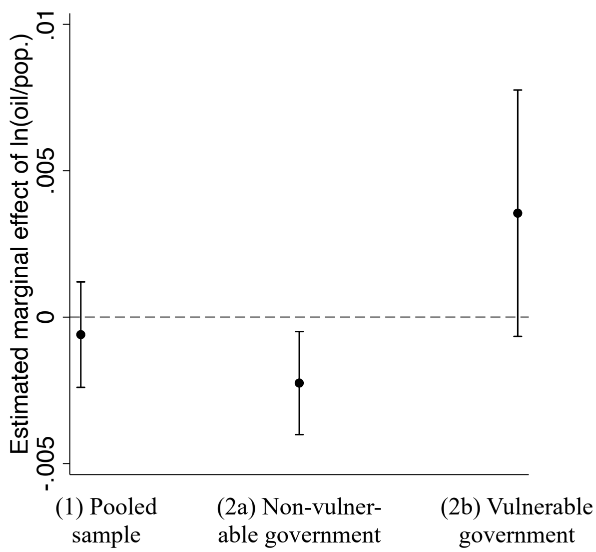
Figure 8: Conditional Results for Oil and Center-Seeking Civil Wars

A. Oil-center seeking civil war cases

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

Notes: 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 B provides supporting information.

B. Regression estimates



Notes: The figure presents point estimates and 95% confidence intervals (calculated from two-sided hypothesis tests) for a series of logit regressions described in Appendix B. The dependent variable is center-seeking civil war onset, and the unit of analysis is country-years.

First, the country experienced recent defeat in warfare or a violent political transition ("W" for war). Several oil-rich countries experienced these conditions within two years prior to their center-seeking civil war. Governments should face particular difficulties to deterring rebel groups in violent independence cases where a domestic war that began during foreign occupation was already ongoing (Angola 1975, Algeria 1962, Iraq 2011), or where the rebel group was already organized from a previous civil war, as with SPLA in Sudan in 2011 after South Sudan gained independence. War defeats can also create focal periods for 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. Second, 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. Third, newly oil-rich governments 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.

Panel B of Figure 8 directly assesses Hypothesis 3 by estimating relative frequencies across the full sample of country-years. Appendix Equation B.4 adds an interaction term to the statistical models used to establish the negative correlation between oil production and center-seeking civil wars (see Appendix Figure B.1). 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%. By contrast, among countries with at least one vulnerability condition, oil production associates positively with center-seeking civil war onset.

Appendix D.6 discusses a typical case (no center-seeking civil wars in Saudi Arabia) and a deviant case (center-seeking rebellion in Angola). In Saudi Arabia, oil revenues enabled the government to dispense mass patronage and use coercion to prevent challenges. By contrast, in Angola, the *post*-colonial center-seeking rebellion in fact continued Angola's *decolonization* conflict against a vulnerable government.

CONCLUSION

This article develops a foundational theory of strategic civil war aims. Its implications help 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. Recapping the theoretical logic, imagine a country with two ethnic groups whose members 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? The revenue effect suppresses incentives for rebellion by generating more resources for the government to buy off and coerce the challenger. By contrast, the predation effect enhances incentives for rebellion by increasing the amount of spoils to either grab by taking the center, or to protect from government expropriation. The net effect of an increase in oil production depends on the numerical size of the challenging group 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. Two factors diminish the magnitude of the predation effect for these challengers. First, governments typically can commit to greater transfers and fewer taxes for members of large ethnic groups. Second, defending the center implies that the government can efficiently translate its revenues into a low probability of the challenger winning a civil war. Therefore, oil production anywhere in the country diminishes the likelihood that a center-seeking civil war occurs 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.

The logic of the model carries implications beyond those specifically for the oil-conflict relationship. Within the resource curse literature, the framework may help to reconcile empirical patterns about durable authoritarian regimes. As Colgan (2015) highlights, two stylized facts about oil and conflict raise a theoretical puzzle: civil wars and durable authoritarian regimes are each prevalent in oil-rich countries. Why would the factors that cause civil wars not also make these regimes unstable? My account offers an alternative interpretation of this puzzle, although one consistent with Colgan's (2015) focus on what I term the revenue effect. Oil wealth frequently triggers separatist civil wars, but these conflicts do not directly threaten regime stability. By contrast, *infrequent* center-seeking civil wars mitigate one source of instability for authoritarian regimes. This is particularly true for regimes that lack various sources of vulnerability (independent of oil), which highlights the importance of studying the strength of ruling coalitions and institutions *before* a country becomes a major petrostate (Smith 2004, 2007; Menaldo 2016). Regarding another source of authoritarian stability, Wright, Frantz and Geddes (2015) provide evidence for a different implication from my model: oil-rich regimes spend more on their militaries, which they link to lower susceptibility to coups.

Beyond oil, the model draws mainly from two influential literatures on conflict—formal bargaining models, and ethnic grievances—that do not focus on civil war aims. Although many scholars propose long-term cultural explanations for contemporary ethnic grievances (Cederman et al. 2013, 30-54), existing theories contain an implicit strategic component: political exclusion exacerbates government commitment problems. The formal bargaining literature links commitment inability to conflict. One insight of my article 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.

My 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 heterogeneous 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 tends to outweigh the revenue effect even for center-seeking civil wars, as examples from Liberia and Sierra Leone in the 1990s suggest. The model may also be fruitfully extended by examining dynamic civil war aims, as Appendix C.3 discusses. Overall, extensions of the present framework should help to guide future theorizing on and empirical evaluations of strategic civil war aims.

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Online Appendix for "Strategic Civil War Aims and the Resource Curse"

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Table A.1: Summary of Parameters and Choice Variables

Stage	**Variables/description**
Parameters/choices for G in period 1	• e_i: parameterizes the exit option for (unmodeled) producers in each region, $i \in \{G, C\}$ • R: endowed government revenue in period 1, equals $2 - e_G - e_C$ • m_G: military spending; this is G's endogenous "coercive input" • x: proposed patronage transfer • d: linear cost of war for G
Parameters/choices for C in period 1	• m_C: C's population share; this is C's exogenous "coercive input" • 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: efficiency with which G's military spending decreases C's probability of winning
Payoffs for $t \geq 2$	• δ: discount factor • t: time • θ: G's commitment ability; determines taxes and transfers for $t \geq 2$ in s.q. regime • $V^G_{\text{s.q.}}$ and $V^C_{\text{s.q.}}$: future continuation values in the status quo regime • V^G_{center} and V^C_{center}: continuation values following a successful center-seeking civil war • V^G_{sep} and V^C_{sep}: continuation values following a successful separatist civil war
Oil parameters	• O_i: fraction of economic output in region $i \in \{G, C\}$ that is oil • γ: indicator for oil production in C's territory

Proof of Lemma 1.

1. *Establish $\underline{m}_C$ and $\overline{m}_C$.* Show that for any $m_G > 0$, a unique $\tilde{m}_C \in \mathbb{R}_{++}$ exists such that:

$$\frac{p_c(m_G, \tilde{m}_C)}{p_s(m_G, \tilde{m}_C)} = \pi_s,$$

for $\pi_s \in (0, 1)$ defined in Equation 15. Satisfying the conditions for the intermediate value theorem implies that at least one such $\tilde{m}_C$ exists: Equation 3 provides the needed boundary conditions, and $p_c(\cdot)$ and $p_s(\cdot)$ are each continuous in m_C. Equation 2 implies the unique threshold claim for $\tilde{m}_C$. Thus, we can implicitly define the thresholds $\underline{m}_C$ and $\overline{m}_C$ stated in the lemma:

$$\frac{p_c(0, \underline{m}_C)}{p_s(0, \underline{m}_C)} = \pi_s \quad \text{and} \quad \frac{p_c(R, \overline{m}_C)}{p_s(R, \overline{m}_C)} = \pi_s$$

Applying the implicit function theorem yields:

$$\frac{d\tilde{m}_C}{dm_G} = -\frac{\partial}{\partial m_G}\left[\frac{p_c(m_G)}{p_s(m_G)}\right] \Big/ \frac{\partial}{\partial m_C}\left[\frac{p_c(m_G)}{p_s(m_G)}\right] > 0,$$

and the sign follows directly from Equation 2. This proves $\underline{m}_C < \overline{m}_C$.

2. *Establish $\hat{m}_G$.* Show that for any $m_C \in \left(\underline{m}_C, \overline{m}_C\right)$, a unique $\hat{m}_G \in (0, R)$ exists such that:

$$\frac{p_c(\hat{m}_G, m_C)}{p_s(\hat{m}_G, m_C)} = \pi_s$$

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

- $\frac{p_c(0,m_C)}{p_s(0,m_C)} > \pi_s$ follows from assuming $m_C > \underline{m}_C$.
- $\frac{p_c(R,m_C)}{p_s(R,m_C)} < \pi_s$ follows from assuming $m_C < \overline{m}_C$.
- $p_c(\cdot)$ and $p_s(\cdot)$ are each continuous in m_C.

Because $\underline{m}_C > 0$, Equation 2 yields the unique threshold claim for $\hat{m}_G$. Applying the implicit function theorem yields:

$$\frac{d\hat{m}_G}{dm_C} = -\frac{\partial}{\partial m_C}\left[\frac{p_c(m_G)}{p_s(m_G)}\right] \Big/ \frac{\partial}{\partial m_G}\left[\frac{p_c(m_G)}{p_s(m_G)}\right] > 0,$$

and the sign follows directly from Equation 2, which completes the proof. ■

To generate interior solutions, the following result about optimal military expenditures requires assumptions about the magnitude of the marginal benefits of military spending at the boundaries. I impose these assumptions for the remainder of the analysis, which are denoted as Equations A.2 and A.4 in the proof.

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

Part a. *A unique interior optimizer* $m^*_{G,c} \in (0, R)$ *exists to G's maximization problem (Equation 16) subject to* $\mu = 1$.

Part b. *A unique interior optimizer* $m^*_{G,s} \in (0, R)$ *exists to G's maximization problem (Equation 16) subject to* $\mu = 0$.

Part c. $m^*_{G,s} < m^*_{G,c}$

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

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

The first order condition implicitly characterizes $m^*_{G,c}$:

$$\underbrace{\frac{\delta}{1-\delta} \cdot \overbrace{\left(-\frac{\partial p_c(m^*_{G,c}, m_C)}{\partial m_G}\right)}^{>0} \cdot (1-\theta) \cdot (2 - e_G - e_C)}_{\text{MB}} = \underbrace{1}_{\text{MC}} \tag{A.1}$$

which is the unique maximizer because the second-order condition is:

$$-\frac{\delta}{1-\delta} \cdot \underbrace{\frac{\partial^2 p_c(m_G, m_C)}{\partial m_G^2}}_{>0} \cdot (1-\theta) \cdot (2 - e_G - e_C) < 0$$

An interior solution requires:

$$-\frac{\partial p_c(R, m_C)}{\partial m_G} < \frac{1-\delta}{\delta \cdot (1-\theta) \cdot (2-e_G-e_C)} < -\frac{\partial p_c(0, m_C)}{\partial m_G} \tag{A.2}$$

Proof of part b. Proof is identical to part a, yielding the implicit characterization of $m^*_{G,s}$:

$$\underbrace{\frac{\delta}{1-\delta} \cdot \overbrace{\left(-\frac{\partial p_s(m^*_{G,s}, m_C)}{\partial m_G}\right)}^{>0} \cdot \overbrace{\big[(1-\theta)\cdot(1-e_c) - \theta \cdot (1-e_G)\big]}^{>0 \text{ by Assumption 1}}}_{\text{MB}} = \underbrace{1}_{\text{MC}} \tag{A.3}$$

An interior solution requires:

$$-\frac{\partial p_s(R, m_C)}{\partial m_G} < \frac{1-\delta}{\delta \cdot \big[(1-\theta)\cdot(1-e_c) - \theta \cdot (1-e_G)\big]} < -\frac{\partial p_s(0, m_C)}{\partial m_G} \tag{A.4}$$

Proof of part c. Combining Equations A.1 and A.3 yields:

$$-\frac{\partial p_c(m^*_{G,c}, m_C)}{\partial m_G} = -\frac{\partial p_s(m^*_{G,s}, m_C)}{\partial m_G} \cdot \pi_s,$$

for $\pi_s \in (0, 1)$ defined in Equation 15. Because $\pi_s < 1$, we have:

$$-\frac{\partial p_c(m^*_{G,c}, m_C)}{\partial m_G} < -\frac{\partial p_s(m^*_{G,s}, m_C)}{\partial m_G}$$

Combining this with the assumption in Equation 2 implies:

$$-\frac{\partial p_c(m^*_{G,c}, m_C)}{\partial m_G} < -\frac{\partial p_c(m^*_{G,s}, m_C)}{\partial m_G}$$

The result follows because $-\frac{\partial p_c}{\partial m_G}(m_G)$ strictly decreases in m_G. ■

To derive monotonic relationships, the following result about threshold values of m_C requires assumptions about the steepness of marginal returns to military spending. I impose these assumptions for the remainder of the analysis, which are denoted as Equations A.6 and A.8 in the proof. For all parameter values, the functional forms from Equation 4 satisfy both inequalities.

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

Part a. *A unique value $\hat{m}_{C,c} \in (\underline{m}_C, \overline{m}_C)$ exists such that:*

- *If $m_C < \hat{m}_{C,c}$, then $\hat{m}_G < m^*_{G,c}$*
- *If $m_C > \hat{m}_{C,c}$, then $\hat{m}_G > m^*_{G,c}$*

Part b. *A unique value $\hat{m}_{C,s} \in (\underline{m}_C, \overline{m}_C)$ exists such that:*

- *If* $m_C < \hat{m}_{C,s}$*, then* $\hat{m}_G < m^*_{G,s}$
- *If* $m_C > \hat{m}_{C,s}$*, then* $\hat{m}_G > m^*_{G,s}$

Part c. $\hat{m}_{C,s} < \hat{m}_{C,c}$

Proof of part a. Define $\hat{m}_{C,c}$ implicitly as:

$$\hat{m}_G(\hat{m}_{C,c}) - m^*_{G,c}(\hat{m}_{C,c}) = 0 \tag{A.5}$$

Satisfying the conditions for the intermediate value theorem implies that at least one such $\hat{m}_{C,c} \in (\underline{m}_C, \overline{m}_C)$ exists:

- $\hat{m}_G(\underline{m}_C) - m^*_{G,c}(\underline{m}_C) < 0$ follows from $\hat{m}_G(\underline{m}_C) = 0$ (see the proof for Lemma 1), and part a of Lemma A.1 shows $m^*_{G,c} > 0$.
- $\hat{m}_G(\overline{m}_C) - m^*_{G,c}(\overline{m}_C) > 0$ follows from $\hat{m}_G(\overline{m}_C) = R$ (see the proof for Lemma 1), and part a of Lemma A.1 shows $m^*_{G,c} < R$.
- These functions are continuous in m_C because each constituent function is continuous in m_C.

The unique threshold claim follows from showing that the following term is strictly positive:

$$\frac{d}{dm_C}\Big[\hat{m}_G(m_C) - m^*_{G,c}(m_C)\Big] = \frac{d\hat{m}_G}{dm_C} - \frac{dm^*_{G,c}}{dm_C}$$

$$= -\left[\frac{\partial p_c(\hat{m}_G)}{\partial m_C} - \frac{\partial p_s(\hat{m}_G)}{\partial m_C}\cdot\pi_s\right]\Bigg/\left[\frac{\partial p_c(\hat{m}_G)}{\partial m_G} - \frac{\partial p_s(\hat{m}_G)}{\partial m_G}\cdot\pi_s\right] + \frac{\partial^2 p_c(m^*_{G,c})}{\partial m_G \partial m_C}\Bigg/\frac{\partial^2 p_c(m^*_{G,c})}{\partial m_G^2}$$

The proof for Lemma 1 proves that the first term is strictly positive, whereas the second term is ambiguous in sign because $\frac{\partial^2 p_c(m^*_{G,c})}{\partial m_G \partial m_C}$ is ambiguous in sign. Thus, we need steep-enough diminishing marginal returns to m_G:

$$\frac{\partial^2 p_c}{\partial m_G^2} > \frac{\partial^2 p_c}{\partial m_G \partial m_C}\Bigg/\left\{\left[\frac{\partial p_c}{\partial m_C} - \frac{\partial p_s}{\partial m_C}\cdot\pi_s\right]\Bigg/\left[\frac{\partial p_c}{\partial m_G} - \frac{\partial p_s}{\partial m_G}\cdot\pi_s\right]\right\} \tag{A.6}$$

Proof of part b. Define $\hat{m}_{C,s}$ implicitly as:

$$\hat{m}_G(\hat{m}_{C,s}) - m^*_{G,s}(\hat{m}_{C,s}) = 0 \tag{A.7}$$

The structure of the proof is identical to that in part a. The condition for steep-enough diminishing marginal returns to m_G is:

$$\frac{\partial^2 p_s}{\partial m_G^2} > \frac{\partial^2 p_s}{\partial m_G \partial m_C}\Bigg/\left\{\left[\frac{\partial p_c}{\partial m_C} - \frac{\partial p_s}{\partial m_C}\cdot\pi_s\right]\Bigg/\left[\frac{\partial p_c}{\partial m_G} - \frac{\partial p_s}{\partial m_G}\cdot\pi_s\right]\right\} \tag{A.8}$$

Proof of part c. Combining Equations A.5 and A.7 yields:

$$\hat{m}_G(\hat{m}_{C,c}) - m^*_{G,c}(\hat{m}_{C,c}) = \hat{m}_G(\hat{m}_{C,s}) - m^*_{G,s}(\hat{m}_{C,s})$$

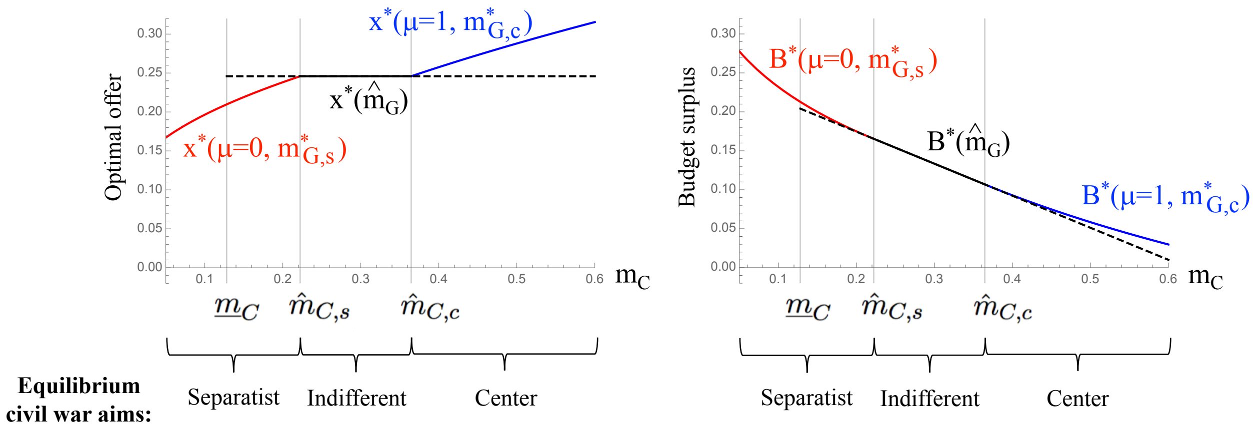
Because $m^*_{G,c} > m^*_{G,s}$ (part c of Lemma A.1), this implies:

$$\hat{m}_G(\hat{m}_{C,c}) - m^*_{G,c}(\hat{m}_{C,c}) > \hat{m}_G(\hat{m}_{C,s}) - m^*_{G,c}(\hat{m}_{C,s})$$

The result follows because Equation A.6 implies that $\hat{m}_G(m_C) - m^*_{G,c}(m_C)$ strictly increases in m_C. ■

Figure A.1 depicts the equilibrium offer and equilibrium budget surplus for the same parameter values as used in Figure 3 to illustrate equilibrium military spending.

Figure A.1: Equilibrium Offer and Budget Surplus



Notes: Figure A.1 uses the same functional form assumptions and parameter values as Figure 3.

Proof of Lemma 2. I first solve for optimal military spending while fixing C's aims at either center-seeking or separatist, and then incorporate how m_G influences civil war aims.

Center-seeking. Solve G's constrained optimization problem (Equation 16) in the center-seeking range. Define the Lagrangian:

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

The associated KKT conditions are:

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

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

- If $m_C < \hat{m}_{C,c}$, then one solution is $m_G = \hat{m}_G$ with associated multipliers $\lambda_1 = 0$ and $\lambda_2 = -\left\{1 + \frac{\delta}{1-\delta} \cdot \left[\frac{\partial p_c(\hat{m}_G)}{\partial m_G} \cdot (1-\theta) \cdot (2 - e_G - e_C)\right]\right\}$. Part a of Lemma A.2 implies that $\hat{m}_G < m^*_{G,c}$ in this parameter range, and part a of Lemma A.1 establishes that $1 + \frac{\delta}{1-\delta} \cdot \left[\frac{\partial p_c(m_G)}{\partial m_G} \cdot (1-\theta) \cdot\right.$

$(2 - e_G - e_C)\Big] < 0$ for any $m_G < m^*_{G,c}$. 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 $m_G < \hat{m}_G$ 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 $m_G + \frac{\delta}{1-\delta} \cdot \left[\frac{\partial p_c(m_G)}{\partial m_G} \cdot (1-\theta) \cdot (2 - e_G - e_C)\right] < 0$ for any $m_G < m^*_{G,c}$ (and we already established that $\hat{m}_G < m^*_{G,c}$ in this parameter range).

- If $m_C > \hat{m}_{C,c}$, then one solution is $m_G = m^*_{G,c}$ (see Lemma A.1) with associated multipliers $\lambda_1 = 0$ and $\lambda_2 = 0$. Because part a of Lemma A.2 implies that $\hat{m}_G > m^*_{G,c}$ 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 $m^*_{G,c} < \hat{m}_G$ in this parameter range. Therefore, any $m_G < m^*_{G,c}$ requires $\lambda_2 = 0$ to satisfy the second complementary slackness condition. However, for any $\lambda_1 \geq 0$, this violates the first-order condition because $1 + \frac{\delta}{1-\delta} \cdot \left[\frac{\partial p_c(m_G)}{\partial m_G} \cdot (1-\theta) \cdot (2 - e_G - e_C)\right] < 0$ for any $m_G < m^*_{G,c}$.
  - Part a of Lemma A.2 establishes that $m^*_{G,c} > 0$. Therefore, any $m_G > m^*_{G,c}$ 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 $1 + \frac{\delta}{1-\delta} \cdot \left[\frac{\partial p_c(m_G)}{\partial m_G} \cdot (1-\theta) \cdot (2 - e_G - e_C)\right] > 0$ for any $m_G > m^*_{G,c}$.

Separatist. Solve G's constrained optimization problem (Equation 16) in the separatist range. Define the Lagrangian:

$$\mathcal{L}(m_G, \lambda) \equiv \max_{m_G, \lambda} \quad R - \big[m_G + x^*(\mu = 0, m_G)\big] + \delta \cdot V^G_{\text{s.q.}} + \lambda \cdot \big(m_G - \hat{m}_G\big)$$

The associated KKT conditions are:

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

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

- If $m_C < \hat{m}_{C,s}$, then one solution is $m_G = m^*_{G,s}$ (see Lemma A.1) with associated multiplier $\lambda = 0$. Because part b of Lemma A.2 implies that $\hat{m}_G < m^*_{G,s}$ 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 $m_G < m^*_{G,s}$ violates the first-order condition because part b of Lemma A.1 establishes that $1 + \frac{\delta}{1-\delta} \cdot \left[\frac{\partial p_s(m_G)}{\partial m_G} \cdot \big[(1-\theta) \cdot (1 - e_c) - \theta \cdot (1 - e_G)\big]\right] < 0$ for all $m_G < m^*_{G,s}$.

- We have established that $\hat{m}_G < m^*_{G,s}$ in this parameter range. Therefore, any $m_G > m^*_{G,s}$ 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 $1 + \frac{\delta}{1-\delta} \cdot \Big[\frac{\partial p_s(m_G)}{\partial m_G} \cdot \big[(1-\theta) \cdot (1-e_c) - \theta \cdot (1-e_G)\big]\Big] > 0$ for any $m_G > m^*_{G,s}$.

- If $m_C > \hat{m}_{C,s}$, then one solution is $m_G = \hat{m}_G$ with associated multiplier $\lambda = 1 + \frac{\delta}{1-\delta} \cdot \Big[\frac{\partial p_s(m_G)}{\partial m_G} \cdot \big[(1-\theta) \cdot (1-e_c) - \theta \cdot (1-e_G)\big]\Big]$. Part b of Lemma A.2 implies that $\hat{m}_G > m^*_{G,s}$ in this parameter range, and part b of Lemma A.1 establishes that $1 + \frac{\delta}{1-\delta} \cdot \Big[\frac{\partial p_s(m_G)}{m_G} \cdot \big[(1-\theta) \cdot (1-e_c) - \theta \cdot (1-e_G)\big]\Big] > 0$ for any $m_G > m^*_{G,s}$. 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 $m_G > \hat{m}_G$ requires $\lambda = 0$ to satisfy the complementary slackness condition. Then, the first-order condition is violated because $1 + \frac{\delta}{1-\delta} \cdot \Big[\frac{\partial p_s(m_G)}{\partial m_G} \cdot \big[(1-\theta) \cdot (1-e_c) - \theta \cdot (1-e_G)\big]\Big] > 0$ for any $m_G > m^*_{G,s}$ (and we already established that $\hat{m}_G > m^*_{G,s}$ in this parameter range).

Endogenous civil war aims. To solve the full maximization problem stated in Equation 16, part c of Lemma A.2 implies the need to examine three non-trivial parameter ranges: $m_C \in \big(\underline{m}_C, \hat{m}_{C,s}\big)$, $m_C \in \big(\hat{m}_{C,s}, \hat{m}_{C,c}\big)$, and $m_C \in \big(\hat{m}_{C,c}, \overline{m}_C\big)$.

- If $m_C \in \big(\underline{m}_C, \hat{m}_{C,s}\big)$, then part 1 of this proof shows that $m_G = \hat{m}_G$ is the unique optimal solution conditional on facing a center-seeking civil war and part 2 shows that $m_G = m^*_{G,s}$ is the unique optimal solution conditional on facing a separatist civil war. By construction, $\hat{m}_G + x^*\big(\mu = 1, \hat{m}_G\big) = \hat{m}_G + x^*\big(\mu = 0, \hat{m}_G\big)$. Part 2 of this proof shows that $m^*_{G,s} + x^*\big(\mu = 0, m^*_{G,s}\big) < \hat{m}_G + x^*\big(\mu = 0, \hat{m}_G\big)$, which implies $m^*_{G,s}$ is the unique optimal solution.

- If $m_C \in \big(\hat{m}_{C,s}, \hat{m}_{C,c}\big)$, then parts 1 and 2 of this proof show that $m_G = \hat{m}_G$ is the unique optimizer.

- If $m_C \in \big(\hat{m}_{C,c}, \overline{m}_C\big)$, then part 1 of this proof shows that $m_G = m^*_{G,c}$ is the unique optimal solution conditional on facing a center-seeking civil war and part 2 shows that $m_G = \hat{m}_G$ is the unique optimal solution conditional on facing a separatist civil war. By construction, $\hat{m}_G + x^*\big(\mu = 1, \hat{m}_G\big) = \hat{m}_G + x^*\big(\mu = 0, \hat{m}_G\big)$. Part 1 of this proof shows that $m^*_{G,c} + x^*\big(\mu = 1, m^*_{G,c}\big) < \hat{m}_G + x^*\big(\mu = 1, \hat{m}_G\big)$, which implies $m^*_{G,c}$ is the unique optimal solution. ■

Given the preceding results, the only remaining component to prove for Proposition 1 is that G prefers to induce peace, if possible; and, if not possible, that G's armament choice is the same as if G could induce peace. I first explain the intuition verbally before presenting the formal proof.

- Comparing Equations 5 and 7 shows clearly that G is better off in the status quo than from losing a center-seeking civil war. Given Assumption 1, comparing Equations 5 and 9 shows the same for separatism.

- Nor can *costly peace* motivate fighting in the present to prevent paying armament costs in the future (e.g., Powell, 1993). Regardless of what happens in period 1, G does not arm in periods $t \geq 2$.
- The final possibility to rule out is a contemporaneous costly peace motivation for war. Even if a solution exists to Equation 16, does G necessarily want to arm to the teeth to induce peace? Might G prefer to spend a small amount on the military in period 1 even if means confronting a rebellion? The proof of Proposition 1 shows that if C rebels in response to G's actions, then G's armament problem is an affine transformation of Equation 16. Thus, G's optimal choice of m_G is unchanged, and the costliness of rebellion ($d > 0$) induces G to choose a pair (m_G, x) that induces peace, if possible.

Proof of Proposition 1, part a. Given the preceding lemmas, the only remaining part to prove is that G cannot profitably deviate to any (x, m_G) such that $R - m_G - x < 0$. Using the future-period utility terms from the model setup yields the following expression for G's lifetime expected utility if C initiates a civil war in period 1:

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

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

Split the term in braces into the following:

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

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

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

Therefore, the overall expression is:

$$\begin{gathered}1-e_G+(1-\theta)\cdot(1-e_C)-1-d\\ \underbrace{-\frac{\delta}{1-\delta}\cdot\Big\{\mu^*(m_G)\cdot p_c(m_G)\cdot(1-\theta)\cdot(2-e_C-e_G)+\big[1-\mu^*(m_G)\big]\cdot p_s(m_G)\cdot\big[(1-\theta)\cdot(1-e_C)-\theta\cdot(1-e_G)\big]\Big\}}_{x^*(m_G)}\\ +\underbrace{\frac{\delta}{1-\delta}\cdot(1-\theta)\cdot(2-e_C-e_G)}_{\delta\cdot V^G_{s.q.}}\end{gathered} \tag{A.9}$$

Subtracting this term from G's lifetime expected utility to buying off C with G's most-preferred transfer that satisfies Equation 12, $R - 1 - x^*(m_G) + \delta \cdot V^G_{s.q.}$, equals $d > 0$.

Part b. Equation A.9 shows that G's objective function if $B^* < 0$ is an affine transformation of its objective function if $B^* \geq 0$, 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). ■

Each of the next two proofs invoke a condition about the steepness of diminishing marginal returns to m_G in the contest functions. Equations A.13 and A.14 state the sufficient conditions, which I assume are true. Since the role of steep-enough marginal returns to m_G in the proof of Proposition 3 is subtle, I first explain the intuition in words and then explain why these additional assumptions are natural. Proposition 3 is a statement about how θ alters the *magnitude of the oil effect*. That is, the proposition assesses the cross-partial of B^* with respect to O_i and θ, and hence whether oil production and commitment ability are complements or substitutes. By contrast, imposing an assumption about the steepness of diminishing returns in m_G would be irrelevant if I instead took the *first* derivative of B^* with respect to θ because then envelope theorem would apply (indeed, the envelope theorem applies when deriving B^* with respect to O_i in Proposition 2).

The sign of the cross-partial derivative in Proposition 3 is ambiguous because θ affects $\frac{dB^*}{dO_i}$ through two channels:

- The direct effect is straightforward: greater commitment ability increases the amount of central transfers and reduces the amount of regional taxes in the status quo regime. Both components of the direct effect decrease the magnitude of the predation effect by raising the opportunity cost of rebelling. This highlights a complementarity between oil production and commitment ability by enhancing the magnitude of the positive-signed effect of O_i on B^*.
- An indirect substitution effect cuts in the opposite direction. Higher θ reduces the marginal benefit of arming (as can be seen in Equations A.1 and A.3), and since the envelope theorem does not apply, $\frac{dm_G^*}{d\theta}$ appears in the corresponding expression (Equation A.10). By decreasing m_G^*, this effect of higher θ *increases* the magnitude of the predation effect, which highlights a channel through which greater commitment ability substitutes from the positive-signed effect of O_i on B^*.

Assuming steep-enough diminishing returns in m_G is sufficient for the direct effect to outweigh the indirect effect in magnitude. Otherwise, the indirect effect would outweigh the direct effect in magnitude for some values of m_G, and the net effect of greater commitment ability would substitute from oil production (at least for some values of m_G). Why is it reasonable to assume that Equation A.13 holds? Any strictly positive, strictly decreasing, and strictly convex function f in which higher-order derivative functions become increasingly steep over its support satisfy this condition, that is, $\frac{f''}{f'} > \frac{f'}{f}$. This is true for all positive values of the input variables for many common contest functions, including the functional forms in Equation 4 as well as $\frac{m_C^\sigma}{m_C^\sigma + m_G^\sigma}$ with $\sigma \geq 1$, which Garfinkel and Skaperdas (2006) highlight is a commonly used contest function. Thus, at least given the contest functions usually studied in these types of models, this is a natural assumption.

Proof of Proposition 3. Given $\frac{d^2B^*}{dO_i d\theta}$ stated in the proposition, a sufficient condition for $\frac{d^2B^*}{dO_i d\theta} > 0$ is:

$$p_j(m_G^*) > \frac{\partial p_j(m_G^*)}{\partial m_G} \cdot \frac{dm_G^*}{d\theta} \cdot (1-\theta), \tag{A.10}$$

for $j \in \{c, s\}$. Need to solve for $\frac{dm_G^*}{d\theta}$. Using the generic probability of winning function $p_j(\cdot)$ and setting $(1-\mu^*) \cdot (1-\gamma) = 0$ enables rewriting either Equation A.1 or A.3 as:

$$\frac{\delta}{1-\delta} \cdot \left[-\frac{\partial p_j(m_G^*)}{\partial m_G} \right] \cdot (1-\theta) \cdot (1-e_i) = 1 \tag{A.11}$$

Applying the implicit function theorem to Equation A.11 yields:

$$\frac{dm_G^*}{d\theta} = \frac{\frac{\partial p_j(m_G^*)}{\partial m_G}}{\frac{\partial^2 p_j(m_G^*)}{\partial m_G^2} \cdot (1-\theta)} \tag{A.12}$$

Substituting Equation A.12 into Equation A.10 and rearranging yields:

$$\frac{\partial^2 p_j(m_G^*)}{\partial m_G^2} > \left[\frac{\partial p_j(m_G^*)}{\partial m_G} \right]^2 \Big/ p_j(m_G^*)$$

The following is a sufficient condition for this inequality to hold:

$$\frac{\partial^2 p_j}{\partial m_G^2} > \left[\frac{\partial p_j}{\partial m_G} \right]^2 \Big/ p_j \tag{A.13}$$

■

For the following proof, note that Equation A.14 holds weakly (for all parameter values) with the functional forms from Equation 4 because $\frac{dm_{G,c}^*}{d\beta} = \frac{dm_{G,s}^*}{d\beta}$.

Proof of Proposition 4.

$$\frac{d}{d\beta}\left\{ \left[1 - \frac{\delta}{1-\delta} \cdot (1-\theta) \cdot p_c(m_{G,c}^*) \right] - \left[1 - \frac{\delta}{1-\delta} \cdot (1-\theta) \cdot p_s(m_{G,s}^*) \right] \right\} \cdot \left(-\frac{de_i}{dO_i} \right)$$

$$= \frac{\delta}{1-\delta} \cdot (1-\theta) \cdot \left[\underbrace{\frac{\partial p_s(m_{G,s}^*)}{\partial \beta}}_{<0} - \underbrace{\frac{\partial p_c(m_{G,c}^*)}{\partial \beta}}_{<0} + \underbrace{\frac{\partial p_s(m_G)}{\partial m_G}}_{<0} \cdot \underbrace{\frac{dm_{G,s}^*}{d\beta}}_{>0} - \underbrace{\frac{\partial p_c(m_G)}{\partial m_G}}_{<0} \cdot \underbrace{\frac{dm_{G,c}^*}{d\beta}}_{>0} \right] \cdot \left(-\frac{de_i}{dO_i} \right)$$

It suffices to establish the following three inequalities. First:

$$-\frac{\partial p_c(m_{G,c}^*)}{\partial \beta} > -\frac{\partial p_s(m_{G,s}^*)}{\partial \beta}$$

The following two facts establish this claim. a. For fixed m_G, we assume $-\frac{\partial p_c(m_G)}{\partial \beta} > -\frac{\partial p_s(m_G)}{\partial \beta}$.
b. Because $-\frac{\partial^2 p_j}{\partial m_G \partial \beta} > 0$, the claim follows from $m^*_{G,c} > m^*_{G,s}$ (part c of Lemma A.1).

The second inequality follows directly from Equation 2:

$$-\frac{\partial p_c(m_G)}{\partial m_G} > -\frac{\partial p_s(m_G)}{\partial m_G}$$

Third:

$$\frac{dm^*_{G,c}}{d\beta} \geq \frac{dm^*_{G,s}}{d\beta}$$

Differentiating the implicit definition of $m^*_{G,c}$ from Equation A.1 and of $m^*_{G,s}$ from Equation A.3 implies that we need:

$$\frac{\partial^2 p_s}{m_G^2} \Big/ \frac{\partial^2 p_c}{\partial m_G^2} \geq -\frac{\partial^2 p_s}{\partial m_G \partial \beta} \Big/ \left(-\frac{\partial^2 p_c}{\partial m_G \partial \beta} \right) \tag{A.14}$$

■

B Main Empirical Appendix

In this section, I first provide evidence of the motivating empirical patterns for this article: regional oil abundance covaries with more frequent separatist civil war onset, and country-level oil production covaries with less frequent center-seeking civil war onset. I then describe the data in depth and provide supporting information for the conditional results shown in Figures 7 and 8. I present the most pertinent information here and save supporting details (such as the regression tables that accompany each figure) for Appendix D.

B.1 Evidence on the Mixed Oil-Conflict Relationship

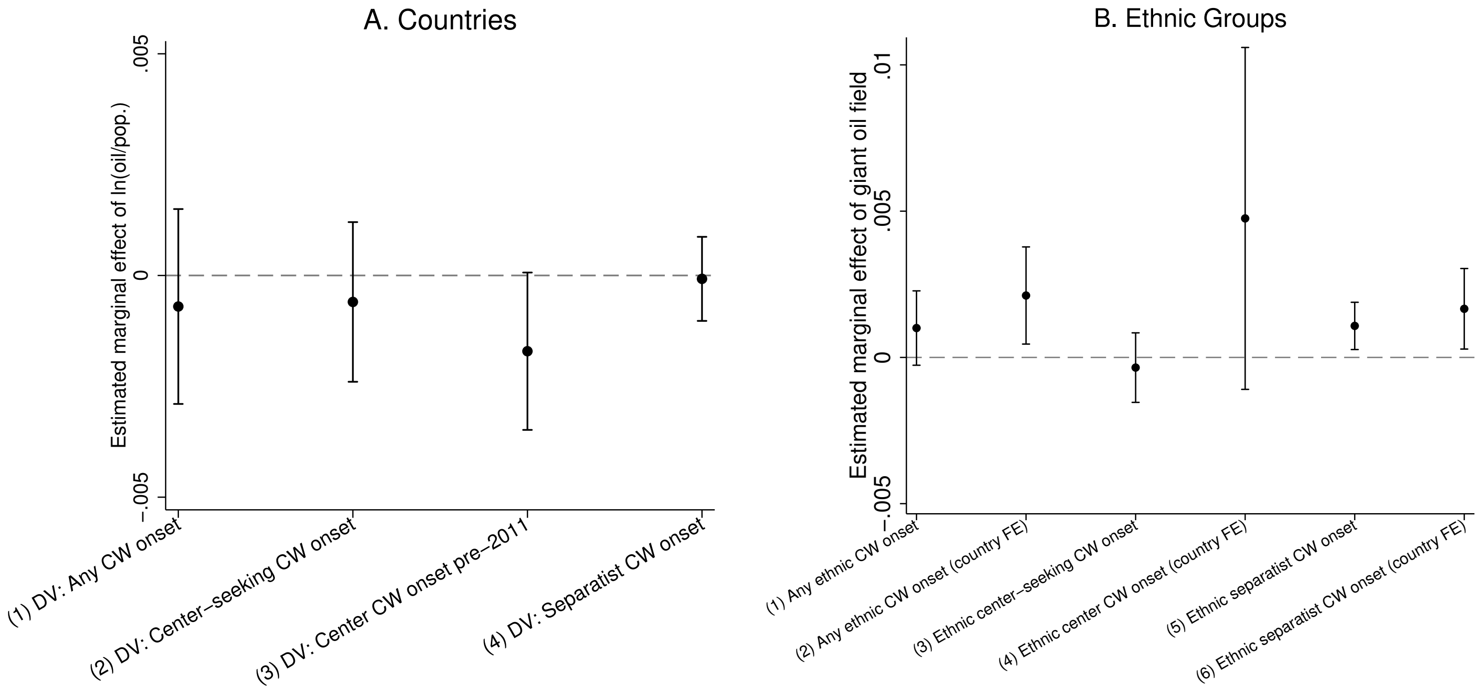
Considerable research analyzes the relationship between oil production and civil war onset, producing a diversity of findings and an emerging consensus that the *aggregate* relationship is null (Ross, 2015, 251). However, studying oil highlights the importance of disaggregating civil war aims. Whereas 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).

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 in the following subsections. It has advantages over the commonly used UCDP/PRIO conflict data because Fearon and Laitin use rigorous criteria for coding civil war "onset" as well as exclude minor conflicts. Empirically, almost all post-1945 civil wars enable relatively unambiguous codings about center-seeking versus separatist goals. For my civil war variables, I combined information from Fearon and Laitin and other conflict datasets to code war aims. I code a single rebel group as exhibiting both center-seeking and separatist aims for only two cases: the SPLM/A in Sudan, and the EPRDF and constituent groups in Ethiopia, which I examine in more depth in Appendix C.3. More frequently, center-seeking and separatist civil wars occur simultaneously within the same *country*, including Angola, Burma, and India. However, each *rebel group* in these conflicts pursued either center-seeking or separatist aims, but not both.

Panel A of Figure B.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. Every specification in Panel A 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.

Model 1 of Panel A 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. 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. The

Figure B.1: Correlations for Oil and Civil War



Notes: Panel A presents semi-elasticity (because oil is logged) marginal effect estimates for annual oil income per capita from logit models, with 95% confidence intervals. The unit of analysis is country-years. Panel B presents marginal effect estimates for an giant oil/gas field indicator from logit models, with 95% confidence intervals. The unit of analysis is ethnic group-years. Appendix D.1 provides additional details on the specifications.

empirical section in the article discusses why the Arab Spring and related events should weaken the negative relationship between oil production on center-seeking civil wars (specifically, the empirical evaluation of Hypothesis 3). Unreported specifications show that no other estimates in Figure B.1 qualitatively differ when truncating the sample to pre-2011.

Panel B of Figure B.1 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 Panel B. 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 if (a) the ethnic group's territory contains any giant oil or gas fields or (b) 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 Panel B demonstrate a positive association between oil wealth and any ethnic civil war onset. The remaining columns demonstrate that this relationship is limited to separatist civil wars. 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. 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 magnitude of the standard error estimates in model 4.

B.2 Country-Level Data and Regressions (Panel A of Figure B.1)

The following details the data used to produce Panel A of Figure B.1. For countries j and years t, the regression equation for Panel A of Figure B.1 and its corresponding regression table, Table D.1, is:

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

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.

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 (a) the later of 1946 and their year of independence and (b) 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.

Civil war data. The civil war data draw from Fearon and Laitin (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 two other civil war datasets, Correlates of War (COW) and the UCDP/PRIO Armed Conflict Dataset (ACD), and additional secondary sources when necessary. This enabled me to assign aims to 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, 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 coded only two cases as exhibiting both aims (Ethiopia and Sudan; Appendix C.3 describes each). By contrast, in countries such as Burma (coded as mixed war aims by Fearon and Laitin), distinct center-seeking and separatist rebellions broke out in 1948, and several other countries such as Angola and India have experienced 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) 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 any country with missing observations for some years—which, in any country with some missingness, occurs before the first data point for that country in the dataset—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 inputted all previous years as \$0. If oil and gas income per capita exceeded this amount in the first year, I inputted corresponding data points from Haber and Menaldo (2011).

Ross and Mahdavi (2015) also provide population data, drawn mostly from World Bank (2017) and Maddison (2008). I used their data to create a variable for *per capita* oil production, and I also control for population as a separate covariate in every country-level regression specification (following Ross 2012). For country-years in the sample during the 1940s, the country's 1950 population data point is used because the World Bank and Maddison each exhibit sparse coverage before 1950. Only Afghanistan had missing population data for any year later than 1950; their first year in the dataset is 1961, and I use that population figure for all previous years.

I lag 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.

B.3 Ethnic Group-Level Data and Regressions (Panel B of Figure B.1)

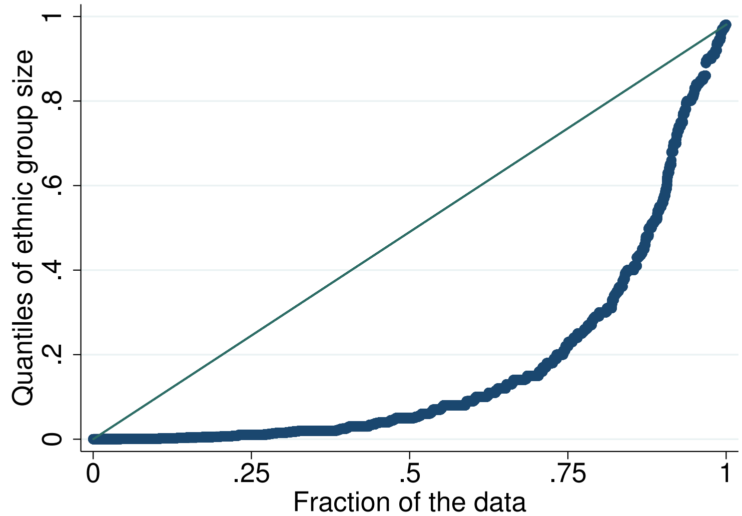
The following details the data used to produce Panel B of Figure B.1. For ethnic groups i, countries j, and years t, the regression equation for Panel B of Figure B.1 and the corresponding regression table, Appendix Table D.2, is:

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

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, plus 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.

Sample. The unit of analysis is ethnic group-years. The sample contains every politically relevant ethnic group with a location polygon in the 2014 version (Update 2) of the Ethnic Power Relations (EPR; Vogt et al. 2015) dataset that meet the country and time criteria described in the previous subsection. Ethnic group size as a fraction of the country's population is quite left-skewed, as the following quantile plot shows, which is why Figures 2 and 4 present average values over five bins of roughly equal size.

Figure B.2: Quantile Plot for Ethnic Group Size



Civil war data. Paine (2019) assigns civil wars from Fearon and Laitin's (2003) dataset to EPR ethnic groups in Sub-Saharan Africa. There I discuss the advantages of this procedure over existing scorings of civil war onset at the ethnic group level in which scholars translate incidence data from the Armed Conflict Dataset into onsets. I extended Paine's (2019) 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 certain rebel groups in Ethiopia and Sudan providing the only exceptions.

Oil data. The oil variable indicates whether the EPR ethnic group has any onshore or offshore giant oil/gas fields. Onshore means that the giant oil field lies with the group's spatial location polygon, and offshore means that the giant oil field is in water within 250 kilometers of a segment of the group's location polygon (assuming the polygon touches the relevant coast) and is within the maritime boundaries for the country in which the group resides. 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). A giant oil field contains ultimate recoverable reserves of at least 500 million barrels of oil equivalent before extraction began. Because the source provides data on when the field was initially discovered (with no missing data), the oil variable can vary over time for ethnic groups; the variable is coded as a 1 in every year after and including the year of discovery. To calculate the variable, I combined the giant oilfield variable with EPR spatial data from GeoEPR (Vogt et al., 2015) and maritime boundary spatial data from Flanders Marine Institute (2016). Appendix D.5 discusses differences between onshore and offshore oil.

B.4 Conditional Results for Oil and Separatist Civil Wars (Figure 7)

Sample. The sample differs slightly from that in Panel A of Figure B.1. Because Figure 7 focuses only on separatist civil wars, it excludes ethnic groups without a concentrated territory to minimize heterogeneity in the estimates. The absence of geographic concentration nearly perfectly predicts the absence of separatist, but not center-seeking, civil wars (author's calculation using Ethnic Power Relations dataset, see Appendix D.4).

Conditioning variables. The conditioning factors examined in Figure 7 are measured as follows:

- *Excluded minorities.* Minorities are groups that EPR codes as composing less than 50% of their country's population. An ethnic group is coded as excluded from political power in a particular year 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 ethnopolitical 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 exceeds the median in the sample, mountainous percentage of territory exceeds the median in the sample, or the territory is noncontiguous from the capital. I calculated the distance between each ethnic group's centroid and the capital city by combining GeoEPR with the CShapes dataset (Weidmann, Kuse and Gleditsch, 2010). I use percent mountainous 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 groups i, countries j, and years t, the regression equation for Columns 2 and 3 of Table D.3 is:

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

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

B.5 Conditional Results for Oil and Center-Seeking Civil Wars (Figure 8)

Government vulnerability variable. A country-year is scored as 1 on the government vulnerability variable used in Figure 8 if any of the following three conditions are true, and 0 otherwise:

- *Lost war or violent independence.* This condition equals 1 if any of the following are true within the previous two years: defeat in international war (Correlates of War; Dixon and Sarkees 2015); executive turnover caused by government defeat in a center-seeking civil war (coded by author drawing from the list of civil wars used throughout the article); government defeat in a separatist civil war, meaning rebels get significant autonomy concessions, de facto autonomy, or an independent state (coded from Fearon and Laitin's 2003 dataset); or independence from foreign occupation in which an internal war (i.e., war fought within the country's territory) occurred in the lead-up to independence (coded by author).
- *Oil shock decade.* Any year between 1973 and 1982, inclusive.
- *Arab Spring.* Any country in the Middle East and North Africa in 2011.

Regression equation. For countries j and years t, the regression equation for Column 2 in Table D.4 is:

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

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

C Discussion and Extensions to Formal Model

C.1 Why Model an Infinite Horizon?

An important simplifying assumption in the model is that the challenger can initiate a war only in the first period. Although the strategic interaction ends after period 1, the players look down the game tree when making choices in period 1. Therefore, future-period consumption influences the bargaining interaction in period 1. Modeling a shadow of the future incorporates a key rationale for war studied in existing models: shifts in power over time coupled with limited commitment ability cause costly fighting in equilibrium. In the present model, the possibility of equilibrium bargaining failure arises because C loses its ability to fight after period 1, which creates incentives for C to initiate a civil war before the adverse power shift occurs, although the commitment parameter θ determines exactly how much wealth C gains in the future under the status quo regime.

Assuming that G endogenously arms only once eliminates additional technical complications that would arise from modeling G's arming decision in every period (Paine 2016 details some technical issues that arise with modeling persistent shifting and endogenous arming over an infinite horizon, which would distract from the main substantive focus here). Although reduced form, the simple way that I model a shadow of the future is sufficient to generate the key tradeoffs; for example, Fearon's (1995, 404-08) canonical model with dynamic commitment inability also exhibits a one-time shift in power after period 1. In fact, my setup is the limiting case of a model in which, during every period of an infinite horizon, C can challenge the government with positive probability—for example, Acemoglu and Robinson's (2006) model of political regime transitions, in which (like many other conflict bargaining models) there is no endogenous armament choice. This claim about a limiting case would not be true if my model contained a finite number of periods, which motivates modeling an infinite number of periods without strategic moves.

Alternatively, I could model strategically trivial moves in future periods; 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 $x_t = \theta \cdot \left(2 - e_G - e_C\right)$ (assuming this is lower bound for transfers), yielding the same equilibrium outcomes as assumed here.

C.2 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) derive equilibrium conditions under which larger spoils increase prospects for fighting.

I can assess these claims by altering the model in a straightforward way. Assume economic production in each region is $Y_i > 0$, 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 prospects for equilibrium conflict.

In this extension, the equilibrium budget constraint changes from Equation 17 to:

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

with the corresponding equilibrium interior transfer amount changing from Equation 12 to:

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

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

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.

C.3 Evolving Civil War Aims

For simplicity, the core 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. The following highlights conditions under which, in a multi-period war, the challenger might switch from center-seeking to separatist aims or vice versa.

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

- If C initiates either type of civil war in period 1, then with probability $\kappa \in (0,1)$, the war stalemates after the first period. If this occurs, then C chooses civil war aims in period 2. This is the only strategic move in period 2 if a non-decisive war occurs in period 1, and no negotiated settlement is possible if the war stalemates. The possible war outcomes in period 2 are identical to those in the core model, that is, the war necessarily ends after period 2.
- C's group size $m_{C,t}$ is a function of time. It begins the game with $m_{C,1} > 0$. If C does not fight in period 1 or if the war is decisive after period 1, then $m_{C,t} = m_{C,1}$ for all t. If instead C fights and the war stalemates, then Nature chooses $m_{C,2}$ from a Bernoulli distribution: $m_{C,\text{low}} > 0$ with probability $q \in (0,1)$ and $m_{C,\text{high}} > m_{C,\text{low}}$ with probability $1-q$. This parameter cannot change again in any future period, that is, for any period $z > 2$, $m_{C,z} = m_{C,2}$. 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 $m_{C,t}$, and G does not make an arming choice. Therefore, I denote C's contest functions as $p_c(m_{C,t})$ and $p_s(m_{C,t})$. The following logic does not depend on G's arming decision, and therefore this simplification enables focusing on the core mechanism of interest.

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

$$E\big[U_C(\text{center}, m_{C,2})\big] = e_C + \delta \cdot \Big[p_c(m_{C,2}) \cdot V^C_{\text{center}} + \big[1 - p_c(m_{C,2})\big] \cdot V^C_{\text{s.q.}}\Big] \tag{C.3}$$

$$E\big[U_C(\text{separatist}, m_{C,2})\big] = e_C + \delta \cdot \Big[p_s(m_{C,2}) \cdot V^C_{\text{sep}} + \big[1 - p_s(m_{C,2})\big] \cdot V^C_{\text{s.q.}}\Big], \tag{C.4}$$

The future continuation values are identical to those in the core model because I assume that fighting is necessarily decisive in period 2. The only alteration is to rewrite m_C as $m_{C,t}$ in those functions. At this information set, C chooses between pursuing center-seeking and separatist aims; which does it prefer? Lemma C.1—which restates Lemma 1 for the special case considered here in which G's military capacity is exogenous—characterizes C's optimal civil war aims.

Lemma C.1. *Small groups optimally prefer separatist over center-seeking civil wars, and vice versa for large groups. Formally, a unique threshold $\tilde{m}_C \in (0,1)$ exists, implicitly defined as $p_c(\tilde{m}_C) = \pi_s \cdot p_s(\tilde{m}_C)$, such that:*

> ***Part a.*** *If $m_C < \tilde{m}_C$, then C's preferred civil war aims are separatist.*
>
> ***Part b.*** *If $m_C > \tilde{m}_C$, then C's preferred civil war aims are center-seeking.*

Assumption C.1 focuses the analysis on the substantively interesting parameter range in which there is a positive probability of C proclaiming either center-seeking $\big(\text{if } m_{C,2} = m_{C,\text{high}}\big)$ or separatist civil war aims $\big(\text{if } m_{C,2} = m_{C,\text{low}}\big)$ following a stalemate in period 1.

Assumption C.1. $m_{C,low} < \tilde{m}_C < m_{C,high}$

Given the Nature draw of $m_{C,2}$, C's expected continuation value if the war stalemates is:

$$V^C_{\text{stale}} = e_C + \delta \cdot \Big\{q \cdot \Big[p_c(m_{C,\text{high}}) \cdot V^C_{\text{center}} + \big[1 - p_c(m_{C,\text{high}})\big] \cdot V^C_{\text{s.q.}}\Big] + (1-q) \cdot \Big[p_s(m_{C,\text{low}}) \cdot V^C_{\text{sep}} + \big[1 - p_s(m_{C,\text{low}})\big] \cdot V^C_{\text{s.q.}}\Big]\Big\} \tag{C.5}$$

These expressions enable me to write C's expected utility to its three choices in period 1. Note that its utility to accepting is unchanged from the core model.

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

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

$$E\big[U_C(\text{separatist}; m_{C,1}, \theta)\big] =$$

$$e_C + \delta \cdot \left\{ (1-\kappa) \cdot \left[p_s(m_{C,1}) \cdot V^C_{\text{sep}} + \left[1 - p_s(m_{C,1})\right] \cdot V^C_{\text{s.q.}} \right] + \kappa \cdot V^C_{\text{stale}} \right\} \tag{C.8}$$

Combining Equations C.7 and C.8 shows that the possibility of stalemates does not alter C's calculus for preferring center-seeking over separatist because V^C_{stale} and κ cancel out. Therefore, Lemma C.1 characterizes C's optimal civil war aims in period 1; and $m_C = m_{C,1}$.

Equation C.9 implicitly defines the equilibrium transfer proposal, $x^*(\theta)$. This expression can be algebraically rearranged to resemble Equation 12, with the difference that it contains additional terms for the possibility of a stalemate.

$$E\big[U_C(\text{accept } x^*(\theta); m_{C,1}, \theta)\big] = \max\Big\{ E\big[U_C(\text{center}; m_{C,1}, \theta)\big], E\big[U_C(\text{separatist}; m_{C,1}, \theta)\big] \Big\} \tag{C.9}$$

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

Proposition C.1. *A unique threshold $\tilde{\theta} < 1$ exists such that if $\theta > \tilde{\theta}$, then $x^*\left(\tilde{\theta}\right) < R$. If $\theta < \tilde{\theta}$, then:*

> ***Switch from separatist to center-seeking.*** *Assume $m_{C,1} < \tilde{m}_C$, the war stalemates after period 1, and $m_{C,2} = m_{C,high}$. 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.*** *Assume $m_{C,1} > \tilde{m}_C$, the war stalemates after period 1, and $m_{C,2} = m_{C,low}$. Then C initiates a center-seeking civil war in period 1 and switches to center-seeking aims in period 2.*

Application to empirical cases. In Ethiopia, rebel groups switched from separatist to center-seeking aims after more than a decade of fighting. In the first phase, between the 1960s and 1980s, Ethiopia experienced separatist rebellions in seven different regions. Four of these generated at least 1,000 battle deaths before 1991: Tigray, Eritrea, Ogaden (Somali), and Oromiya (Oromo). According to the Armed Conflict Database, various rebel groups also sought center-seeking aims in the 1980s. A second phase began in 1989. 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), which sought to overthrow the government.[1] The EPRDF also launched joint operations with EPLF (Eritreans, 6%), which retained separatist aims. EPRDF captured Addis Ababa in 1991, and EPLF gained territorial control over Eritrea and voted to secede in 1993.

The switch from the first to second phase corresponds with an increase in $m_{C,t}$ between periods 1 and 2 in the model extension. It is plausible that the EPRDF coalition was not feasible at the outset of the war, and came together only following major government losses in 1988 (Dixon and Sarkees, 2015, 638), consistent with the assumed Nature draw for $m_{C,2}$. 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 given the large coalition that had recently become feasible.

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

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 and, eventually, independence. Prior to the beginning of the second civil war in 1983, Sudan experienced a separatist conflict between 1963 and 1972 in which members of 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.[2]

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 $m_{C,t}$ during the conflict, but instead the realization of $m_{C,2}$ was $m_{C,\text{low}}$ rather than $m_{C,\text{high}}$. 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 material conditions to non-Arab groups in the periphery than riverain Arabs [the ruling group]" (Roessler, 2016, 117). This created reasonable expectations that a broad-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.[3] 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. I did not classify any other rebel group as proclaiming both center-seeking and separatist aims (either at different times, as in Ethiopia; or simultaneously, as in Sudan). Although some countries experience simultaneous center-seeking and separatist conflicts, *distinct* rebel groups proclaimed center-seeking and separatist 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 do not mix groups with center-seeking and separatist aims.

This model extension provides insight into why any particular rebel group is rarely associated with both center-seeking and separatist aims. 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

[2] 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.

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

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 3 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 are too small to contemplate taking the center. Conversely, many center-seeking rebel groups lack a coherent territory that could form the basis for a new state (either in terms of ethnic geographic concentration or historical roots) as a fall-back option if their campaign to take the capital stagnates.

C.4 Does Oil Production Influence Civil War Aims?

In the core model, C prefers to win a center-seeking rather than separatist civil war because it gains perpetual revenues from the central region in addition to protecting all the spoils from its own region. The following alteration to the setup creates the possibility that an oil-rich C would prefer to win a separatist rather than center-seeking civil war. Now, a victorious C needs to transfer spoils to the deposed governing actor. This is a relevant consideration not only for thinking more deeply about strategic causes of civil war aims, but also for addressing a possible alternative explanation for the mixed oil-conflict pattern: separatist civil wars in oil-rich regions substitute for center-seeking civil wars that would have occurred if secession was not possible. However, combining the theoretical logic with empirical evidence casts doubt on this possibility.

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

- In the core model, C ends any interaction with the former governing actor if it wins either type of civil war. I continue to assume this is true for victorious secession, but not for winning a center-seeking civil war. Instead, I assume that a successful center-seeking war simply increases share of spoils that C retains from its own region and that it collects from G's region in every period. Denote θ from the core model as $\theta_{\text{s.q.}}$, and assume that winning a center-seeking civil war increases this parameter to $\theta_{\text{center}} \in \left(\theta_{\text{s.q.}}, 1\right)$. Implicitly, the core model assumes $\theta_{\text{center}} = 1$, whereas now I assume that C must provide some spoils to the former governing actor if they remain together in the same country.
- 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.

Analysis. C's expected utility to each of its three options has the same structure as in the core model. The continuation values $V^C_{\text{s.q.}}$ and V^C_{sep} are also the same as in the core model, except replacing θ with $\theta_{\text{s.q.}}$. The only different term is:

$$(1-\delta) \cdot V^C_{\text{center}} = e_C + \theta_{\text{center}} \cdot (2 - e_G - e_C), \tag{C.10}$$

as opposed to $2 - e_G - e_C$ in the core model. Given the motivating substantive question I want to address in this extension—does oil production cause separatist civil wars to substitute for center-seeking civil wars?—I focus on parameter values in which C prefers to fight either type of civil war rather than accept G's offer in period 1. That is, we know a civil war occurs in equilibrium, but what are its aims? Hence, I impose the following condition:

$$\frac{\delta}{1-\delta} \cdot p \cdot \min\left\{ \left(\theta_{\text{center}} - \theta_{\text{s.q.}}\right) \cdot (2 - e_C - e_G),\ (1 - \theta_{\text{s.q.}}) \cdot (1 - e_C) - \theta_{\text{s.q.}} \cdot (1 - e_G) \right\} > 2 - e_G \tag{C.11}$$

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:

$$e_C < 1 - \frac{\theta_{\text{center}}}{1 - \theta_{\text{center}}} \cdot \left(1 - e_G\right) \tag{C.12}$$

High regional oil production corresponds with parameter values in which Equation C.12 holds because of the assumption from the core model that e_C strictly decreases in O_C. Proposition C.2 presents the main result.

Proposition C.2. *Assume that Equation C.11 holds. A unique threshold $\tilde{e}_C$ exists 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 C.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.

Application to empirical cases. Although theoretically coherent, it is unlikely that Proposition C.2 can explain many empirical cases. Oil-rich groups that have fought separatist civil wars were unlikely to have sought the center in the absence of oil wealth, based on their share of the national population. Of the seventeen wars listed 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 25%. Furthermore, anecdotal considerations about the three largest groups in Panel A of Figure 7 suggest that seeking the center was not a viable option—or, at least, historical precedents favored secession. A separatist civil war occurred in Yemen in 1994, initiated by Southerners that composed a majority of the population. However, South Yemen had merged with North Yemen only four years prior, creating a concrete distinct state that Southerners could recreate. In Nigeria, Britain governed Igbos in the southeast region as a separate territory from the north for much of the colonial era. Thus, when northerners gained control of the state at independence, Igbos had a viable separatist narrative after a series of coups and purges in 1966 left them powerless at the center. In Iraq, the Ottomans governed Mosul (Kurds) as a separate province prior to Britain colonization and creation of Iraq. The historical difficulty that Iraq's Kurds faced to constructing durable political organizations suggests that they could more easily fight in the mountains rather than organize an attack on the capital.

D Supplemental Empirical Appendix

D.1 Regression Tables

Table D.1: Regression Table for Panel A of Figure B.1

Dependent variable:	All CW onset	Center CW onset	Center CW onset	Sep CW onset
	(1)	(2)	(3)	(4)
ln(Oil & gas p.c.)	-0.000700	-0.000597	-0.00171	-7.65e-05
	(0.00112)	(0.000919)	(0.000906)	(0.000483)
ln(Population)	0.0582	0.0248	0.0226	0.0290
	(0.0122)	(0.00793)	(0.00792)	(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 B.1 using a logit link. It presents semi-elasticity marginal effect estimates (because oil is logged) evaluated at coefficient means, with country-clustered standard error estimates (calculated using two-sided hypothesis tests) in parentheses. 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.

Table D.2: Regression Table for Panel B of Figure B.1

Dependent variable:	All CW onset		Center CW onset		Separatist CW onset	
	(1)	(2)	(3)	(4)	(5)	(6)
Giant oil/gas field	0.00100	0.00212	-0.000349	0.00475	0.00108	0.00166
	(0.000649)	(0.000847)	(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 B.2 using a logit link. It present marginal effect estimates evaluated at coefficient means, with ethnic group-clustered standard error estimates (calculated using two-sided hypothesis tests) in parentheses. 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.

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 B.3 using a logit link. The top of the table presents untransformed coefficient estimates, with ethnic group-clustered standard errors (calculated using two-sided hypothesis tests) in parentheses. The bottom of the table reports marginal effect estimates for different values of the conditioning variables, evaluated at coefficient means; and the associated standard error estimates 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.

Table D.4: Regression Table for Figure 8

	DV: Center-seeking CW onset	
	(1)	(2)
ln(Oil & gas p.c.)	-0.0291	-0.154
	(0.0452)	(0.0681)
Vulnerable gov.		0.499
		(0.363)
ln(Oil & gas p.c.)*Vulnerable gov.		0.241
		(0.0885)
ln(Population)	0.176	0.197
	(0.0536)	(0.0555)
Country-years	6,828	6,828
Countries	150	150
Time controls?	YES	YES
	Marginal effects	
ln(Oil & gas p.c.), unconditional	-0.000597	
	(0.000919)	
ln(Oil & gas p.c.) | Vulnerable gov.=0		-0.00225
		(0.000898)
ln(Oil & gas p.c.) | Vulnerable gov.=1		0.00355
		(0.00215)

Notes: Table D.4 estimates Equation B.4 using a logit link. The top of the table presents untransformed coefficient estimates in the top part, with country-clustered standard errors (calculated using two-sided hypothesis tests) in parentheses. The bottom of the table reports semi-elasticity marginal effect estimates (because oil is logged) for different values of the conditioning variables, evaluated at coefficient means; and the associated standard error estimates in parentheses. Note that the marginal effect estimate in Column 1 is identical to that in Column 2 of Table D.1. 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.

D.2 Rule by Small Ethnic Groups

When discussing Figure 2, I briefly summarized modes through which small ethnic groups (20% of their country's population or less) have gained control of the government. Here I describe the sample and list every case. Using the set of ethnic-group years that meet the sample criteria described in Appendix B, I calculated the numerical size of the ethnic group with the highest power status in the central government. In the Ethnic Power Relations (EPR; Vogt et al. 2015) coding scheme, this corresponds with groups with a status of monopoly, dominant, or senior partner (if there were multiple senior partners, I counted only the largest one). Table D.5 lists 59 cases, and states the first year of the new ruling group (see additional notes below for more details on the sample). I then coded the mode by which each of these regimes either gained power. For sources, I consulted the EPR Atlas (the codebook for EPR's power status variable) and two Africa-specific sources since most of the cases are in Africa: Roessler's (2011) appendix with information on transitions among ruling ethnic groups, and Meng and Paine's (2020) appendix with information on regimes that gained power via a civil war.

Table D.5 lists every case. Ten cases involved a rebellion, whether on its own or in conjunction with other modes of gaining power. However, this is somewhat of an overcount because in two cases, the ruling ethnic group does not correspond directly to the group that controlled the government after the rebellion ended. In South Africa, EPR codes "Blacks" as a politically relevant ethnic group prior to 1994 because Africans versus Europeans was the relevant political cleavage, whereas divisions among Africans were not politically salient. Blacks (77% of the population) were the rebelling group despite members of a specific African group Xhosa (18% of the population) becoming the senior partner in government after 1994. In Liberia, the rebel groups MODEL and LURD that participated in the struggle to depose Charles Taylor were not politically relevant actors in the post-war settlement (Käihkö, 2015, 2018).

Table D.5: Rule by Small Ethnic Groups

Ethnic group	Country	Year of entry	Group %	Mode of entry
Northern (Bariba, etc.)	Benin	1960	15	Decolonization
Northern (Bariba, etc.)	Benin	1968	15	Coup
Northern (Bariba, etc.)	Benin	1996	15	Election
Ngalops (Drupka)	Bhutan	1989	20	Ethnic narrowing
Tutsi	Burundi	1966	14	Coup
Fulani (and other northern Muslim peoples)	Cameroon	1960	17.5	Decolonization
Beti (and related peoples)	Cameroon	1983	18	Succession
Riverine groups (Mbaka etc.)	CAR	1960	14.5	Decolonization
Yakoma	CAR	1982	4	Coup
Sara	CAR	1994	10	Election
Toubou	Chad	1980	4	Rebellion
Zaghawa, Bideyat	Chad	1991	1	Rebellion
Bakongo	Congo	1964	9	Coup
Mbochi	Congo	1969	12	Coup
Bembe	Congo	1992	1	Election
Mbochi (proper)	Congo	1998	9	Rebellion
Bakongo	DRC	1960	10.3	Decolonization
Ngbandi	DRC	1961	2	Coup
Tutsi-Banyamulenge	DRC	1998	2	Rebellion
Luba Shaba	DRC	1999	5	Coup (purge)
Baule (Akan)	Cote d'Ivoire	1960	20	Decolonization
Southern Mande	Cote d'Ivoire	2000	10	Coup
Kru	Cote d'Ivoire	2001	11	Election
Tigry	Ethiopia	1992	6.08	Rebellion
Mbede (Nzebi, Bateke, Obamba)	Gabon	1968	20	Succession
Wolof	Gambia	1965	14.5	Decolonization
Ga-Adangbe	Ghana	1967	8	Coup
Asante (Akan)	Ghana	1972	15	Coup
Ewe	Ghana	1982	13	Coup
Asante (Akan)	Ghana	2001	15	Election
Susu	Guinea	1985	20	Coup
Cape Verdean	Guinea-Bissau	1974	2	Decolonization
Papel	Guinea-Bissau	1981	7	Coup
Papel	Guinea-Bissau	2006	7	Election
Sunni Arabs	Iraq	1946	19	Decolonization
Kalenjin-Masai-Turkana-Samburu	Kenya	1979	15	Succession
Sunnis (Arab)	Lebanon	1971	20	Demographic shift
Americo-Liberians	Liberia	1946	2	Decolonization
Krahn (Guere)	Liberia	1981	5	Coup
Americo-Liberians	Liberia	1997	2	Rebellion/election
Gio	Liberia	2004	8	Rebellion/transition gov't
Americo-Liberians	Liberia	2006	2	Election
Ijaw	Nigeria	2011	10	Succession
Tutsi	Rwanda	1995	15	Rebellion
Serer	Senegal	1960	15	Decolonization
Limba	Sierra Leone	1968	8	Coup
English Speakers	South Africa	1946	4.5	Decolonization
Afrikaners	South Africa	1948	8	Election
Xhosa	South Africa	1994	18	Rebellion/election
Shaygiyya, Ja'aliyyin and Danagla (Arab)	Sudan	1956	15	Decolonization
Kurds	Syria	1949	8	Coup
Alawi	Syria	1966	13	Coup
Mainland Chinese	Taiwan	1949	14	Foreign invasion
Northerners (Langi etc.)	Uganda	1966	17.3	Coup
Far North-West Nile (Kakwa-Nubian etc.)	Uganda	1972	7.9	Coup
Northerners (Langi etc.)	Uganda	1980	18	Election/foreign invasion
South-Westerners (Ankole etc.)	Uganda	1986	20	Rebellion
Europeans	Zimbabwe	1965	3	Decolonization

Nineteen regimes in Table D.5 achieved power via a coup d'etat. Although these cases also involved coercion, coups are distinct from center-seeking rebellions. Whereas rebellions require belligerents to build a private military and defeat the state military in battle, coups involve quick strikes by individuals that are part of the state military. Many researchers posit explicit differences in the mechanisms that trigger coups rather than civil wars (Roessler, 2016; Paine, 2020). A useful task in future research would be to better integrate causes of coups into the conflict resource curse literature, which to this point has almost exclusively focused on rebellions (although see Nordvik 2019 and Lango, Bell and Wolford 2020).

Among the remaining regimes, thirteen gained power during decolonization from European rule (and thus were the ruling group at independence), nine by winning an election, and four through normal constitutional succession rules. The remaining three are heterogeneous. In Taiwan, the Kuomintang conquered the island in 1949 after losing a civil war in mainland China, hence bringing to power a minority of mainland Chinese. In Lebanon, a constitutionally ordained power-sharing arrangement made both Sunni Arabs and Maronite Christians senior partners in the government. Based on the country's original census, Maronite Christians were 29% of the population and Sunni Arabs were 22%. However, a new census yielded revised estimates in 1971 that Maronite Christians were 16% of the population and Sunni Arabs were 20%. Thus, demographic shifts meant that although the ruling coalition remained unchanged with regard to the identity of the ethnic groups, the largest senior partner no longer exceeded 20% of the population. In Bhutan, a change in the definition of who was eligible to rule the kingdom narrowed the monopoly group from all Bhutanese (50% of the population) to the subgroup of Ngalops (Drupka).

I do not list cases in which the size of the ruling group changed but (a) there was no regime change and (b) the original ruling group was below 20% of the country's population (the latter reason is why I include Bhutan). For example, Idi Amin staged a coup that, using EPR's list of ethnic groups, brought "Far North-West Nile (Kakwa-Nubian, Madi, Lugbara, Alur)" into power in 1972, who composed 7.9% of the country's population. In 1974, the ruling group changed to "Kakwa-Nubian," who were 3.1% of the population. However, Idi Amin remained in power through 1974, but narrowed the set of individuals with access to high level positions from Far North-West Nile groups broadly defined to a specific subgroup, Kakwa-Nubian.

D.3 Rebel Tactics and Civil War Aims

Kalyvas and Balcells (2010) analyze rebel tactics 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 estimate 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 Panel A of Figure B.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 D.6. Using multinomial logit models, they 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 D.6 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 D.6: Adding Separatist Indicator to Kalyvas and Balcells

	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 D.6 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).

D.4 Territorial Concentration and Civil War Aims

Toft (2014, 191) summarizes existing evidence on the importance of territorial concentration for facilitating a separatist rebellion: "[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 . . . 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."

Table D.7 presents two specifications. Using the same sample of ethnic groups as in Panel B of Figure B.1, 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 territorial concentration is strongly and positively correlated with separatist civil war onset, but not with 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 because 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: See the note for Table D.2. The only difference is that the specification for Table D.7 replaces the oil indicator with the territorial concentration indicator.

D.5 Rebel Finance Theories and Evidence for Onshore/Offshore Oil

One important theme in recent research on the resource curse is that the within-country location of oil production affects prospects for conflict (Ross, 2015, 251). My theory offers a nuanced implication for the importance of oil location: oil production is likely to trigger separatist conflict if located in a region with a politically excluded minority group. However, oil production is unlikely to trigger center-seeking civil wars, regardless of within-country location. In the section that introduced oil production into the model, I discussed an alternative theory in the literature that posits a distinct mechanism about rebel finance. Many argue that oil located near potential rebel groups makes conflict likely by providing rebels with an opportunity to steal oil production to finance their rebellion (Collier and Hoeffler, 2005; Lujala, 2010; Ross, 2012). As I state in the text, empirically, oil rarely provides large-scale finance for rebel groups. Instead, my theory incorporates the better substantively grounded premise that governments control the preponderance of oil revenues (Colgan, 2015, 8), which follows from the core properties of oil production such as high capital-intensity and fixed location that facilitate easy taxation (Le Billon, 2005, 34).

One observable implication that distinguishes mine from existing theories is based on distinguishing onshore and offshore oil production. My theory suggests that this distinction should not matter. If a politically excluded minority group would gain control over specific oil fields by seceding, then my model highlights a trigger for war: separatism is attractive because the challenger fears predation under the status quo regime. Whether the oil fields are onshore or offshore does not affect this calculus. By contrast, existing location theories anticipate that groups with offshore oil production only should not rebel more frequently than oil-poor groups because offshore oil is almost impossible to loot (Lujala, 2010; Ross, 2012).

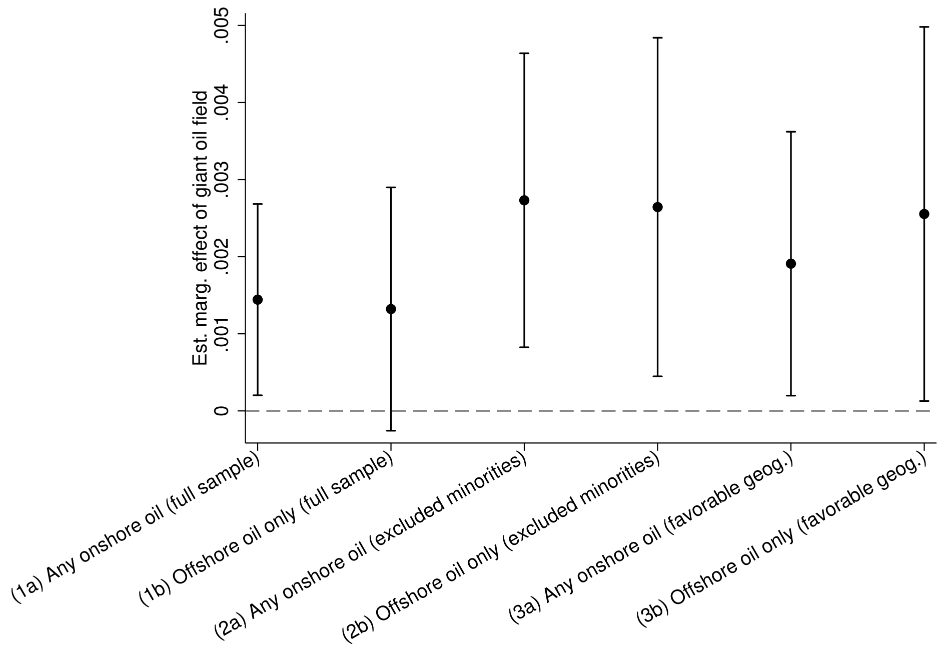
Here, I show empirically that offshore oil production is indeed positively correlated with separatist civil war onset—in fact, the estimates are very similar to those for onshore oil. Specifically, I re-run the specifications used to assess Hypotheses 1 and 2 while distinguishing ethnic groups with offshore oil production only from those with onshore or mixed production (Appendix B.3 describes how I coded onshore and offshore oil). However, because there are few groups with only offshore oil production, the offshore correlation is based on a small number of cases.

The regression equation for Figure D.1 and Table D.8 is:

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

where β_N is the coefficient estimate for o<u>n</u>shore oil and β_F is the coefficient estimate for o<u>f</u>fshore oil.

Figure D.1: Figure 7 with Disaggregated Onshore and Offshore Oil



Notes: See the note for Figure 7. The only difference in specification is that the oil indicator is disaggregated into onshore and offshore oil, as described above.

In Figure D.1 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.

An important caveat for interpreting the results in Figure D.1 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 only four "positive-positive" cases, hence rendering the statistical tests somewhat inconclusive. The discussion below of Angola provides evidence of the proposed mechanisms from a specific case.

Table D.8: Regression Table for Figure D.1

	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: See the note for Table D.3. The only difference in specification is that the oil indicator is disaggregated into onshore and offshore oil, as described above.

D.6 Qualitative Evidence from Saudi Arabia and Angola

Qualitative 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 elements of the government's choice set in the 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 most of the country's oil (Jones, 2010, 90-92). 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: no 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 created 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.

Angola's Cabinda province is another typical case in which an exploited oil-rich minority group with favorable geography launched a separatist civil war. This is consistent with Hypotheses 1 and 2. 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: "oil" and "petroleum" appear 62 times on the main page of the Cabinda Free State's website (Cabinda Free State, n.d.). Despite offshore fields producing nearly all of Cabinda's oil (Le Billon 2007, 106; Porto 2003, 4), this has not attenuated the demands of local residents for a fairer distribution of resources, consistent with the argument in Appendix D.5 that offshore oil also contributes to separatism.

Cabinda also features favorable geography for rebellion (Hypothesis 2) due to its territorial separation from mainland Angola, and Portugal governed Cabinda as a largely distinct colony (Martin, 1977, 54-55). Even during Angola's decolonization struggle, MPLA (who gained control of the government at independence) 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.

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. Hypothesis 3 anticipates this outcome because Angola met one of the government vulnerability conditions at independence. 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. Thus, although by convention Angola is coded as experiencing a civil war "onset" in 1975, it was really a continuation of an ongoing decolonization war that the government, despite its oil wealth, was largely powerless to stop.

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