

Greed, Grievances, or *Strategic* Intransigence? Why Oil-Rich Regions Fight Separatist Civil Wars

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Abstract

Oil-rich regions frequently fight separatist civil wars, consistent with the broader hypothesis that oil wealth diminishes prospects for civil peace. Although existing “greed” and “grievances” hypotheses highlight important attributes of oil production that may contribute to violence, we have few insights into a basic question about mechanisms: what prevents governments from strategically using the large revenue streams afforded by oil to buy off secessionists? This paper studies an infinitely repeated stochastic game in which a government bargains with a territorial actor over regional revenues. The region can guard against government predation of its economic production by exiting the formal economy or by fighting to secede. The first result explains why capital-intense oil production undermines the region’s economic exit option, which facilitates government exploitation and increases the likelihood of separatist civil wars. The second result complements this conflict-inducing effect by demonstrating that local oil wealth reinforces bad institutions by undermining government incentives to adopt taxation constraints.

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1 Introduction

Oil-rich regions frequently fight separatist civil wars.¹ Exemplifying patterns found in existing research, among a broad sample of African and Asian countries, politically relevant ethnic groups with at least one major oil field in their territory initiated a separatist civil war in 2.4% of ethnic group-years between 1945 and 2009, compared to 0.5% for oil-poor groups.² However, this empirical pattern is puzzling when examined from the perspective of non-oil explanations for civil war propensity. Governments have faced severe impediments to raising revenues throughout history,³ and considerable scholarship argues that weak states underpinned by minimal revenue streams are more susceptible to civil conflict.⁴ Furthermore, oil revenues have been argued to insulate authoritarian governments from societal attacks.⁵ It therefore seems strange that oil wealth enhances government revenues—yet is posited to raise separatist civil war propensity. Why does oil tend to undermine peaceful wealth-sharing agreements?

Despite a large literature in comparative politics and international relations that has highlighted important aspects of oil production that engender a “conflict resource curse,”⁶ we have few insights into this key questions about mechanisms, specifically, why governments do not use oil revenues to buy off secessionists. One major set of theories focuses on how oil causes “grievances” within producing regions because governments redistribute wealth away from these regions (Sorens 2011, 574-5; Ross 2012, 151-2; Condra 2013).⁷ These

¹Sorens (2011), Condra (2013), Morelli and Rohner (2014), and Hunziker (2015) provide evidence from regionally disaggregated data. Ross (2012, 184), Collier and Hoeffler (2005), and Blair (2014) provide evidence from cross-national data.

²The appendix describes the data.

³Herbst (2000) provides examples from Africa.

⁴Most of these arguments build off Fearon and Laitin (2003) and Collier and Hoeffler (2004).

⁵Ross (2001) overviews this broad literature.

⁶Ross (2013) reviews this voluminous literature, whose leading articles have jointly been cited over 10,000 times (see Paine 2015, 1).

⁷Collier and Hoeffler’s (2004) distinction between grievance and greed explanations for civil war in their

arguments presume both that governments can easily extract oil wealth—hence providing revenues that can be distributed elsewhere—and that governments indiscriminately redistribute away from oil-rich regions. However, why should *easy* extraction imply higher civil war propensity? As noted, hypotheses from related literatures imply this effect of oil may instead enable the government to buy off rebels by helping to solve the frequent challenge of accruing government revenues. Furthermore, even if easy revenue extraction does entail pernicious consequences for peace, why should local oil production cause *irreconcilable* redistributive tensions—considering countervailing government incentives to prevent fighting by strategically allowing more oil wealth to remain in the producing region?

Nor can the other major strand of theories—focused on “greedy” rebels—explain why governments do not use oil revenues to buy off secessionists. Regarding separatist conflicts, Collier and Hoeffler (2005, 44) argue: “There are two major reasons why natural resources might be a powerful risk factor—the opportunity that they provide in rebel groups to finance their activities during conflict and the lure of capturing resource ownership permanently if the rebellion is victorious.”⁸ However, why should a *large* territorial prize prevent a negotiated settlement? The prize-driven revenue stream should seemingly enable the government to broker a lucrative wealth-sharing deal under the status quo territorial arrangement. The rebel looting hypothesis may also face difficulties explaining this puzzle

seminal article has and continues to structure the literature. For example, Smith’s (2015, 5) recent literature review states: “the theorized mechanisms linking resource wealth to civil conflict track fairly well along a grievance-greed continuum.”

⁸Collier and Hoeffler also argue that oil wealth specifically exerts an exaggerated effect on greed rebellions (44). Providing additional examples, 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” and Fearon (2008, 8) states: “scholars in the civil war literature routinely ‘explain’ the association between oil production (or other natural resources) and civil war by arguing that these increase the value of winning.” These prize arguments draw from theoretical wisdom in the economics of conflict literature (Garfinkel and Skaperdas 2006) and resemble arguments that valuable territory (more broadly defined) triggers territorial conflict (Toft 2014, 188). Ross (2012, 147-153) elaborates upon Collier and Hoeffler’s (2004, 2005) rebel finance argument.

because—juxtaposing grievance and greed arguments—how can oil provide easy government revenues while also providing easy *rebel* finance?

This paper provides a new theory explaining why oil causes separatist civil wars. It complements existing explanations by scrutinizing greed and grievances effects, but it provides greater insight into mechanisms by considering a richer set of possible government strategies than do existing theories to explain why oil wealth’s countervailing conflict-suppressing effects do not prevent bargaining breakdown. A government and region interact in an infinitely repeated stochastic game. In each period of the baseline game, the government sets a tax rate on production from the region’s formal economy and offers patronage to the region from revenues collected elsewhere in the country. The region then decides how much to produce in the formal versus the informal economy, i.e., to what extent to “exit” the taxable formal economy. The region also either accepts the government’s proposal or fights to create a separate state. A successful war permanently prevents the government from taxing the region’s economic production. The region fluctuates stochastically across periods between having weak or strong coercive power, and in the baseline model the government cannot commit to future taxation or patronage proposals.

The analysis focuses on how increased oil production in the region affects separatist incentives. The first main result emerges from comparing how different types of economic production affect the region’s ability to exit the taxable formal economy, which in turn impacts the government’s taxation choices. This is a largely novel consideration for studying causes of separatist civil wars because although many scholars focus on government exploitation and associated grievances, they do not incorporate commodity taxation into their theoretical framework. If the region is oil-rich, its residents’ threats to withhold labor from the formal sector—which decreases taxable production and therefore could induce the government to lower its tax rate—is ineffective. Local labor input only minimally affects oil

output because oil production is a highly capital-intensive industry.⁹ Therefore, reacting to a weak economic exit option, the government can easily exploit a large percentage of an oil-rich region's wealth in periods the region is coercively weak. This increases the region's incentives to fight in periods it does pose a strong separatist threat.

The first result addresses drawbacks of existing grievances arguments by explaining why easy revenues decrease the government's ability to buy off the region: the same easy-revenue properties of oil posited to promote authoritarian stability *also* make separatist civil wars more likely. This same logic also highlights a previously unrecognized contradiction between grievance and greed theories: these easy revenue properties also minimize opportunities for rebel looting. The first result additionally contrasts with greed arguments because the large prize exerts ambiguous effects on separatist incentives. One novel empirical implication of these findings is that contrary to existing arguments, the separatist effects of oil should exist for offshore oil production because offshore oil extraction is more capital-intensive than onshore production. Evidence from Angola supports this implication.

However, if the government is so effective at raising oil revenues that this causes war, the government would seemingly benefit if it could commit to reduce the tax rate enough to prevent costly fighting. An extension to the model evaluates this possibility by allowing the government, at the outset of the game, to impose an exogenously enforced maximum tax rate. The second main result explains why oil encourages governments to *strategically* pursue intransigent bargaining strategies toward oil-rich regions, i.e., why oil undermines incentives to institutionalize taxation constraints. Although decreasing taxes would benefit the government by preventing fighting, core properties of oil wealth—capital-intensive production and a large prize—raise the opportunity cost of reducing taxes. In addition to addressing strategic governmental choices over institutions—a consideration that grievances

⁹Below I discuss differences from alluvial diamonds and subsistence agriculture.

theories omit—the second main result also contrasts with rebel greed arguments by showing that oil causes separatist conflict primarily by triggering *government* rather than *rebel* greed. This result is also important because many general resource curse theories imply that oil only exerts pernicious effects when the institutions at the time of discovery are weak, without scrutinizing how oil can reinforce extant bad institutions. Sudan exemplifies the difficulty of institutionalizing tax constraints for oil-rich regions.

This paper contributes to four important literatures in comparative politics and international relations. Foremost, it deepens our understanding of the broader “resource curse” phenomenon—which is especially important considering recent research arguing that oil wealth does not unconditionally increase incentives for all types of civil wars (Paine 2015; Blair 2014; Cotet and Tsui 2013).¹⁰

Second, the model builds off formal conflict bargaining models to understand incentives for secession. Although these models have been used to study regime transitions (Acemoglu and Robinson 2006), international warfare (Fearon 1995; Powell 1999), and civil war broadly (Fearon 2004; Powell 2012), to my knowledge no existing conflict models have examined how different economic bases vary the ability of producers to exit to the informal economy and, consequently, affect prospects for secession. Economic theories of secession (Bolton and Roland 1997; Alesina and Spolaore 2003) examine how differences in regional wealth affect incentives to *vote* for secession, but do not address questions about bargaining breakdown into conflict. Furthermore, none of these models focus on oil specifically and therefore do not address the core puzzle considered here about why the conflict-inducing effects of oil wealth should overwhelm conflict-suppressing effects.

Third, the paper also provides insights into broader causes of separatist civil wars. Empir-

¹⁰The democracy (Haber and Menaldo 2011) and economic development (Alexeev and Conrad 2009) chains of the resource curse argument have also recently come under scrutiny.

ical studies have demonstrated that regionally concentrated groups occupying territorial “homelands” are more likely to initiate separatist civil wars, in particular when they occupy territory with high material value (Toft 2014, 187-8). Although informative, these results do not provide insight into what triggers *fighting* between the region and government—a central focus of the present theory. The model also provides insight into how economic bases that eliminate economic exit options—rather than *valuable* territory, *per se*—increase prospects for separatist civil wars.

Given the strong overlap between separatist civil wars and ethnic civil war, these empirical findings also relate, fourth, to a widespread literature on grievances and ethnic conflict (Gurr 1969; Horowitz 1985; Cederman et al. 2013; Denny and Walter 2014). It is crucial to understand specific causes of ethnically based grievances—such as local oil wealth—because “grievances” in a general sense are too widespread to meaningfully account for variance in political violence (Fearon and Laitin 1996). Conceiving the government and region from the model as composed of different ethnic groups,¹¹ the model demonstrates how ethnically-defined grievances arise *in equilibrium* from the government’s ability and desire to levy high tax rates if the group is oil-rich, rather than *assumes*—as in most existing theories—that power divided along ethnic lines necessarily engenders grievances. Related, in response to earlier findings that country-level measures of grievances such as ethnic fractionalization exhibit weak correlations with civil war onset (Fearon and Laitin 2003; Collier and Hoeffler 2004), considerable scholarship has established that ethnic-level grievances are correlated with ethnic civil war onset (Cederman et al. 2013). Although these studies have produced findings relevant for conflict resource curse debate—for example, ethnic groups whose territories produce more wealth than the national average are more likely to rebel—oil wealth specifically has received minimal attention in leading

¹¹The model setup describes why this is a useful assumption.

publications (e.g., Cederman et al. 2013, 84).

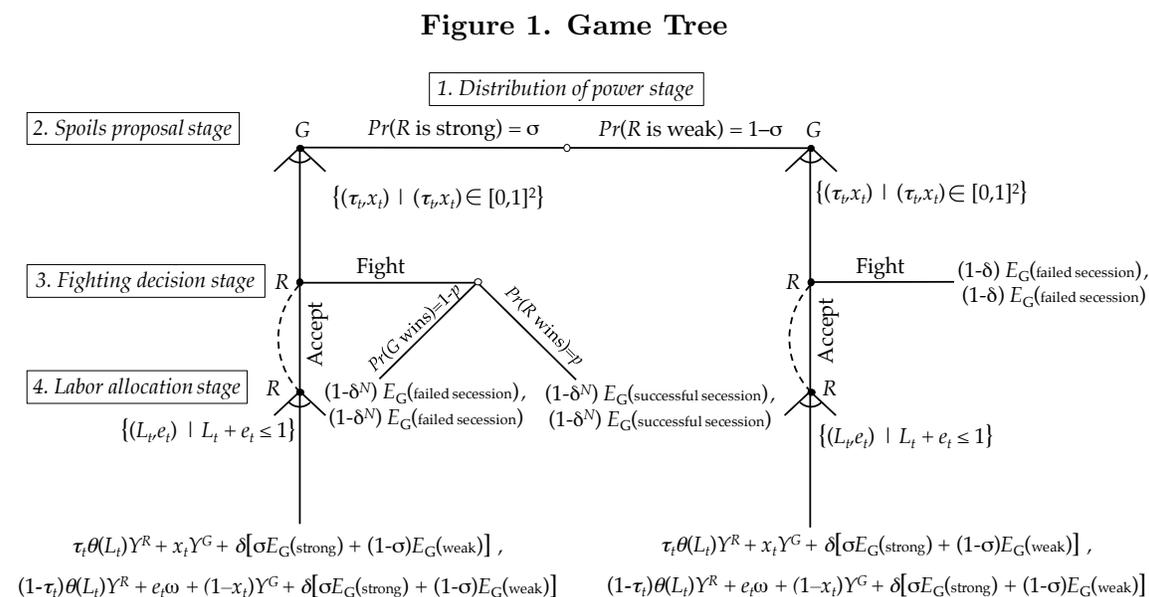
The next section sets up the model, followed by equilibrium analysis. The following two sections present the two main results. An appendix provides supporting theoretical results.

2 Baseline Model: How Bargaining over Taxation Affects Separatist Civil Wars

This section sets up the model and defines the equilibrium concept.

2.1 Setup

A government (G) and region (R) interact in an infinite time horizon. Future payoffs are discounted by a common rate $\delta \in (0, 1)$ and time is denoted by $t \in \mathcal{Z}_+$. The stage game played in each period contains four sets of actions.



Notes: Figure 1 presents the stage game played in each period of the infinitely repeated game when the history does not contain a separatist war. The only differences between the left (R is strong) and right (R is weak) sides of the tree occur at the fighting stage, because when R is strong it wins with probability p and the fight lasts N periods, whereas when R is weak it wins with probability 0 and the fight lasts one period. Consumption amounts stated are per-period averages.

1. *Distribution of power stage.* If no fight has occurred in the past, Nature stochastically chooses whether R is “strong” (probability σ) or “weak” (probability $1 - \sigma$), terms formally defined below. This stage is degenerate following a separatist civil war because, as described below, G and R ’s interaction ends if R wins, and R is permanently weak if it loses.

2. *Spoils proposal stage.* G offers a proposal to R . This includes a tax rate $\tau_t \in [0, 1]$ that transfers τ_t percentage of R ’s current-period economic output in the formal sector to G . The proposal also contains a patronage offer $x_t \in [0, 1]$ that transfers $1 - x_t$ percent of G ’s exogenous revenues collected elsewhere in the country—denoted Y^G —to R .

3. *Fighting decision stage.* Third, R either accepts G ’s proposal or fights a separatist war to create an autonomous state. If R accepts, its consumption depends on G ’s proposal and on its labor allocation, as described in the fourth stage.

If instead R initiates a separatist civil war in a strong period, neither actor consumes during the current or next $N - 1$ periods. R ’s ultimate probability of winning the war is $p \in (0, 1)$. After fighting ends, G consumes its entire exogenous revenue stream in all future periods and bargaining ceases. If R successfully separates, the tax rate drops permanently to 0 (meaning, in essence, G and R ’s interaction ends). If R loses, it is weak in all future periods and continues to be subject to G ’s taxes. If R fights when it is weak, the fight only lasts the current period. R and G consume their wartime amounts and R loses with probability 1, implying it is permanently weak after the one-period war ends.

4. *Labor allocation stage.* If R accepts G ’s proposal, R allocates one unit of effort between supplying labor $L_t \geq 0$ to produce a good in the formal sector and contributing effort

$e_t \geq 0$ to collect a wage in the informal sector (which cannot be taxed), with $L_t + e_t \leq 1$. Formal economic output in R 's territory equals a production function $\theta(L_t, \eta)$ multiplied by R 's endowment of potential formal-sector economic output Y^R , of which $Y^O \leq Y^R$ derives from oil reserves. The function $\theta(\cdot)$ captures how labor effort affects formal good production, and the parameter $\eta > 0$ scales the elasticity of R 's formal-sector economic production with respect to the amount of labor supplied. Smaller η implies output is less responsive to changes in labor input, i.e., production is less labor elastic. For notational simplicity, below I drop the explicit dependence of θ on the parameter η . If R devotes all its effort to formal-sector labor, by assumption $\theta(1) = 1$ and formal-sector output achieves its maximum value Y^R . Additionally, there are strictly positive and strictly diminishing marginal returns to labor input, and $\theta(\cdot)$ always achieves values between 0 and 1. Formally, $\frac{d\theta}{dL_t} > 0$, $\frac{d^2\theta}{dL_t^2} < 0$, and $\theta(\cdot) \in [0, 1]$ for all L_t . Therefore, choosing $L_t < 1$ yields formal-sector economic output $\theta(L_t) \cdot Y^R < Y^R$. Finally, R receives a wage ω for each unit of effort contributed to the informal sector.

By accepting, R consumes its formal-sector output not extracted by G , wages from the informal sector, and patronage. This sums to $(1 - \tau_t) \cdot \theta(L_t) \cdot Y^R + \omega \cdot e_t + (1 - x_t) \cdot Y^G$. G consumes revenues extracted from R and the percentage of its exogenous revenues not transferred to R , which is $\tau_t \cdot \theta(L_t) \cdot Y^R + x_t \cdot Y^G$.

Table 1 summarizes the parameters and choice variables in the game.

Table 1. Summary of parameters and choice variables

Stage	Variables/description
Primitives	G : government R : regional actor δ : discount factor t : time
1. Distribution of power stage	σ : % of periods R is strong
2. Spoils proposal stage	τ_t : tax rate x_t : patronage offer Y^G : G 's exogenous revenues
3. Fighting decision stage	p : R 's probability of winning if it is strong N : length of war if R secedes in a strong period
4. Labor allocation stage	L_t : R 's formal-sector labor supply e_t : R 's informal-sector effort Y^R : total potential formal-sector output from R 's territory Y^O : total potential oil output from R 's territory $\theta(\cdot)$: percentage of R 's potential formal-sector output actually produced η : elasticity of formal sector output to labor input ω : wage from informal sector

Two aspects of the model setup deserve elaboration. First, for the purposes of situating the model at the crossroads of studies on territory and separatism and on ethnicity and grievances, it is natural to conceive the government and region as belonging to different ethnic groups. Scrutinizing triggers of separatist civil wars is only relevant in this context. Separatist rebellions require a territorially concentrated group with shared interests. These conditions are most frequently fulfilled by ethnic groups, as opposed to groups organized around political memberships such as class or political ideology (Denny and Walter 2014). Empirically, 39 of 40 separatist civil wars since 1945 have been fought along ethnic lines (201). Furthermore, the difficulty of changing ethnic identity explains why the government and region interact as two long-run players.

Second, the stochastic shift in R 's ability to secede reflects that political actors are only occasionally able to solve collective action problems and mount an effective challenge against

the government (Acemoglu and Robinson 2006, 123-128). Windows of opportunity may arise, for example, when the government is temporarily weak. As an example, the fall of the Iranian shah in 1979 created perceptions of temporary regime weakness by Iran's oil-rich Arab and Kurd minorities and facilitated separatist attempts (Ward 2009, 230-3). Demonstration effects from the Iranian Revolution may have also facilitated mobilization in nearby countries. "There is little doubt that the Iranian Revolution helped galvanize politics and energize dissent among Shiites in neighboring countries. The revolution helped explain both the timing and some of the forces that encouraged Saudis to take to the streets" (Jones 2010, 186).¹² Similarly, Angola's long-running center-seeking civil war resumed after the opposition party UNITA rejected election results in 1992. The rebel group FLEC-FAC escalated its low-intensity separatist fight for Cabinda shortly afterwards, "at a time when the government was facing its toughest military challenge yet from UNITA" (Porto 2003, 5). This provided a window for FLEC-FAC to achieve military aims or gain concessions.

2.2 Equilibrium Concept

I solve for conditions under which a Markov Perfect Equilibrium (MPE; henceforth, equilibrium) exists that does not involve fighting along the equilibrium path of play. An equilibrium requires players to choose best responses to each other, with strategies predicated upon the state of the world and on previous actions during the current period.

¹²Saudi Arabia's Shiites are concentrated in the east, which contains the majority of Saudi Arabia's oil wealth.

3 Equilibrium Analysis of Baseline Model

The government wants to retain as much of its exogenous revenue source and to collect as much tax revenue as possible from R 's region. G faces two constraints, however. In reaction to an unfavorable proposal, R can either exit the formal economy or fight to separate. To distinguish the effects of each of R 's options to guard against government predation, the analysis first considers a one-shot version of the game in which the fighting stage does not occur. This explains how R 's economic exit option affects equilibrium choices. I then characterize equilibrium actions in each of the four states of the world: G has defeated a separatist attempt, R has won a separatist war, no war has occurred in the past and R is weak in the current period, and no war has occurred in the past and R is strong in the current period. The analysis explains why R might fight in response to any proposal in a strong period. The section concludes with a proposition that summarizes the conditions under which a peaceful equilibrium exists.

3.1 Optimal Strategies in a One-Shot Game without the Fighting Decision Stage

Analyzing a one-period game in which R cannot fight highlights how R 's economic exit option affects G 's taxation decision. Formally, this game consists of a single interaction in which G chooses (τ, x) , R responds with (L, e) , and then consumption occurs. Each player's consumption amounts are defined identically as above.

Solving backwards and starting with the labor allocation stage of the stage game, R trades off between supplying more labor to increase formal-sector output and consuming the informal-sector wage. Because R 's consumption strictly increases in both inputs, the effort constraint $L + e \leq 1$ binds, which implies $e^*(\tau) = 1 - L^*(\tau)$. Marginally higher labor supply

increases R 's consumption by the percentage it retains, $1 - \tau$, multiplied by the effect of increased labor supply on formal sector output, $\frac{d\theta}{dL}$, multiplied by total potential output in the region, Y^R . Marginal gains are ω from exiting to collect wages from the informal sector. R chooses formal-sector labor to equate these marginal consumption terms. Therefore, $L^*(\tau)$ is implicitly defined by:

$$\underbrace{(1 - \tau) \cdot \frac{d\theta(L^*(\tau))}{dL} \cdot Y^R}_{\text{Marginal consumption from supplying labor to formal sector}} = \underbrace{\omega}_{\text{Marginal consumption from informal sector wage}} \quad (1)$$

Moving backwards to the spoils proposal stage, G does not face a constraint when choosing x . Because G 's utility strictly increases in x and R will accept any proposal, $x^* = 1$. However, G faces a tradeoff when setting the tax rate—even though R accepts any proposal. If G proposes a tax rate τ , from R 's region it will consume the tax rate multiplied by formal sector output, $\theta(L^*(\tau)) \cdot Y^R$. Although raising taxes enables G to consume a larger percentage of R 's formal-sector production, a higher tax rate also decreases formal-sector production. By diminishing R 's marginal consumption from supplying labor—as Equation 1 shows—higher taxes cause R to substitute effort away from taxable labor, which decreases $\theta(L^*(\tau))$. G sets τ to equate the marginal benefit and marginal cost of taxation, and therefore the revenue-maximizing tax rate $\bar{\tau}$ is implicitly defined by:¹³

$$\underbrace{\theta(L^*(\bar{\tau}))}_{G \text{ receives higher \% of } R\text{'s production}} = \underbrace{-\bar{\tau} \cdot \frac{\partial\theta(L^*(\bar{\tau}))}{\partial L} \cdot \frac{dL^*(\bar{\tau})}{d\tau}}_{R \text{ devotes less labor to formal sector production}} \quad (2)$$

Proposition 1 presents the equilibrium strategy profile of the one-shot peaceful game.

¹³The right-hand side of Equation 2 is strictly positive because $\frac{dL^*(\bar{\tau})}{d\tau} < 0$, i.e., higher taxes decrease equilibrium labor supply.

Proposition 1. Equilibrium strategy profile of one-shot peaceful game.

G retains its entire exogenous revenue source and sets a tax rate on R 's production to maximize its own revenues. R responds to G 's tax proposal with a formal/informal economy allocation that maximizes its consumption. Formally, G proposes $(\tau^*, x^*) = (\bar{\tau}, 1)$, for $\bar{\tau}$ defined in Equation 2. R chooses $L^*(\tau)$ defined in Equation 1 and $e^*(\tau) = 1 - L^*(\tau)$. In equilibrium, $L^* = \bar{L} \equiv L^*(\bar{\tau})$ and $e^* = \bar{e} \equiv 1 - \bar{L}$.

3.2 Optimal Actions in the Full Game

The logic just described is identical to the strategic interactions in all periods following a failed separatist war because, by assumption, R must accept any proposal. Similarly, although R can choose to fight in a period it is weak (and all past periods were peaceful), R will never exercise that option because it wins with probability 0. Using the terminology from Proposition 1 characterizes R 's consumption in these types of periods. Because R supplies labor \bar{L} and is taxed at $\bar{\tau}$, its per-period consumption is:

$$U_R(\text{weak}) = (1 - \bar{\tau}) \cdot \theta(\bar{L}) \cdot Y^R + \omega \cdot (1 - \bar{L}) \quad (3)$$

$$U_R(\text{failed secession}) = (1 - \bar{\tau}) \cdot \theta(\bar{L}) \cdot Y^R + \omega \cdot (1 - \bar{L}) \quad (4)$$

Periods following a successful separatist war differ somewhat because Equation 2 is irrelevant: G is constrained to set taxes to 0 and to retain all its exogenous revenues. Therefore, R chooses the optimal formal/informal sector allocation in Equation 1 knowing it retains all the production from its region, and:

$$U_R(\text{successful secession}) = \theta(L_r^*) \cdot Y^R + \omega \cdot (1 - L_r^*), \quad (5)$$

for $L_r^* \equiv L^*(\tau_t = 0)$.

In a strong period, if R 's probability of winning p is low enough, then R 's threat does not constrain G 's choices. This implies the same actions as in a weak period. However, if p is high enough, R will fight rather than accept G 's optimal proposal in the one-shot game without a fighting option, $(\bar{\tau}, 1)$. In this case, R 's outside war option constrains G 's choices. To induce acceptance, Equation 6 states G 's proposal (τ_s^*, x_s^*) must make R 's expected lifetime utility to accepting—which entails strong-period consumption in the current and in σ percent of future periods, and weak-period consumption in $1 - \sigma$ percent of future periods—at least as high as its expected utility to fighting:

$$[1 - \delta(1 - \sigma)] \cdot \left[(1 - \tau_s^*) \cdot \theta(L_s^*) \cdot Y^R + (1 - L_s^*) \cdot \omega + (1 - x_s^*) \cdot Y^G \right] + \delta(1 - \sigma) \cdot U_R(\text{weak}) \geq \delta^{N+1} \left[p \cdot U_R(\text{successful secession}) + (1 - p) \cdot U_R(\text{failed secession}) \right], \quad (6)$$

for $L_s^* \equiv L^*(\tau_s^*)$. Because G makes all the bargaining proposals, G can hold R to its reservation value from fighting. By enabling G to pocket the surplus saved by preventing fighting, this provides incentives for G to make a lucrative enough proposal in a strong period that induces R to accept—even if this implies $(\tau_s^*, x_s^*) = (0, 0)$. If G can buy off R , G 's optimal proposal therefore makes R indifferent between accepting or fighting by satisfying Equation 6 with equality.

For high enough p , in a strong period R optimally rejects even the most favorable proposal, $(\tau_s^*, x_s^*) = (0, 0)$. Illuminating parameter values in which costly fighting occurs in equilibrium, suppose R is relatively likely to win when strong (high p), players are patient (high δ), and opportunity windows to fight are rare (low σ). High p relative to σ implies fighting yields a higher probability of future periods with no taxation (probability p) than does accepting and maintaining the status quo territorial arrangement (σ percent of future

periods). Furthermore, although R receives the best possible proposal in the current period, high δ implies R heavily weights future consumption. Therefore, R will endure the costs of war to achieve higher expected future utility.

Lemma 1 summarizes this discussion by characterizing G 's optimal proposal in a strong period for different values of p .

Lemma 1. The higher is R 's probability of winning in a strong period, the more attractive for R is G 's patronage/tax proposal. If this probability is sufficiently low, G can buy off R with the same unattractive proposal detailed in Proposition 1. Formally, if $p < \underline{p}$, then $\tau_s^* = \bar{\tau}$ and $x_s^* = 1$. If R 's probability of winning is sufficiently high, G cannot buy off R even if it offers all its exogenous revenues and sets the tax rate to 0. Formally, if $p > \bar{p}$, Equation 6 cannot be satisfied even with $\tau_s^* = 0$ and $x_s^* = 0$.¹⁴

As a final note before stating the equilibrium, G can buy off R —regardless of other parameter values—if $p < \sigma$. R is strictly worse during the N fighting periods because it does not consume. Furthermore, if $p < \sigma$ and $(\tau_s^*, x_s^*) = (0, 0)$, then R is also strictly worse off after a separatist war because R expects to experience no-taxation periods more frequently under the status quo territorial arrangement (σ percentage of periods) than following a separatist fight (p). Imposing Assumption 1 focuses the analysis on the more substantively relevant parameter range in which fighting may occur.

Assumption 1. $p > \sigma$.

3.3 Equilibrium Strategy Profile

Proposition 2 summarizes this discussion by characterizing strategies in a peaceful equilibrium and the conditions under which a peaceful equilibrium exists.

¹⁴The appendix defines these thresholds and presents G 's optimal proposals at intermediate values of p .

Proposition 2. Equilibrium strategy profile of baseline game. If $p < \bar{p}$, for $p < \bar{p}$ defined in Lemma 1, then the following strategies compose the unique equilibrium strategy profile.

- In any period following failed secession, Proposition 1 characterizes equilibrium actions.
- In any period following successful secession, L_r^* solves Equation 1 with $\tau_t = 0$ and R devotes the remainder of its effort to the informal sector (implying $e_r^* = 1 - L_r^*$).
- In a weak period, Proposition 1 characterizes equilibrium actions (additionally, R accepts any proposal).
- In a strong period, Lemma 1 characterizes G 's optimal proposal. L_s^* solves Equation 1, R devotes the remainder of its effort to the informal sector (implying $e_s^* = 1 - L_s^*$), and R accepts if Equation 6 holds and not otherwise.¹⁵

If $p > \bar{p}$, a peaceful equilibrium does not exist.

4 No Economic Exit: Regional Oil Wealth and Separatist Incentives

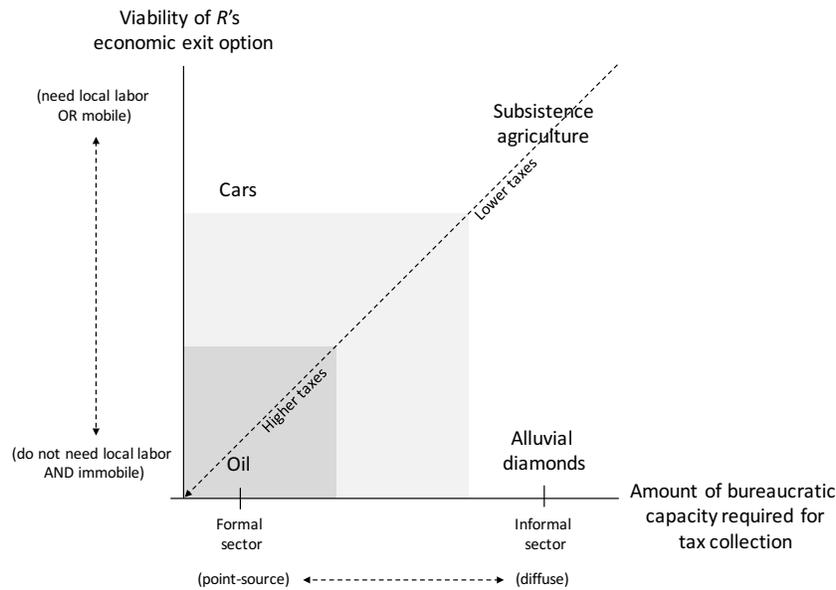
The first main result emerges from evaluating how different types of economic production affect the region's ability to exit the taxable formal economy, which in turn impacts the government's taxation choices. If the region is oil-rich, its residents' threat to withhold labor from the formal sector—which decreases taxable production and therefore could induce the government to lower its tax rate—is ineffective. Therefore, reacting to a weak economic exit option, the government can easily exploit a large percentage of an oil-rich region's wealth in periods the region is coercively weak. This result addresses drawbacks of existing grievance and greed arguments, and an example from Angola exemplifies a novel empirical implication about offshore oil.

¹⁵The appendix states the strategy profile more technically by defining R 's optimal response to any possible current-period proposal (τ_t, x_t) .

4.1 Oil Wealth Undermines the Region's Economic Exit Option

Different economic bases create varied opportunities for government taxation. Figure 2 plots different economic activities by how they affect R 's economic exit option and the amount of bureaucratic capacity required for tax collection.

Figure 2. Key Properties of Different Economic Bases



Several characteristics of oil production make its output inelastic to local labor input, which undermines R 's economic exit option and explains why oil is low on the vertical axis of Figure 2. Producing oil requires large capital investments, many of which are foreign-funded. Ross (2012, 46) shows the capital-to-labor ratio is considerably higher in the oil and gas industry than in any other major industry for U.S. businesses operating overseas. Menaldo (2014, chapter 3, 27-36) and Alnaswari (1994, 1) describe the intimate relationship between oil production in developing countries and foreign capital and technology. Even

labor that is needed for production can easily be imported because lower-level oil company employees require scant knowledge of local circumstances. And because oil is an immobile asset, R cannot threaten to move its oil reserves outside the reach of the government if taxed at unfavorable rates (Boix 2003, 42-3). Reinforcing these effects, oil operates as an enclave industry, which minimizes possibilities for local labor to hold-up downstream production. Oil production in Angola exemplifies these characteristics. “International oil companies, and oil service companies, kept their staff and installations in Angola to a minimum, preferring wherever possible to run their Angolan operations from overseas” (Le Billon 2007, 108). Although oil production accounts for the majority of economic output and government revenues in Angola, the industry “employs less than 0.2 per cent of the active population, and is barely physically present in the country” (109).¹⁶

The minimal effect of local labor input on oil production distinguishes it from economic activities such as subsistence agricultural or car production, which each have high values on the vertical axis of Figure 2. Subsistence agriculture relies heavily on local labor input. When bargaining over agricultural revenues, high taxes may undermine the government’s potential revenue base by decreasing labor supply and formal-sector good production. For example, low fixed prices on cash crops (which is essentially a high tax) in many African countries after independence provided strong incentives for local producers to either shift from producing cash crops to producing subsistence crops, or to smuggle cash crops across international borders, rather than to sell cash crops to their government (Bates 1983, 85-6)—i.e., substituting informal for formal economic activity. Oil production also differs

¹⁶Oil is not the only economic activity that could be located in the bottom-left quadrant of Figure 2. Kimberlite diamonds and deep-shaft minerals such as copper possess similar attributes (Le Billon 2005, 30). Although the goal of this paper is to understand why *oil*-rich regions fight separatist civil wars at elevated rates, it would certainly be desirable in future empirical work to examine whether kimberlite diamonds and copper exhibit similar effects. Providing a supporting case, the Democratic Republic of the Congo’s Katanga region possesses large copper deposits and attempted to secede at independence (Le Billon 2005, 43). Ross (2013, 13-14) states that, overall, existing empirical evidence is mixed regarding non-oil natural resources and civil war.

from industrial manufacturing production, such as cars, because car production is more mobile.

The low bureaucratic capacity needed to collect oil taxes explains why oil production tends to occur in the formal sector, i.e., why oil is located far to the left on the horizontal axis. 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). This distinguishes oil from diffuse resources, such as alluvial diamonds, that are “exploited over wide areas through a large number of small-scale operators” (32). Not only do alluvial diamonds and drugs require less capital to extract, they are also more difficult for the government to monitor. Implicit in the model’s distinction between a formal-sector good and informal outside wage option, G can perfectly enforce tax rates on the formal-sector good but cannot collect any taxes on R ’s informal wages. Because governments can relatively easily monitor production and enforce military control over oil fields, taxing production of this point-source resource requires minimal bureaucratic capacity (Dunning 2008, 40). Whereas rebel groups can more easily hide production of other types of natural resources from the government, oil is a “less lootable resource” (Humphreys 2005, 523) and is “easily controlled by the central government” (Colgan 2013, 4).¹⁷

This discussion establishes substantive support for Assumption 2.

Assumption 2. Oil is a formal-sector good, and larger oil reserves in R ’s territory decrease the elasticity of formal-sector production with respect to labor. Formally, $\frac{d\eta}{dY^0} < 0$.

¹⁷Alluvial diamonds are low on the vertical axis of Figure 2 because, unlike subsistence agriculture, they have a fixed location that does not require local labor to extract. Subsistence agriculture is far-right on the horizontal axis because its diffuse production makes it difficult for the government to monitor, whereas the concentrated production of automobile industries eases monitoring.

4.2 Oil-Based Grievances Create Incentives to Secede

The first main result addresses drawbacks of existing grievances arguments by explaining why easy revenues decrease the government's ability to buy off the region: the same easy-revenue properties of oil posited to promote authoritarian stability *also* make separatist civil wars more likely. The constraint limiting G 's tax rate in a weak period is R 's economic exit option: higher taxes cause R to substitute away from formal-sector labor, which decreases taxable production. Lemma 2 shows that more oil in R 's territory relaxes this constraint, explaining why economic bases located in the bottom-left quadrant of Figure 2 are subject to high government taxes. Furthermore, oil raises $\bar{\tau}$ *solely* because of the economic exit effect whereas the prize exerts an indirect effect that decreases $\bar{\tau}$.

Lemma 2. Larger oil reserves in R 's territory increase the optimal weak-period tax rate. Formally, $\frac{d\bar{\tau}}{dY\sigma} > 0$. Furthermore, the direct economic exit effect on output, indirect economic exit effect on output, and indirect economic exit effect on labor supply each increase $\bar{\tau}$, whereas the indirect prize effect on labor supply decreases $\bar{\tau}$ (these terms are formally defined in the appendix).

Table 2 explains why the easy-revenue effect of oil raises separatist civil war propensity, which is somewhat counterintuitive when juxtaposed with theories of oil and authoritarian stability. R can guard against government predation through both its fighting option and economic exit option. Having strong contemporaneous coercive power is sufficient to prevent exploitation because G would rather buy off R in a strong period than to trigger fighting. Similarly, having an effective economic exit threat—which is possible for an oil-poor R —is sufficient to prevent predation even in weak periods because G does not want to undermine formal-sector output. In contrast, oil raises $\bar{\tau}$ and thereby increases the variance in R 's consumption across strong and weak periods in the status quo territorial regime. This increases R 's incentives to secede in a strong period because gaining its own state

would eliminate government predation.

Table 2. Characteristics of periods in which R is exploited

		R 's contemporaneous fighting ability	
		<i>Weak</i>	<i>Strong</i>
R 's economy	<i>Oil-poor</i> (more effective economic exit threat)	R is not exploited	R is not exploited
	<i>Oil-rich</i> (less effective economic exit threat)	R is exploited	R is not exploited

Proposition 3 formalizes this argument.

Proposition 3. Tax effect of oil increases fighting prospects. Larger oil reserves in R 's territory increase the range of p values high enough that equilibrium fighting occurs through the effect of oil on raising the equilibrium weak-period tax rate. Formally, $\frac{d\bar{p}}{d\tau} < 0$.

4.3 Ambiguous Greed Effects

In contrast to economic exit effects, the effect of local oil wealth on raising R 's potential economic production—and therefore the prize of winning—exerts ambiguous effects on incentives to secede. Furthermore, the same properties of oil production that enable high taxes also minimize opportunities for rebel looting—a previously unrecognized contradiction between grievance and greed theories.

The problem with invoking the prize of winning to link local oil wealth to separatist civil wars is larger Y^R also facilitates lucrative wealth-sharing deals under the status quo territorial arrangement, in which G allows R to keep more resources in a strong period. In every strong period, to prevent fighting G can propose not only the same tax rate of 0 that R faces after winning a separatist fight, but also an additional patronage offer. The sign of

the prize effect depends on R 's patience and the length of wars. If R secedes, it immediately experiences N periods without consumption. Therefore, higher Y^R unequivocally *decreases* separatist propensity by raising the opportunity cost of fighting. Conditional on enduring the costs of war, however, higher Y^R increases separatist incentives. Assumption 1 states $p > \sigma$, and therefore R expects no-taxation periods to occur more frequently following a fight (probability p) than under the status quo territorial arrangement (σ).

Proposition 4. Prize effect of oil exerts ambiguous consequences for secession. If R is sufficiently impatient or if wars are sufficiently long, then the prize effect of oil decreases the range of p values large enough that equilibrium fighting occurs; and increases the range of p values otherwise. Formally, for threshold values defined in the appendix, if $\delta < \bar{\delta}$ or $N > \underline{N}$, then $\frac{d\bar{p}}{dY^R} > 0$. If $\delta > \bar{\delta}$ and $N < \underline{N}$, then $\frac{d\bar{p}}{dY^R} < 0$.

Although Proposition 4 characterizes a conditional effect, substantive considerations suggest the prize effect does not strongly motivate R to initiate a war. Ross (2012, 161) contends, “The prospect of future spoils cannot pay the daily costs of supporting a rebel army—costs that are often incurred for many years.” Using terminology from the model, the prize should increase the opportunity cost of fighting more than it motivates R to try to capture a larger share of the prize after the war, which does not occur until N periods. This argument about high opportunity costs is particularly relevant because ethnic separatist conflicts experienced in oil-rich territories tend to feature high N . Ethnic civil wars tend to last longer than non-ethnic civil wars (Denny and Walter 2014, 206), especially when they feature “sons-of-the-soil” dynamics in which a government-sponsored ethnic group attempts to displace a minority group from its home soil.¹⁸ Governments’ desire to control oil-rich land provides strong incentives for such a displacement policy, as infamously

¹⁸Since 1945, sons-of-the-soil wars have averaged 15.1 years whereas other civil wars have averaged 7.1 years (Fearon and Laitin 2011, 201). Related, “one of the strongest, most consistent findings [in studies of war] is that wars over territory tend to last longer and be more difficult to resolve than wars fought over other issues” (Toft 2014, 187).

exemplified by Baghdad’s earlier goal of converting Kirkuk to an Arab-majority area and Saddam Hussein’s deployment of chemical weapons against Kurds. More generally, nearly half (10 of 22) of post-1945 sons-of-the-soil wars have occurred in oil-rich territories.¹⁹

Additionally, the implication that oil causes fighting *because* of easy government extraction contrasts with arguments that groups located in oil-rich territory are routinely able to loot oil wealth to fund an insurgency (Collier and Hoeffler 2004, 2005; Ross 2012, 147-153). These arguments are implicitly based on assuming oil should either be conceived as the informal sector, or that oil is potentially taxable but governments face difficulties extracting oil revenues. As discussed, inherent properties of oil production instead imply relatively easy government control. Large-scale rebel looting has only occurred in a handful of exceptional cases marked by very weak states unable to exercise any control over their oil-rich territories (Paine 2015, 7-10). Even during an ongoing war, “The government’s oil income is typically so much larger than the rebels’ share that the relative balance of power favors the incumbent government” (Colgan 2015, 8). Therefore, even if R was assumed to be able to consume some of its oil production during a war, these considerations imply an oil-rich R ’s wartime consumption should be—at most—small.

4.4 Overall Effect of Oil on Separatist Civil Wars

In sum, the effect of local oil wealth on formal-sector labor elasticity composes the main, unambiguous effect that enables G to increase the weak-period tax rate and that raises incentives for separatist fighting. The overall effect of local oil wealth on separatist incentives is positive under either of two reasonable assumptions. First, the magnitude of the effect of oil on raising taxes is large enough that the net effect of oil decreases the opportunity

¹⁹This count of Fearon and Laitin’s (2011) twenty-two cases excludes wars of Soviet colonization and Western decolonization.

cost of a separatist civil war. Second, the magnitude of the opportunity cost effect is not too large relative to the magnitude of the post-war effects.

Proposition 5. Oil raises prospects for secession. There are two sufficient conditions for larger oil reserves in R 's territory to increase the range of p values high enough that equilibrium fighting occurs. Formally, for threshold values defined in the appendix, if $\frac{d\bar{\tau}}{dY^O} > \tilde{\tau}$, then $\frac{d\bar{p}}{dY^O} < 0$. If $\delta > \underline{\delta}$ and $N < \bar{N}$, for $\underline{\delta} < \bar{\delta}$ and $\bar{N} > \underline{N}$, then $\frac{d\bar{p}}{dY^O} < 0$.

4.5 Empirical Example: Angola's Dangerous Offshore Oil

Although the main purpose of the formal model is to better understand the mechanisms underpinning the resource curse applied to separatist civil wars, one novel empirical implication from studying the properties of oil wealth that trigger bargaining breakdown is that the widely discussed distinction between onshore and offshore oil production should not greatly alter prospects for separatist civil war onset. Many studies have argued that because it is very difficult for rebels to loot offshore oil production, this locational effect safeguards against separatist civil wars (Lujala 2010; Ross 2012, 162-4; Blair 2014). In contrast, the present analysis argues properties of oil production that facilitate high taxes are the core link to separatist civil wars, rather than differential looting possibilities. Because offshore oil production is even more capital-intensive and enclave-based than onshore oil production, the conflict-inducing effects might in fact tend to be stronger for offshore oil.

Angola's Cabinda province exemplifies the dangerous possible consequences of offshore oil. Offshore fields produce nearly all of Angola's oil (Le Billon 2007, 106; Porto 2003, 4), and Cabinda's oil revenues have accounted for roughly half of the government's budget since independence (Martin 1977, 57; Porto 2003, 3). Although in general it is easy for govern-

ments to maintain a monopoly of violence over and to extract revenues from any oil field, the Angolan government faced a major rebellion before and after independence that crippled the state and its economy (Le Billon 2007, 109). The government exhibited limited territorial control over Cabinda for reasons stemming from the Cabinda’s ambiguous territorial status during the colonial era,²⁰ tensions with Cabindan organizations during the decolonization struggle with Portugal, and struggles with other rebel organizations after independence (Martin 1977). Counterfactually, it seems plausible that the government would have faced difficulties extracting from Cabinda’s oil fields had they been located onshore. Instead, Cabinda’s offshore oil has “insulat[ed] the industry from local communities and hostilities” (Le Billon 2007, 106), which has facilitated massive government exploitation of Cabinda’s resources. Cabinda is “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). Cabinda initiated a major separatist civil war in 1992.

5 Extension: Why Oil Production Reinforces Bad Institutions

If the government is so effective at raising oil revenues that this causes war, G would seemingly benefit if it could commit to reduce the tax rate enough to prevent costly fighting. This section extends the baseline model to allow G , at the outset of the game, to impose an exogenously enforced maximum tax rate in every period. The second main result explains why oil encourages governments to *strategically* pursue intransigent bargaining strategies

²⁰Cabinda is an enclave, separated entirely from mainland Angola by a strip of the Democratic Republic of the Congo.

toward oil-rich regions, i.e., why oil undermines the government’s incentives to institutionalize taxation constraints. Although decreasing taxes would benefit the government by preventing fighting, core properties of oil wealth—capital-intensive production and a large prize—raise the opportunity cost of reducing taxes. In addition to addressing strategic governmental choices over institutions—a consideration that grievances theories omit—the second main result also contrasts with rebel greed arguments by showing oil causes separatist conflict primarily by triggering *government* rather than *rebel* greed. This result is also important because many general resource curse theories imply that oil only exerts pernicious effects when the institutions at the time of discovery are weak, without scrutinizing how oil can reinforce extant bad institutions.

5.1 Setup

Formally, the extended game is identical to the baseline setup except G has an additional choice variable $\hat{\tau} \in [0, 1] \cup \{\emptyset\}$ that is selected before the first period of the game. If $\hat{\tau} = \emptyset$, then the game continues identically as above. If $\hat{\tau} \neq \emptyset$, then G has an imposed an exogenously enforced tax rate for every future period, i.e., τ_t ceases to be a strategic choice in the remainder of the game. If $\hat{\tau} < \bar{\tau}$, then this implies G has constrained itself from maximally exploiting R in weak periods.²¹ Ross (2007, 246-251) provides numerous examples of how governments can limit exploitation of oil-rich regions. One possibility is decentralizing revenue collection. Other possibilities do not directly affect taxes, but *de facto* reduce taxation by improving R ’s benefits from its oil wealth: directly distributing oil rents to citizens, prioritizing local labor for the oil industry, restricting migration into the oil-rich region, and encouraging oil companies to invest in local public goods. Providing

²¹Although choosing $\hat{\tau} < 1$ disables G from offering $\tau_t = 1$ in a strong period, the appendix demonstrates that G can always set $\hat{\tau}$ high enough to prevent equilibrium fighting.

greater access to power at the center for ethnic minority groups can also enable better control of their natural resources (Cederman et al. 2013).

Although allowing G to choose taxation constraints in a vacuum ignores crucial historical factors that affect institution-building, analyzing this setup provides important insights. Fighting can occur in the baseline model when R 's consumption varies by large amounts between strong and weak periods, and G cannot commit to reducing taxes in weak periods. This resembles general arguments that “commitment problems” cause fighting (Fearon 1995; Powell 2004, 2006). However, the current analysis demonstrates that even though G pays no upfront costs to imposing taxation constraints, G may not perceive as *problematic* its inability to commit to lower taxes because of the opportunity cost logic explained below. Studying G 's incentives to constrain its tax rate is also intriguing when compared to existing formal theoretic analyses of fiscal capacity investments, such as Besley and Persson (2011). They focus on governments' incentives to pursue bureaucratic investments that *increase* the maximum tax rate without considering circumstances in which *constraints* may be desirable, a perhaps unique issue posed by oil wealth.

5.2 Equilibrium Analysis: Will the Government Constrain Its Tax Rate?

The government faces a tradeoff when choosing whether or not to constrain its tax rate. On the one hand, if separatist attempts would occur in equilibrium absent taxation constraints, then creating institutions that prevent costly fighting yields a clear benefit for G . On the other hand, imposing taxation constraints entails an opportunity cost by reducing G 's consumption in weak periods. Even if fighting would occur without constraints, the opportunity cost of constraints may outweigh the benefit.

Evaluating whether G will constrain its weak-period tax rate requires first solving for the

optimal $\hat{\tau}$ (from G 's perspective) that facilitates peace, denoted as $\hat{\tau}$, and then comparing G 's lifetime expected utility if $\hat{\tau} = \hat{\tau}$ to lifetime utility if $\hat{\tau} = \bar{\tau}$.²² Lemma 3 demonstrates that $\hat{\tau}$ makes R indifferent between accepting G 's equilibrium strong-period proposal and fighting. Because taxation constraints only deliver a benefit by preventing equilibrium fighting, G does not want to constrain the tax rate any more than needed to induce acceptance in a strong period.

Lemma 3. If $p > \bar{p}$, the optimal constraint that induces peace makes R indifferent between accepting and fighting in a strong period. Formally, $\hat{\tau}$ solves:

$$(1 - \hat{\tau}) \cdot \theta(L^*(\hat{\tau})) \cdot Y^R + (1 - L^*(\hat{\tau})) \cdot \omega = \delta^{N+1} \left[p \cdot U_R(\text{successful secession}) + (1 - p) \cdot U_R(\text{failed secession}) \right] \quad (7)$$

Equation 8 presents an inequality stating the conditions under which the expected utility of imposing tax constraints exceeds the expected utility of exploiting R in weak periods.

$$\begin{aligned} E[U_G(\hat{\tau} = \hat{\tau})] - E[U_G(\hat{\tau} = \emptyset)] = & \\ & \underbrace{-\frac{(1 - \delta)(1 - \sigma)}{1 - \delta(1 - \sigma)} \cdot [\bar{\tau} \cdot \theta(\bar{L}) - \hat{\tau} \cdot \theta(\hat{L})]}_{\text{Tax revenue from region, short-term}} \cdot Y^R \\ & \underbrace{-\frac{\sigma}{1 - \delta(1 - \sigma)} \cdot [\delta^{N+1}(1 - p) \cdot \bar{\tau} \cdot \theta(\bar{L}) - \hat{\tau} \cdot \theta(\hat{L})]}_{\text{Tax revenue from region, long-term}} \cdot Y^R \\ & \underbrace{+\frac{\sigma}{1 - \delta(1 - \sigma)} \cdot (1 - \delta^{N+1}) \cdot R^G}_{\text{Patronage}} > 0. \end{aligned} \quad (8)$$

Equation 8 highlights the beneficial saved costs of fighting versus the opportunity cost

²²The following analysis assumes $p > \bar{p}$ (see Lemma 1). If instead $p < \bar{p}$, then G could buy off R in strong periods even without constraining its weak-period taxation. Therefore, G would not derive a benefit from imposing constraints and $\hat{\tau}^* = \bar{\tau} = \hat{\tau}$.

of constraints by distinguishing G 's utility from each strategy into short-term (all periods before the first strong period) and long-term effects (all periods including and after the first strong period). In the short term, G consumes more if there are no taxation constraints because it can impose the revenue-maximizing tax rate. Formally, $\bar{\tau} \cdot \theta(\bar{L}) > \hat{\tau} \cdot \theta(\hat{L})$, for $\hat{L} \equiv L^*(\hat{\tau})$.

In contrast, from the long-term perspective, in expectation G may consume more if taxation constraints exist. Consumption generated by the revenue-maximizing tax rate is weighted by $\delta^{N+1}(1-p)$ because consumption does not resume until the fight ends, and G only retains control over R 's production if G prevents separation. If $\delta^{N+1}(1-p)$ is high enough, then the long-term effects reinforce the short-term effects to provide incentives for strategic intransigence. In contrast, if $\delta^{N+1}(1-p)$ is small and G expects the fight to happen relatively soon—i.e., σ is large—then the long-term effects will dominate the short-term effects and G will optimally enact a taxation constraint. Proposition 6 summarizes this discussion by characterizing the conditions under which G adopts taxation constraints.

Proposition 6. Conditions under which the government enacts taxation constraints.

- If G can buy off R in the baseline game, then G will not enact taxation constraints. Formally, if $p < \bar{p}$, for $\bar{p} < \bar{p}$ defined in Lemma 1, then $\hat{\tau}^* = \emptyset$.
- If expected long-term revenue is lower after enacting constraints, or if the short-term effects dominate, then G will not enact taxation constraints. Formally, if $\delta^{N+1}(1-p) > \phi$ or $\sigma < \bar{\sigma}$, for thresholds defined in the appendix, then $\hat{\tau}^* = \emptyset$.
- If expected long-term revenue is higher after enacting constraints and if the long-term effects dominate, then G will enact taxation constraints. Formally, if $\delta^{N+1}(1-p) < \phi$ and $\sigma > \bar{\sigma}$, then $\hat{\tau}^* = \hat{\tau}$.

5.3 Oil Raises the Opportunity Cost of Constraining Taxes

More oil in R 's territory undermines incentives to constrain taxes for substantively relevant parameter ranges. Oil raises the opportunity costs of institution-building through both the economic exit and prize mechanisms, in contrast to the ambiguous prize effect on R 's separatist incentives in the baseline model. The difference in prize-based incentives occurs because whereas the government reaps an immediate benefit from exploiting the region's oil wealth—despite causing a separatist civil war in the future—the group suffers immediate costs by fighting.

Once again, it is useful to distinguish between short-term (all periods before the first strong period) and long-term effects (all periods including and after the first strong period). The short-term oil effects unambiguously diminish incentives for taxation constraints. For a fixed size of the prize, Lemma 2 shows the economic exit effect of oil increases G 's optimal tax rate. Therefore, the more oil is, the greater is the difference between $\bar{\tau}$ and $\hat{\tau}$ —which raises the opportunity cost of constraining taxes. Additionally, for a fixed difference between $\bar{\tau}$ and $\hat{\tau}$, a larger prize implies a higher opportunity cost of taxing at any rate lower than the revenue-maximizing amount because each percentage difference in the tax rate yields a greater total decrease in revenues. Similar to the analysis of Equation 8, the long-term effects are weaker than the short-term effects because R 's oil raises the opportunity costs of losing consumption for N periods and of possibly losing permanent control of R 's production. However, more oil decreases both ϕ and $\bar{\sigma}$ (see Proposition 6) by increasing consumption under the revenue-maximizing tax rate, $\bar{\tau} \cdot \theta(\bar{L})$, relative to consumption under the taxation constraint, $\hat{\tau} \cdot \theta(L^*(\hat{\tau}))$.²³ Overall, these incentives imply Proposition

²³Furthermore, although the model assumes p is determined independently of oil, other formal models demonstrate that larger oil revenues facilitate higher military capacity spending by expanding the government's budget (Paine 2015)—which lowers p .

7.

Proposition 7. Oil decreases incentives for taxation constraints. More oil increases the size of the set of parameter values in which expected long-term revenue is lower after enacting constraints, and increase the size of the set of σ low enough that short-term effects dominate. Formally, $\frac{d\phi}{dY\sigma} > 0$ and $\frac{d\bar{\sigma}}{dY\sigma} > 0$.

Distinguishing how the prize effect differentially impacts G 's and R 's incentives for war is crucial because the implications oppose existing greed arguments. In this model, the large oil prize exerts stronger incentives for the *government* to enact policies that cause fighting than for a greedy *region* to fight to create its own state—the focus of existing prize arguments. The effects differ because R pays the costs of fighting immediately. In contrast, G reaps immediate benefits from exploiting R —because G imposes the revenue-maximizing tax rate until the war occurs—but does not pay the costs of fighting until future periods.

5.4 Empirical Example: Sudan's Failed Regional Autonomy

The result that more oil in R 's region decreases G 's incentives to impose taxation constraints is important because many theories imply that oil only exerts pernicious effects when institutions at the time of discovery are weak—without examining whether oil wealth tends to reinforce extant bad institutions. For example, although Condra (2013) presents a more nuanced perspective than most existing theories by arguing that oil located in ethnic minority regions of Africa should trigger separatist civil wars because of the inherent difficulty of inter-ethnic wealth sharing, he does not evaluate how oil affects this conditioning variable. The broader resource curse literature largely shares this focus on exogenous institutions (e.g., Robinson et al. 2006; Mehlum et al. 2006).²⁴

²⁴Wiens (2014) provides an important recent exception. A key difference in setup from the present model is that Wiens examines authoritarian stability and demonstrates that oil allows leaders to maintain

Sudan provides a supporting case in which a government actively undermined existing agreements to try to gain control over oil revenues. The Sudanese government granted an autonomous region in the south after a civil war that ended in 1972. Less than a decade later, oil discoveries in the south (Sudan Update 1999) coincided with aggressive moves by the Khartoum government that effectively abrogated the settlement of 1972. In 1980, Sudan’s president “announced plans to redraw the borders between southern and northern provinces. When this proposal was blocked by the regional government, he conveniently created a new province . . . and removed the oil fields altogether from southern administrative jurisdiction” (Ofcansky 1992). Khartoum followed this by splitting the south into three regions, organizing and arming tribal militias in the south, and declaring Sharia law for the entire country in 1983. A second major separatist civil war broke out shortly afterwards.

6 Conclusion

Oil-rich regions frequently fight separatist civil wars, consistent with the broader hypothesis that oil wealth diminishes prospects for civil peace. However, what prevents governments from strategically using the large revenue streams afforded by oil to buy off secessionists? Existing “greed” and “grievances” hypotheses cannot explain this puzzle because they do not examine the strategic foundations of intransigent government bargaining postures. This paper studied an infinitely repeated stochastic game in which a government bargains with a territorial actor over regional revenues. The region can guard against government predation of its economic production by exiting the formal economy or by fighting to secede. The first power without making institutional concessions. Here, counterintuitively, oil makes political instability—specifically, separatist civil wars—*more* likely when there are no institutions but *also* reinforces bad institutions.

result explained why capital-intense oil production undermines the region's economic exit option, which facilitates government exploitation and increases the likelihood of separatist civil wars. The second result complemented this conflict-inducing effect by demonstrating that local oil wealth reinforces bad institutions by undermining government incentives to adopt taxation constraints.

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