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How Authoritarian Survival Strategies Affect Civil War Onset

By

John Knowlton Paine, Jr.

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Political Science

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Robert L. Powell, Chair

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Abstract

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John Knowlton Paine, Jr.

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This dissertation studies causes of civil war from a game theoretic perspective. It aims to understand not only how authoritarian leaders can strategically mitigate prospects for civil war, but also why authoritarian rulers may pursue activities that *increase* conflict propensity—despite the large adverse welfare consequences of civil wars. Each essay focuses primarily on one particular authoritarian survival strategy: building military capacity, extracting resources from society, and excluding threatening ethnic groups from power at the center. The dissertation applies these strategic considerations to engage two major debates in comparative politics: how each of oil wealth and inter-ethnic relationships affect prospects for fighting. The first essay argues that although oil wealth exerts certain effects that increase incentives for rebel groups to fight to control the capital, oil wealth also increases government revenues and exerts an overall effect of decreasing center-seeking civil war propensity. The second essay focuses on a different aspect of oil production, showing how local oil wealth facilitates government territorial encroachment and increases incentives to fight a separatist civil war for oil-rich ethnic minority groups. The third essay extends the focus on inter-ethnic bargaining by showing ethnic groups organized as pre-colonial kingdoms in Sub-Saharan Africa undermined inter-ethnic institution building and increased incentives for ethnopolitical exclusion, civil wars, and military coups after independence.

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## Introduction to the Dissertation

This dissertation studies causes of civil war from a game theoretic perspective. It aims to understand not only how authoritarian leaders can strategically mitigate prospects for civil war, but also why authoritarian rulers may pursue activities that *increase* conflict propensity—despite the large adverse welfare consequences of civil wars. Each essay focuses primarily on one particular authoritarian survival strategy: building military capacity, extracting resources from society, and excluding threatening ethnic groups from power at the center. The dissertation applies these strategic considerations to engage two major debates in comparative politics: how each of oil wealth and inter-ethnic relationships affect prospects for fighting.

Conventional wisdom characterizes oil as a “curse” that composes an important cause of all types of civil war. The first two essays evaluate this argument by distinguishing between different types of civil war and by scrutinizing regime stabilizing effects of oil that have received relatively little attention in the conflict resource curse literature. Specifically, the essays distinguish between center-seeking civil wars in which a rebel group fights to overthrow the capital, and separatist civil wars in which a rebel group fights to create an autonomous state.

The first essay argues conventional wisdom about oil and civil wars overlooks countervailing effects of oil that diminish conflict propensity. Oil wealth provides a government with revenues it can use to enhance military capacity and to build a welfare state. It evaluates contending conflict-inducing and conflict-suppressing effects of oil and applies them to study center-seeking civil wars. The essay argues the revenue-enhancing effects of oil overwhelm vulnerability-inducing mechanisms, and that oil wealth diminishes center-seeking civil war propensity. Although oil wealth increases the “prize” to seizing control of the government, this same prize enables the government to dispense patronage to the societal challenger—which neutralizes the prize effect. The additional ability of the government to invest oil revenues to decrease the challenger’s probability of winning systematically increases the government’s bargaining leverage and deters center-seeking conflict.

The second essay addresses a different aspect of oil and civil wars by focusing on how governments tax oil production in territories occupied by ethnic minority groups. An important strand of the conflict resource curse literature argues that oil production in ethnic minority areas causes deep grievances and raises separatist civil war propensity. The essay aims to clarify the strategic foundations for this empirical relationship by addressing specific properties of oil—as opposed to other types of economic activity—that cause grievances, and why the government does not strategically alleviate these grievances to prevent fighting. The strategic focus on taxation shows why the low reliance of oil production on local labor input enables the government to encroach upon the minority group’s territory, which causes grievances. Furthermore, the large size of oil production raises the opportunity costs of lowering oil taxes for the government—implying it prefers to extract larger revenues from the lucrative prize, even though this will trigger separatist attempts by aggrieved ethnic minority groups. The separatist-inducing effects of oil production are particularly acute when inter-ethnic institutional ties between the government and minority group are weak, which engenders a conditional resource curse hypothesis for separatist wars.

The third essay continues the focus of the second on ethnic bargaining and civil war. Two main questions inspired by the broader literature on ethnicity and political violence motivate this essay. First, why do authoritarian rulers frequently exclude other ethnic groups from political power—even though this increases their incentives to launch a civil war? In contrast to the oil and separatism

model, this essay shows why a government will sometimes pursue a policy that increases civil war propensity not to enrich itself, but instead to guard against internal security threats. As the second question, what historical factors explain variance in ethnopolitical exclusion choices? The essay argues that ethnic groups organized as pre-colonial kingdoms (PCK) in Sub-Saharan Africa undermined inter-ethnic institutional ties and created animosities through reinforcing historical channels. This caused a tradeoff for political leaders after independence: inter-ethnic ruling coalitions that included PCK groups were at high risk for military coups, whereas excluding groups to mitigate coup risk raised civil war risk. The higher rates of ethnopolitical exclusion and of political violence in these countries resulted from these inter-ethnic tensions.

Comparing arguments from the two essays on oil politics shows the revenue-enhancing effects of oil—in particular, the effect of oil on boosting coercive capacity—strongly decrease conflict propensity, whereas the taxation-induced territorial encroachment effect strongly increases conflict propensity. The essays discuss why these mechanisms are of differential importance for center-seeking and separatist civil wars. And whereas these essays follow the existing conflict resource curse literature by focusing on challengers outside the government, the third essay extends the second essay’s focus on ethnic bargaining to focus on internal security threats.

The essays also provide empirical evidence to test the novel implications of each formal model. The oil and center-seeking paper uses standard cross-national regression models from the literature, and shows how a seemingly minor specification change implied by the formal model produces new empirical findings about center-seeking civil wars. The formal model also implies that cross-national data is not relevant for testing theories about oil and separatist civil wars. Combined with the focus of the oil and separatist civil war essay on inter-ethnic relationships, this explains why the second essay uses ethnic group-level data to test its core implications. Furthermore, the theoretical analysis compares differential implications for separatist and center-seeking civil wars, which guides the empirical tests. Finally, the third essay includes results from an original dataset on pre-colonial kingdoms, which facilitates a broader goal of collecting historical data useful for studying causes of modern political violence.



## Chapter 1

# Rethinking the Conflict “Resource Curse”: How Oil Wealth Prevents Center-Seeking Civil Wars

### Abstract

A broad literature on how oil wealth affects civil war onset argues oil production engenders violent contests to capture a valuable prize from vulnerable governments. However, research linking oil wealth to durable authoritarian regimes argues oil-rich governments deter societal challenges by strategically allocating enormous revenues to enhance military capacity and provide patronage. This article presents a formal model that jointly evaluates how these competing mechanisms affect incentives for center-seeking civil wars. Incorporating the revenue-enhancing effects of oil to study conflict yields two key implications. First, oil-generated revenues should strengthen the government and exert an overall effect that *decreases* center-seeking civil war propensity. Second, existing evidence may appear to consistently support a conflict resource curse because it tests a hypothesis about relative effects rather than the more relevant hypothesis about overall effects. Revised statistical results demonstrate a consistently *negative* association between oil wealth and center-seeking civil war onset.

## 1.1 Introduction

Following decades of scholarly research on the political effects of natural resource wealth—frequently focused specifically on oil production—the multi-faceted effects of “black gold” remain of intense interest. Resembling a broader pattern of characterizing oil wealth as a “curse,” an influential perspective in the enormous international relations literature on causes of civil war contends that oil production frequently encourages rebel groups to initiate civil wars against vulnerable governments.<sup>1</sup> Existing arguments about oil span a wide spectrum of general mechanisms posited to cause civil conflict. Regarding material incentives to fight, expectations of capturing “unimaginably” high rents from oil revenues have provided one of the strongest “economic motive[s] for civil war in the past half-century” because the state becomes a lucrative *prize*.<sup>2</sup> Regarding opportunities to fight, because resource-rich rulers do not have to build strong ties with society to raise revenues,<sup>3</sup> oil-rich governments tend to have weak bureaucratic institutions relative to their country’s per capita income level. This *relative state weakness* mechanism enables fights for the prize<sup>4</sup>—a problem exacerbated when rebels can *loot* and bunker oil to finance their insurgency.<sup>5</sup> These prominent arguments that oil wealth motivates and provides opportunities for violent rebellions against vulnerable governments underpin existing cross-national regression evidence that consistently supports a conflict resource curse.<sup>6</sup>

Comparative politics research on authoritarian regime survival, however, provides a compelling alternative hypothesis.<sup>7</sup> Although this related literature also characterizes oil as a curse, the *mechanisms* that undergird anti-democratization hypotheses are incompatible with vulnerability-based conflict resource curse arguments. Oil-rich governments are hypothesized to prevent democratization by strategically investing enormous revenues in military capacity and by building generous welfare states. The hypothesis that oil wealth enhances the coercive apparatus is conventional wisdom among Middle East and North Africa scholars,<sup>8</sup> and “rentier” spending effects have attracted even wider attention.<sup>9</sup>

Juxtaposing divergent theoretical conclusions from these related resource curse literatures raises two key questions for evaluating a widely discussed cause of civil wars. How do revenue-enhancing and government vulnerability effects impact rebels’ overall incentives to attack an oil-rich government? And, if revenue-enhancing effects are theoretically relevant, why do existing statistical results consistently uphold a conflict resource curse?

This article addresses these questions by first distinguishing between two types of civil war, *center-seeking* civil wars to control the capital and *separatist* civil wars to create an autonomous govern-

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<sup>1</sup>Major academic contributions include Collier and Hoeffler 2004; Fearon and Laitin 2003; Fearon 2005; Hegre and Sambanis 2006; Ross 2004, 2012; Lei and Michaels 2014. According to Google Scholar these articles have a combined citation count of 12,427 (accessed 5/4/15). Ross 2013 reviews this voluminous literature.

<sup>2</sup>Laitin 2007, 22. Prize-based arguments derive mainly from economic theories of conflict (Garfinkel and Skaperdas 2006), which provided the original theoretical insights linking oil wealth to civil wars according to Ross 2013, 13.

<sup>3</sup>Tilly 1992, 207-8, 210, 218; Chaudhry 1997; Karl 1997.

<sup>4</sup>Fearon and Laitin 2003, 81; Fearon 2005.

<sup>5</sup>Collier and Hoeffler 2004; Ross 2012, 147-53.

<sup>6</sup>Footnote 1 presents the most influential studies supporting a conflict resource curse. Cotet and Tsui 2013 provide dissenting results.

<sup>7</sup>Ross 2001, 332-7 provides an extensive review.

<sup>8</sup>Gause 1994; Bellin 2004, 148; Lynch 2012, 41.

<sup>9</sup>Colgan 2014, 5 provides numerous recent citations.

ment. The analysis focuses mainly on center-seeking wars because the motivating theoretical puzzle of strengthening versus vulnerability mechanisms directly impacts this type of civil war, whereas the within-country location of oil reserves should be more important for determining separatist civil wars. Focusing on one type of civil war at a time therefore provides needed theoretical and empirical clarifications for conflict resource curse debates. To preview the distinction elaborated upon below, the oil prize will not motivate secession if a potential rebel group's region does not contain any oil reserves—whereas seizing the center would yield the prize—and the deterrence effect of oil-funded government militaries will be less effective against separatist insurgencies fought in the periphery than against attacks on the capital. This theoretical consideration also implies that widely used country-level oil income measures—which do not take oil location into account—only provide valid tests for hypotheses about oil and center-seeking wars.<sup>10</sup>

To evaluate the conflict resource curse applied to center-seeking civil wars,<sup>11</sup> this article first presents a game-theoretic model that extends bargaining models of conflict originally developed to explain international warfare<sup>12</sup> that have subsequently been used to study regime transitions<sup>13</sup> and civil wars.<sup>14</sup> This framework requires researchers to think how stimuli—such as oil—affect not only the *individual* calculus of governments or of societal challengers, but also how they affect *strategic interactions* between these actors. The formal model unifies competing oil vulnerability and revenue-enhancing mechanisms into a joint theoretical framework. In each period of an infinite horizon game, a challenger is stochastically chosen to be either strong or weak. After learning the challenger's strength, a government allocates its per-period revenues—which consist of oil and non-oil revenues—among personal consumption, armament, and a patronage offer to a challenger. The challenger either accepts the offer or fights to control the government. The model incorporates oil's revenue-enhancing effects by assuming the government controls and strategically allocates oil revenues—an empirically grounded contrast to oil looting theories. Oil generates a state prize effect by increasing the challenger's expected gains from winning a fight. Finally, the model captures the relative state weakness mechanism by assuming, for a fixed amount of revenues, bureaucratic capacity decreases in the percentage of revenues that derive from oil.

The first main formal theoretical result explains why oil-generated revenues dominate vulnerability effects and decrease the probability of center-seeking civil wars. Although oil enhances the prize of capturing the state, the government strategically spends oil revenues on military capacity—which lowers the challenger's probability of winning a fight—and on patronage, which increases the challenger's utility to accepting an offer. Building military capacity partially counteracts the prize effect by decreasing the challenger's probability of winning. The coercive possibilities afforded by oil decrease incentives to attack the government.

Although this finding provides needed insights for resolving competing theoretical claims, it also raises a new puzzle: why does existing cross-national regression evidence consistently support a conflict resource curse? Not only do conventional regression specifications usually aggregate center-seeking and separatist civil wars, they also test a *relative* conflict resource curse hypothesis but do

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<sup>10</sup>Research that has disaggregated categories of civil war does not agree which type should exhibit a stronger resource curse. As examples from published research, Buhaug 2006 argues the conflict resource curse should apply more strongly for center-seeking than separatist civil wars whereas Sorens 2011 argues the opposite.

<sup>11</sup>The conclusion discusses implications for separatist civil wars and for regime transitions.

<sup>12</sup>Fearon 1995; Powell 1999.

<sup>13</sup>Acemoglu and Robinson 2006.

<sup>14</sup>Fearon 2004; Powell 2012.

not assess the *overall* effects of oil on conflict. To understand this distinction, it is useful to compare the first main theoretical finding to a relative resource curse hypothesis implied by the relative state weakness assumption: oil is less effective at preventing center-seeking civil war than other types of revenue. Thus, although the model predicts that more oil exerts a negative overall effect on the probability of center-seeking civil war onset *because oil raises revenues*, when hypothetically fixing the amount of government revenues and raising the percentage that derives from oil—i.e., evaluating the effect of oil relative to other revenue sources—more oil should raise conflict propensity.

Distinguishing the overall and relative effects of oil provides the second main result from the model and carries an important empirical implication. The widespread empirical practice of regressing civil war onset on oil wealth while controlling for per capita income only tests the second hypothesis about relative effects. Controlling for income inhibits inferring the overall effects of oil because holding income fixed posits an implausible counterfactual claim for oil-rich countries: they would have achieved the same level of income per capita—and, related, their governments would have developed other lucrative revenue sources—even had they not become major oil producers. Because large-scale oil production tends to raise both income per capita and government revenues by considerable amounts, controlling for income *holds fixed* the crucial revenue-enhancing channel through which oil should decrease incentives for societal challenges according to authoritarian stability research. Furthermore, the post-treatment bias induced by controlling for income should engender upwardly biased regression estimates—meaning oil appears to be more of a curse than it actually is.

Regression evidence demonstrates the empirical relevance of this specification alteration for cross-national data analysis—which has provided the empirical foundation for the conflict resource curse hypothesis. One set of regressions uses the same statistical models as much existing research and demonstrates that simply omitting the income control removes the strong positive correlation between oil wealth and center-seeking civil war onset.<sup>15</sup> Furthermore, statistical models that introduce additional justified modifications demonstrate a consistent negative association between oil and center-seeking conflict.

To advance these considerations, the paper begins by presenting six foundational assumptions to substantively ground the formal model. The next section sets up and solves the model, followed by sections presenting the two main theoretical results and empirical evidence. The conclusion discusses how implications from the formal model should help to reconcile broader arguments for and against a “resource curse.” The appendices provide supporting theoretical and empirical results.

## 1.2 Foundational Assumptions Linking Oil and Center-Seeking Civil Wars

The divergent implications of oil-authoritarianism and oil-conflict research demonstrate many existing arguments about oil are mutually inconsistent.<sup>16</sup> This observation highlights the need for a theoretical framework that jointly examines opposing arguments. Directly comparing positions from different oil literatures provides foundational assumptions that substantively ground the formal model. This discussion emphasizes the need to scrutinize how oil revenues affect the calculus

<sup>15</sup>Appendix C.4 shows this implication also applies to separatist civil wars.

<sup>16</sup>Smith 2004; Basedau and Lay 2009; Morrison 2012; Colgan 2014 make a similar allegation.

of both governments—as in research on oil and authoritarianism—and challengers, the predominant theme of the oil-civil war literature. The sixth assumption distinguishes center-seeking and separatist civil wars.

### 1.2.1 Assumption #1: Governments Possess Oil Revenues

Key attributes of oil production heavily favor a government over rebel groups, an observation that corresponds with assumptions from oil and authoritarianism research. In contrast, oil and civil war research often focuses on how oil funds insurgencies,<sup>17</sup> or assumes all participants in a spoils contest face the same budget constraint (economic theories of conflict).

Oil production requires large capital investments, a crucial feature of oil that favors governments over challengers.<sup>18</sup> Ross shows the capital-to-labor ratio is considerably higher in the oil and gas industry than in any other major U.S. industry operating overseas.<sup>19</sup> Similarly, Alnaswari states, “Foreign capital and technology had to be called upon to develop oil resources since capital requirements for developing, producing, transporting, refining, and finally marketing oil products were well beyond the capabilities of [developing] countries.”<sup>20</sup> Compared to natural resources such as alluvial diamonds and drugs that require little capital to extract, oil is a “less lootable resource”<sup>21</sup> that “is easily controlled by the central government.”<sup>22</sup>

Empirically, rebel groups have almost never accessed oil revenues to fund start-up costs for challenging a government because of impediments to directly accessing oil wealth during peacetime. Among Ross’ review of cases, only Congo-Brazzaville in the 1990s exhibits this phenomenon in an oil-rich country that experienced a civil war.<sup>23</sup> In this exceptional case, rebel leader and former president Denis Sassou-Nguesso promised to restore French oil company Elf Aquitaine’s monopoly over Congo’s oil if he regained power, in return for assistance. However, cases in which international actors provide a “booty futures” market are rare—a failed coup attempt in Equatorial Guinea in 2004 and Libya in 2013 provide two other known cases—because international oil companies and their host governments favor incumbents over challengers to prevent costly disruptions to oil production. For example, distinct states arose on the periphery of the Arabian peninsula because British oil companies needed a designated ruler with which to sign concessions.<sup>24</sup> The British navy militarily supported these new incumbents.<sup>25</sup>

Rebels have greater opportunities to disrupt or to profit from oil production during ongoing civil wars. Bombing pipelines provides one disruptive option. In extreme circumstances a rebel group may halt oil production entirely by deterring international oil companies from remaining in the country, as during the Second Sudanese Civil War. Rebels may also be able to steal government-produced oil, as in Nigeria and Iraq during the 2000s.<sup>26</sup> The Islamic State rebel group in Iraq and

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<sup>17</sup>Collier and Hoeffler, 2004; Ross 2012, 151-3.

<sup>18</sup>Gause 1994, 42.

<sup>19</sup>Ross 2012, 46.

<sup>20</sup>Alnaswari 1994, 1.

<sup>21</sup>Humphreys 2005, 523.

<sup>22</sup>Colgan 2013, 4.

<sup>23</sup>Ross 2004; Ross 2012, 174-8.

<sup>24</sup>Zahlan 1989.

<sup>25</sup>Macris 2010.

<sup>26</sup>Ross 2012, 170-3; Burns and Semple 2006.

Syria provides an extreme example of rebels looting oil. By gaining military control over existing oil fields and refineries, by the summer of 2014 they had achieved resources exceeding that “of any other terrorist group in history.”<sup>27</sup>

However, these examples provide rare exceptions rather than the norm. Focusing instead on dominant trends, even during ongoing conflicts governments control the overwhelming majority of oil production. This undergirds Colgan’s argument that rebels rarely militarily defeat oil-rich governments because oil revenues provide the government with funds to win a war.<sup>28</sup> In almost all circumstances, even a rebel group that controls oil-rich territory faces great difficulties to extract oil and construct a national distribution system to reap profits<sup>29</sup>—factors related to high capital costs, foreign assistance needs, and the tendency for international actors to support incumbents. The Islamic State partially overcame these difficulties by using smuggling routes established during the post-2003 Iraq state collapse. However, its oil fields still have produced at far below capacity rates<sup>30</sup>—especially after U.S. bombing campaigns began in 2014.<sup>31</sup>

The stylized fact about government ownership also critiques the empirical relevance of economic theories of conflict. These models conceptualize wars as a contest. Each side invests in arms to increase its probability of winning a fight for the prize. A larger prize induces actors to devote more resources to fighting. However, the conventional assumption that every actor faces the same budget constraint contrasts with the stylized fact that an oil-rich government has a much larger budget than the challenger to spend on the contest. Instead, the standard contest model setup may be illuminating for natural resources more easily looted than oil, especially when the state has collapsed. For example, Olsson and Fors use this framework to explain how gold, diamonds, and coltan affected the civil war that began in the Democratic Republic of the Congo in 1997.<sup>32</sup>

### 1.2.2 Assumption #2: Oil Provides a Large Revenue Base and Raises Income

Not only does oil provide government revenues, it often provides a *large* revenue base. Ross lists the “exceptionally large size” of oil revenues as a central characteristic of oil production and provides supporting cross-national evidence.<sup>33</sup> Oil revenues are also large even compared to rents from other natural resources. In Haber and Menaldo’s dataset on oil, natural gas, coal, and metals income for a global sample of countries, oil and natural gas composed 90% of all global resource income from 1960 to 2006.<sup>34</sup> Furthermore, in 76% of country-years with more than \$500 in resource income per capita in this global sample, at least half the income came from oil and gas. “The global trade of oil generates revenues that are somewhere between ten and a hundred times larger than the next largest natural resource.”<sup>35</sup>

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<sup>27</sup>Dilanian 2014.

<sup>28</sup>Colgan 2014, 6 provides examples in which government revenues vastly exceeded rebel funds despite rebel leaders engaging in oil looting for private profit.

<sup>29</sup>Fearon 2005, 500.

<sup>30</sup>al-Khatteeb 2014.

<sup>31</sup>Meichtry and Schechner 2015.

<sup>32</sup>Olsson and Fors 2004.

<sup>33</sup>Ross 2012, 27-33.

<sup>34</sup>Haber and Menaldo 2011.

<sup>35</sup>Colgan 2013, 12.

Evidence connecting oil wealth to large revenue bases complements the recent rethinking of the economic development resource curse. Alexeev and Conrad demonstrate oil-abundant countries have considerably higher per capita incomes than oil-poor countries.<sup>36</sup> Their evidence overturned earlier conventional wisdom (e.g., Sachs and Warner) based on studying economic growth rates during an unrepresentative period in world history.<sup>37</sup> Although it is puzzling that oil-rich states performed so poorly during the 1970s and 1980s, most major oil producers had already become wealthy from commercial oil production prior to this period<sup>38</sup>—a simple albeit powerful observation that research prior to Alexeev and Conrad’s had overlooked. Furthermore, their evidence also rejects a weaker version of the resource curse proposed in earlier work: oil may boost economic growth, but only in countries with strong pre-oil institutions.<sup>39</sup> Alexeev and Conrad’s evidence instead suggests “countries with weaker institutions benefit more from natural resources.”<sup>40</sup>

Large revenues and high per capita income in major oil producers are especially striking in contrast to bleak economic prospects faced by many oil-rich countries prior to discovering large oil reserves. Modern states did not exist in the Arabian peninsula prior to oil discoveries, and the region was one of the poorest in the world. “The pearling industry was vital to the pre-war economies . . . [and] suffered an almost total collapse after the Wall Street crash of 1929 . . . It would have been almost impossible to overcome this crisis had the strange hand of fate not intervened: the oil companies arrived in search of concessions.”<sup>41</sup> As examples, Qatar is now one of the world’s richest countries, but in 1942 the king mortgaged his house to pay off “public” debts and in 1949 the country had only six public employees.<sup>42</sup> Before Libya discovered oil, “the country’s major revenue sources were sales of scrap metal left behind by the belligerents during [World War II], sales of esparto grass, and rent from military bases leased by the United States and Great Britain . . . 80 percent of the country’s population still lived at subsistence level in the hinterland.”<sup>43</sup>

### 1.2.3 Assumption #3: Governments Use Oil Revenues Strategically

A core premise of oil and authoritarianism research is that oil-rich governments strategically use their large revenue streams to decrease incentives for societal challenges. This contrasts with the core idea behind the state prize argument: oil-rich governments provide easy targets for predation. More generally, most work on oil and conflict devotes little attention to strategic government choices.<sup>44</sup> Consequently, existing theories often imply oil wealth raises civil war frequency by imposing unsatisfying limitations on the government’s assumed range of strategic options.

As one example of a crucial strategic consideration, the model below assumes the government can bargain with the challenger. This assumption is standard in models of international warfare<sup>45</sup> and political regime transitions,<sup>46</sup> but not in economics of conflict models. A key result from Besley and

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<sup>36</sup>Alexeev and Conrad 2009.

<sup>37</sup>Sachs and Warner 1997. Ross 2012, 196 provides a concurrent argument to Alexeev and Conrad’s.

<sup>38</sup>Alexeev and Conrad 2009, 587.

<sup>39</sup>Mehlum et al. 2006; Robinson et al. 2006.

<sup>40</sup>Alexeev and Conrad 2009, 591.

<sup>41</sup>Zahlan 1989, 22.

<sup>42</sup>Crystal 1995, 117, 129.

<sup>43</sup>Vandewalle 1999, 46.

<sup>44</sup>Colgan 2014, 7 makes a similar claim.

<sup>45</sup>Fearon 1995; Powell 1999.

<sup>46</sup>Acemoglu and Robinson 2006.

Persson exemplifies why it is important to assume governments can bargain.<sup>47</sup> They improve upon standard contest function models by assuming only the government can access natural resource wealth. But even though natural resource revenues strengthen the government’s coercive capacity, the model *still* predicts more resource rents raise the probability of violence.<sup>48</sup> Because their model does not allow the government to make offers to the challenger, the challenger can only access natural resource wealth by fighting. More generally, economic theories of conflict face the shortcoming that, “There is typically no decision to fight: arming and fighting are one and the same. This prediction of ever-present conflict is unsatisfying since political competition over power and resources is ubiquitous while violent conflict is not.”<sup>49</sup>

As another example of government strategy in the model presented here, the government can invest oil revenues in military capacity—consistent with existing evidence that links oil wealth to higher levels of military spending.<sup>50</sup> However, because most oil and conflict research does not closely scrutinize strategic government choices, the idea that governments can invest oil revenues in coercive capacity is largely absent.

#### 1.2.4 Assumption #4: Oil Raises the Prize of Winning

Although economics of conflict models do not incorporate certain key features of oil wealth, they do highlight the important effect that oil increases the value of capturing the state. Actors in these models fight *because* there is a lucrative prize.<sup>51</sup> Fearon summarizes the logic succinctly by stating “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.”<sup>52</sup>

The prize effect is an important omission from oil and authoritarianism research. Indeed, if assumptions #1 through #3 are valid, it is difficult to comprehend how oil wealth could *fail* to raise value of winning for a rebel group. Thus, whereas the oil-civil war literature tends to understate the conflict-depressing effects of oil, oil-authoritarianism research does not carefully evaluate this crucial channel through which oil may increase conflict propensity.

#### 1.2.5 Assumption #5: Oil Exerts a *Relative* State Weakness Effect

Until recently, it was widely believed that oil wealth systematically weakened governance institutions. However, recent findings reject this argument and focus on a similar issue as discussed in the introduction: earlier analyses concluded oil weakens institutions only because they controlled for per capita income. Instead, existing evidence supports a *relative* state weakness hypothesis: relative to other revenue sources, oil revenues are not as effective at boosting institutional quality.

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<sup>47</sup>Besley and Persson 2011, ch. 4.

<sup>48</sup>Besley and Persson 2011, 184.

<sup>49</sup>Blattman and Miguel 2010, 11.

<sup>50</sup>Wright et al. 2013, 15-17. Colgan 2014, 5 provides additional citations. Gause 1994, 66-68 provides data on the enormous military expenditures by Arabian peninsula monarchies, including large increases following the 1973 oil boom.

<sup>51</sup>E.g., Garfinkel and Skaperdas 2006.

<sup>52</sup>Fearon 2008, 8.



Alexeev and Conrad, Ross, and Kennedy and Tiede incorporate different measures of institutional quality and reach a similar conclusion: there is no evidence that oil wealth systematically weakens governance institutions.<sup>53</sup> Kennedy and Tiede consider the widest range of institutional measures and instead reach the opposite conclusion that “oil has a net positive effect on governance.”<sup>54</sup> Menaldo concurs with this evidence and argues that oil wealth tends to improve institutional quality by “endowing a government with a laboratory in which it can ‘learn how to tax’ ” and by creating positive spillovers for other aspects of state capacity.<sup>55</sup> In a qualitative study that exemplifies rethinking the state weakness effect, Hertog provides evidence that “problems of bureaucratic fragmentation and low regulatory power were apparent in the modern Saudi state right from its inception.”<sup>56</sup> He explicitly contrasts his framework with Chaudhry’s earlier influential argument that the 1970s oil boom led caused Saudi state to dismantle a highly coherent bureaucracy.<sup>57</sup>

Instead, these newer statistical studies show earlier research provided evidence of a “relative” institutional resource curse because, by controlling for per capita income, they compared oil-rich countries to oil-poor countries with similar levels of income per capita.<sup>58</sup> This alternative hypothesis about relative effects finds considerable substantive support. It appears uncontroversial to assert that oil-rich states have weaker bureaucratic capacity than oil-poor countries with comparable levels of income per capita, a frequently used proxy for state capacity. Considerable research shows governments face arduous hurdles to extract direct tax revenues.<sup>59</sup> Therefore, oil-poor states have to improve bureaucratic capacity to achieve higher development levels. In contrast, bureaucratic government did not exist in countries like Oman, Qatar, or the United Arab Emirates prior to the 1973 oil boom. Bureaucracies in these countries were created solely to distribute oil rents to society.<sup>60</sup> Furthermore, by associating with international oil companies, poor countries that discover oil can extract their resource without having to build industrial capacity of their own and without having to penetrate society. In direct contrast to countries that derive large revenue streams from direct taxes, *weak* states often produce larger amounts of oil because of pressing fiscal needs.<sup>61</sup>

Providing additional substantive grounding for a relative state weakness claim, Fearon and Laitin’s influential conflict resource curse hypothesis also assumes oil exerts a relative—but not overall—effect on weakening institutional quality.<sup>62</sup> However, as discussed with the second main result of the model, their relative state weakness hypothesis is widely misinterpreted as concerning the overall effects of oil on institutions.

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<sup>53</sup>Alexeev and Conrad 2009; Ross 2012, 208-215; Kennedy and Tiede 2013.

<sup>54</sup>Kennedy and Tiede 2013, 760. They group their measures into three categories: rule of law, government efficiency, and public goods provision. Ross examines a measure of government effectiveness and corruption and Alexeev and Conrad analyze rule of law.

<sup>55</sup>Menaldo 2014, ch. 4, pg. 11.

<sup>56</sup>Hertog 2010, 39.

<sup>57</sup>Chaudhry 1997.

<sup>58</sup>The discussion accompanying the second main result of the model details the problems this causes.

<sup>59</sup>E.g., Herbst 2000.

<sup>60</sup>Gause 1994, 63.

<sup>61</sup>Haber and Menaldo 2011, 2; Menaldo 2014, ch. 3.

<sup>62</sup>Fearon and Laitin 2003, 81.

### 1.2.6 Assumption #6: The Location of Oil Reserves is Less Important for Center-Seeking than Separatist Civil Wars

Recent research argues oil wealth’s effect on civil war propensity depends on where oil reserves are located within the country.<sup>63</sup> This section advances arguments about geography by demonstrating oil location should minimally alter incentives to attack the center but crucially impact separatist motives.<sup>64</sup> Expounding this vital distinction clarifies why the formal model provides greater insight into center-seeking wars, and why country-level data only provide a valid test for hypotheses about center-seeking wars.

Two examples illustrate this argument by considering incentives faced by a societal group in an oil-rich country. First, suppose the group’s homeland does not contain any oil fields. As Table 1 summarizes, if the overall effect of oil strengthens states by enhancing government revenues, then higher country-level oil production should reduce incentives to attack the center. In contrast, if oil tends to make governments vulnerable prizes of predation, then higher country-level oil production should enhance center-seeking motives. Location does not matter, and the debate that motivates this article provides direct implications for how oil wealth impacts center-seeking civil wars. However, even if *oil-civil war* arguments are correct, more country-level oil will *decrease* separatist incentives because the group would not capture the prize by seceding.

**Table 1. Hypothetical Example #1: Oil Located *Outside* Group’s Territory**

	Center-seeking motives if oil-authoritarianism hypothesis is correct	Center-seeking motives if oil-civil war hypothesis is correct	Separatist motives
<b>Prize</b>	Increases	Increases	No effect
<b>Revenue</b>	Decreases	Decreases	Decreases
<b>Overall Effect</b>	Decreases	Increases	Decreases

Second, suppose the group’s territory does contain oil reserves. As Table 2 summarizes, once again, the revenue-enhancing versus vulnerability debate determines how oil affects motives to attack the capital. However, even if *oil-authoritarianism* arguments are correct about center-seeking civil wars, the overall effects of oil wealth may *increase* separatist incentives. A stronger state apparatus should weaken incentives to attack the center by a greater amount than incentives to launch a separatist war—and the farther away and the rougher the terrain in the group’s area, the more feasible guerrilla warfare against a stronger government becomes. The key idea here, drawing from Buhaug’s argument and evidence,<sup>65</sup> is that the marginal effect of buying a tank on raising the government’s probability of winning is larger when the government defends the capital than when

<sup>63</sup>Ross 2013, 14-16 reviews this work.

<sup>64</sup>Most research that scrutinizes locational effects of oil does not distinguish between different types of civil war. The distinction presented here most closely complements Blair’s 2014 analysis of heterogeneous location effects for separatist wars. The following discussion more directly addresses why locational factors that condition the oil-separatist relationship should not strongly affect the oil-center relationship.

<sup>65</sup>Buhaug 2010.

it fights in the periphery. This argument also highlights why it is relevant that regime transitions—on which oil-authoritarianism arguments focus—conceptually resemble center-seeking fights more closely than separatist wars.<sup>66</sup>

**Table 2. Hypothetical Example #2: Oil Located *Inside* Group’s Territory**

	<b>Center-seeking motives if oil-authoritarianism hypothesis is correct</b>	<b>Center-seeking motives if oil-civil war hypothesis is correct</b>	<b>Separatist motives</b>
<b>Prize</b>	Increases	Increases	Increases
<b>Revenue</b>	Decreases	Decreases	Decreases (less strongly)
<b>Overall Effect</b>	Decreases	Increases	Increases?

These two examples demonstrate why the oil-civil war versus oil-authoritarianism debate yields clear predictions for center-seeking incentives—seizing the capital yields the prize regardless of oil location, and military investments defend the center more effectively than the periphery—whereas the within-country location of oil fields strongly conditions the overall effect of oil on separatist civil wars. Because the model focuses on this debate rather than on location effects, and because standard cross-national oil production measures do not take location into account, the theoretical implications and empirical testing strategy are more relevant for understanding center-seeking civil wars. The conclusion discusses implications for separatist civil wars.

### 1.2.7 Summarizing the Assumptions

Assumptions #1 through #3 highlight how oil can strengthen a government. But assumption #4 highlights an important countervailing effect, and properly interpreting evidence about oil and governance institutions does not tip the balance one way or the other—oil revenues may not be as effective as other revenue sources, but that does not imply oil weakens states (assumption #5). Assumption #6 suggests mechanisms debated by the oil-authoritarianism and oil-civil war literatures may be less important than within-country location of oil to explain separatist wars but, like existing research, does not provide a clear hypothesis for the overall effect of oil on center-seeking civil war onset.

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<sup>66</sup>[AUTHOR] elaborates another oil location-specific factor that raises separatist propensity more than center-seeking prospects: residents of historically discriminated and numerically small ethnic groups harbor grievances when the government encroaches upon their territory to extract oil.

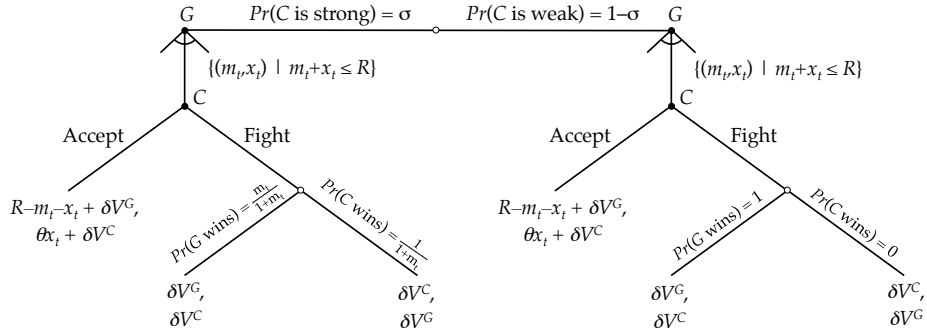
### 1.3 A Unified Theory of Oil and Center-Seeking Civil War Onset

The formal model incorporates these assumptions to provide a unified framework for evaluating how the competing effects of oil wealth affect overall incentives to initiate a center-seeking civil war. This section presents and solves the model, and the next two sections present the main findings.

#### 1.3.1 Setup

Two long-lived actors, a government  $G$  and challenger  $C$ , bargain over state revenues in each period of an infinite time horizon game. Future consumption is discounted exponentially by  $\delta \in (0, 1)$ . Because the challenger can gain control of the state in the future,  $G$  and  $C$  refer to an actor's position in a particular period. Figure 1 presents the stage game played in each period.

Figure 1. Tree of Stage Game



In each period Nature stochastically chooses whether  $C$  is “strong” (probability  $\sigma$ ) or “weak” (probability  $1 - \sigma$ ), terms that will be formally defined below.  $G$  moves next. In every period,  $G$  possesses revenues  $R \geq 1$ , of which  $\omega$  percent derives from oil. Capturing assumption #3 about strategic governments, in each period  $G$  allocates its revenues among three factors.  $G$  devotes an amount  $m_t \geq 0$  to arm its military.  $G$  also offers  $C$  a share of spoils  $x_t \geq 0$  that captures a more general decision over patronage, welfare policies, public sector job provision, and other ways for the government to distribute benefits.  $G$  retains the residual not spent on armaments and patronage as personal consumption in period  $t$ . The per-period budget constraint requires  $m_t + x_t \leq R$ .

$C$  moves next, deciding whether to accept the patronage offer or to fight to control the state, i.e., initiate a center-seeking civil war. If  $C$  accepts an offer  $x_t$ , it only consumes  $\theta(\cdot) \in (0, 1]$  percent of the intended patronage offer. The remaining  $[1 - \theta(R, \omega)]x_t$  is destroyed by bureaucratic corruption and other sources of inefficiency. The following assumptions about  $\theta$  directly incorporate assumption #5 about relative state weakness. For fixed total revenues  $R$ , institutional capacity for

distributing patronage is assumed to decrease in the percentage of revenue that derives from oil.<sup>67</sup> Formally,  $\theta_\omega < 0$ . Additionally, institutional capacity is assumed to increase in total revenues, meaning  $\theta_R > 0$ . Therefore, by assumption, increases in non-oil revenues raise institutional quality by lowering  $\omega$  and raising  $R$ . However, increases in oil revenues exert an ambiguous effect on institutional quality because more oil raises both  $\omega$  and  $R$ —consistent with assumption #5. Below, the dependence of  $\theta$  on other parameters will be suppressed when it does not create confusion.

Therefore, if  $C$  accepts, in period  $t$  the challenger consumes  $\theta x_t$  and  $G$  consumes the remaining revenues  $R - m_t - x_t$ . The game then moves to the next period with the same players as government and challenger. Each player has a linear utility function, and Figure 1 denotes the future continuation values for each player as  $V^G$  and  $V^C$ , respectively.

If instead  $C$  fights, its probability of winning a center-seeking civil war depends on its contemporaneous strength. If  $C$  is weak, it wins a fight with probability 0 regardless of  $G$ 's military spending. If  $C$  is strong, it wins a fight with probability  $\frac{1}{1+m_t}$ . The most natural interpretation of this assumption is that in strong periods  $C$  has an exogenous arms endowment normalized to 1 and each side wins a war with probability directly proportional to its share of arms.  $C$  becomes the government in period  $t + 1$  if it wins the war and remains as challenger otherwise. The incumbent government remains in control of the state in period  $t + 1$  with complementary probability  $\frac{m_t}{1+m_t}$  and becomes the challenger if it loses. Neither player consumes in the period of a fight, but a war does not alter future revenues.

Two assumptions about  $C$ 's option to fight require closer scrutiny. First, the amount of oil revenues does not affect  $C$ 's armaments. As established with assumption #1, this captures an overwhelming empirical trend rather than artificially assumes away a generally relevant conflict-inducing effect of oil. To motivate this argument, suppose instead  $G$  and  $C$  each choose armament spending from separate endowments. As long as  $G$ 's revenues are sufficiently larger,  $C$  will optimally spend all its revenues to participate in the contest. This corner solution produces identical implications as the simplifying assumption here that  $C$  inherits an exogenous armament endowment. Certainly, if  $C$  controlled a large enough percentage of the oil revenues, the findings below would not hold because more oil could unambiguously *raise* the probability of fighting. However, the discussion accompanying assumption #1 implies the current setup of the model has stronger empirical foundations than this alternative.

Second, many prominent formal theories of civil wars also model stochastic shifts in the distribution of power.<sup>68</sup> One plausible microfoundation for this assumption is that societal groups are only occasionally able to solve collective action problems and effectively challenge the government.<sup>69</sup> This is natural if we conceptualize the challenger not necessarily as an established rebel group,

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<sup>67</sup>The parameter  $\theta$  can be thought of as a production function for translating patronage spending into output. Assuming relative state weakness captures that Qatar's nascent bureaucracy in the 1970s was less effective at translating oil revenues into coveted goods than a bureaucracy in an oil-poor country that had achieved similarly large revenue streams.

The discussion accompanying assumption #5 also demonstrates why the relevant considerations about institutional quality—from the perspective of the existing literature—concern the government's ability to provide valuable services for its population (e.g., Kennedy and Tiede's 2013 categories of rule of law, government efficiency, and public goods provision) rather than affect its ability to translate revenues into coercive capacity. However, if an additional institutional parameter conceptually similar to  $\theta$  were assumed to impact  $G$ 's probability of winning, the findings below would be qualitatively unaltered.

<sup>68</sup> Fearon 2004; Powell 2012.

<sup>69</sup> Acemoglu and Robinson 2006, 123-128.

but instead as a societal actor that occasionally faces opportunities to coerce the government. For example, Iraq’s defeat in the 1991 Gulf War provided a temporary coordination device for discontented Shi’a in the south to organize insurgencies known collectively as the *Intifida*. Similarly, the electoral defeat of incumbent president Denis Nguesso-Sassou in the Republic of Congo in 1992 dramatically boosted the ability of a challenger to confront the new government—for as long as Nguesso-Sassou could effectively organize his supporters.

A final notable assumption highlights an important scope condition. The model assumes the government cannot commit to future promises. As shown below,  $G$  will only deliver patronage payments commensurate to the challenger’s contemporaneous expected utility from fighting. This builds on, for example, Blattman and Miguel’s contention that, “The most intriguing theories of civil war focus on the cases where credible commitments to peace or redistribution cannot be made even with complete information.”<sup>70</sup> Walter also discusses the prominence of commitment problem explanations for civil wars.<sup>71</sup> The no commitment assumption highlights the model’s relevance for studying weakly institutionalized environments. That is, it provides an appropriate setting for studying the effects of oil in a country like Saudi Arabia, but not Norway—which was already a rich, consolidated democracy prior to discovering oil.

### 1.3.2 Equilibrium Analysis

Two steps solve for the existence of a Markov Perfect Equilibrium (MPE) that does not involve fighting along the equilibrium path of play, which is shown to be unique when one exists. After presenting the government’s full constrained optimization problem, I first solve for the optimal armament and patronage offer allocation while assuming these choices satisfy the budget constraint (Lemma 1). The Markov assumption requires the government to choose one level of arms ( $m_s^*$ ) and patronage ( $x_s^*$ ) in each strong period and another level of arms ( $m_w^*$ ) and patronage ( $x_w^*$ ) in each weak period,<sup>72</sup> as well as for the challenger to choose its action based only on whether it is strong or weak in the current period and on the government’s current-period armaments and offer. Second, I examine conditions under which the armament and patronage offer pair from Lemma 1 will be feasible, given the per-period budget constraint (Lemma 2). These two lemmas engender the equilibrium strategy profile (Proposition 1). Concomitant with solving for a peaceful equilibrium, all one-step deviations considered below assume the future path of play is peaceful. Appendix A proves these results.

As a preliminary result, any equilibrium features  $(m_w^*, x_w^*) = (0, 0)$ . Because the government always prevails over a weak challenger regardless of its arms investment,  $C$  accepts any offer. Therefore,  $G$  does not arm and sets the patronage offer to 0, meaning  $C$  consumes 0 in weak periods. To minimize notation,  $(m^*, x^*)$  will refer to the equilibrium armament and offer pair in a period the challenger is strong.

To solve for  $G$ ’s optimal offer in a period  $C$  is strong, I first assume an equilibrium allocation  $(m^*, x^*)$  exists that will be chosen in all future periods and solve for optimal current-period choices

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<sup>70</sup>Blattman and Miguel 2010, 13.

<sup>71</sup>Walter 2009.

<sup>72</sup>As Appendix A discusses, the following solves for a modified MPE in which  $G$  is restricted to considering Markovian deviations when setting  $m_s^*$ . Appendix A also discusses the consequences of relaxing this assumption.

$(m_t, x_t)$ . I then set the current-period choices equal to the equilibrium terms to solve for the equilibrium amounts.

$C$ 's expected lifetime utility to accepting an offer in a strong period is  $E[U_C(\text{accept} \mid \text{strong})] = \theta x_t + \delta V^C$  because  $C$  consumes  $\theta x_t$  in the current period and the expected continuation value of the challenger in the future,  $V^C$ . Because in equilibrium  $C$  will consume  $\theta x^*$  in the  $\sigma$  percentage of future periods it is strong and nothing when weak,  $V^C = \frac{\sigma \theta x^*}{1-\delta}$ .  $C$ 's expected lifetime utility to fighting is  $E[U_C(\text{fight} \mid \text{strong})] = \delta \left[ \frac{1}{1+m_t} V^G + \frac{m_t}{1+m_t} V^C \right]$  because no consumption occurs in the fighting period, and if  $C$  wins it receives the future continuation value for the government whereas losing yields the challenger's future continuation value. This expected utility of fighting term specifies a one-step deviation from the proposed equilibrium strategy profile because it assumes future play is peaceful. Because the government consumes  $R$  in periods the challenger is weak and  $R - m^* - x^*$  in periods the challenger is strong,  $V^G = \frac{R - \sigma(m^* + x^*)}{1-\delta}$ . Combining terms and simplifying produces  $E[U_C(\text{fight} \mid \text{strong})] = \frac{\delta}{(1-\delta)(1+m_t)} \left[ R - \sigma(m^* + x^*) + m_t \sigma \theta x^* \right]$ .

These two expected utility terms for  $C$  show how the oil-authoritarianism and oil-civil war mechanisms enter the model. The revenue-generating effects of oil (assumption #2) loosen  $G$ 's per-period budget constraint  $x_t + m_t \leq R$  (but does not affect the challenger's budget; assumption #1) by enabling higher levels of military capacity investments and patronage offers (assumption #3). Oil exhibits a prize effect by raising  $R$  in the function for  $C$ 's expected utility to fighting (assumption #4). Finally, oil engenders relative state weakness because  $\theta_\omega < 0$  (assumption #5). Within-country oil location does not alter these considerations (assumption #6).

Conditional on  $m_t$ ,  $G$  will optimally choose  $x_t$  to make  $C$  indifferent between accepting and fighting as long as the offer is non-negative:  $x_t = \max \left\{ 0, \frac{\delta}{(1-\delta)(1+m_t)\theta} \left[ R - \sigma(m^* + (1+\theta)x^*) \right] \right\}$ .  $G$  solves the following program in a period  $C$  is strong to maximize lifetime utility in a peaceful equilibrium:

$$\max_{m_t, x_t} R - m_t - x_t + \frac{\delta}{1-\delta} \left\{ R - \sigma[m_t + x^*(m_t)] \right\} \quad (1)$$

$$\begin{aligned} \text{s.t. (C1)} \quad & x_t \geq \frac{\delta}{(1-\delta)(1+m_t)\theta} \left\{ R - \sigma[m_t + (1+\theta) \cdot x^*(m_t)] \right\} \\ \text{(C2)} \quad & x_t \geq 0 \\ \text{(C3)} \quad & m_t \geq 0 \\ \text{(C4)} \quad & R \geq m_t + x_t, \end{aligned}$$

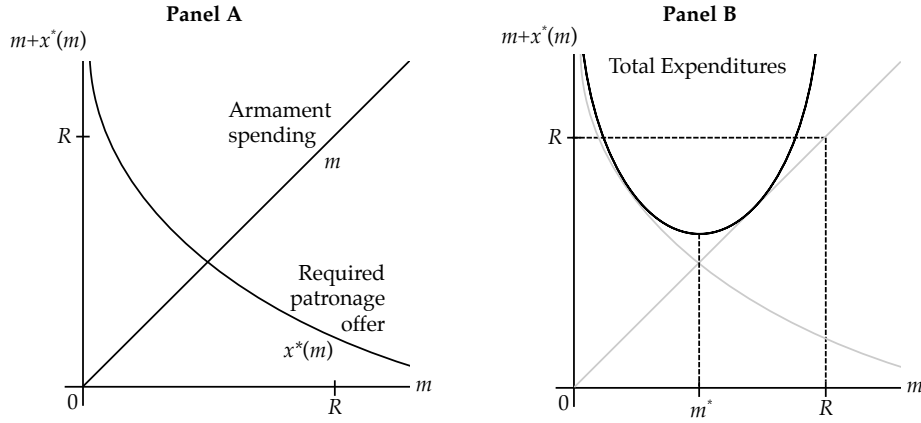
where  $x^*(\cdot)$  is the optimal patronage offer for a given level of military spending. The first two constraints require  $G$  to make a high enough offer that  $C$  will accept, and for this amount to be non-negative. The third constraint requires non-negative armaments and the fourth requires satisfying the per-period budget constraint.

I first assume C4 does not bind. Lemma 1 analyzes  $G$ 's optimal allocation assuming  $G$  can afford the desired armament amount and patronage offer.

**Lemma 1.** Assuming it is possible for  $G$  to buy off  $C$ , there is a unique optimal armament and patronage choice. Formally, define  $(m^*, x^*)$  as the argument that maximizes Equation 1 subject to C1, C2, and C3.  $(m^*, x^*)$  exists and is unique.

Figure 2 provides intuition for Lemma 1. On the one hand, armament expenditures are costly for  $G$  because they raise total expenditures. On the other hand, higher  $m$  decreases  $C$ 's probability of winning a fight and therefore reduces the patronage offer needed to buy the challenger off. Panel A depicts this tradeoff. The result is that the government maximizes personal consumption—which is equivalent to minimizing total government expenditures—by spending on the military until additional arms spending is less effective at reducing total expenditures than simply transferring funds to the challenger as patronage. This provides the optimal armament amount  $m^*$  shown in Panel B. The government devotes to patronage the remaining revenues needed to buy off the challenger.<sup>73</sup>

**Figure 2. Optimal Armament and Patronage Choices**



Although Lemma 1 characterizes  $G$ 's optimal allocation when a peaceful equilibrium exists, it does not provide insight into the conditions under which this equilibrium exists. When C4 binds,  $G$  is forced to spend more on arms and patronage in a strong period than it has in current-period revenues, which implies  $G$  cannot buy  $C$  off from fighting for the center.<sup>74</sup>

Fighting occurs in every strong period if  $\sigma$ —the percentage of future periods in which  $C$  expects to be strong—is sufficiently low.  $C$  does not consume in weak periods. Therefore, the more frequently  $C$  expects to be weak in the future, the smaller is  $C$ 's expected future stream of benefits to remaining as challenger. Consequently, in a strong period,  $C$  needs to be compensated with more in the present to be induced not to fight. This makes it harder to buy  $C$  off. When  $\sigma$  is low enough, to induce acceptance in a rare period that  $C$  is strong,  $G$  would be required to spend more on arms and patronage than it has in current period revenues. Because  $G$  cannot credibly promise to pay  $C$

<sup>73</sup>Figure 2 assumes a parameter range in which  $(m^*, x^*)$  has an interior solution.

<sup>74</sup>Because  $G$ 's maximization problem is equivalent to the goal of minimizing total expenditures, if  $G$ 's optimal military and patronage choices exceed  $R$ , then all possible allocations that would induce  $C$  to accept also exceed  $R$ .



more than 0 in a weak period, and because  $G$  cannot borrow across periods, when  $\sigma$  is low enough  $C$  will fight in response to any offer in a strong period. Lemma 2 characterizes a threshold  $\bar{\sigma}$  such that  $m^*(\bar{\sigma}) + x^*(\bar{\sigma}) = R$ , meaning fighting occurs if  $\sigma < \bar{\sigma}$ . When this is the case, the benefits from possibly gaining control of the state in the future outweigh the lost consumption from fighting, considering the low future benefits to remaining as challenger.

**Lemma 2.** If  $C$  is sufficiently patient, there exists a unique value of  $\sigma$ , denoted  $\bar{\sigma}$ , such that  $G$  will not be able to buy off  $C$  in a strong period if  $\sigma < \bar{\sigma}$ . If  $C$  is not sufficiently patient,  $G$  will be able to buy off  $C$  in a strong period regardless of other parameter values. Formally, if  $\delta > \delta_2$  (for  $\delta_2$  defined in the proof), there exists a unique value  $\bar{\sigma}$  such that  $m^* + x^* > R$  when  $\sigma < \bar{\sigma}$ , and  $m^* + x^* < R$  when  $\sigma > \bar{\sigma}$ . If  $\delta < \delta_2$ ,  $m^* + x^* < R$  for all  $\sigma$  because  $\bar{\sigma} < 0$ .

The final consideration for a peaceful equilibrium requires establishing that if  $\sigma > \bar{\sigma}$ ,  $G$  chooses to allocate arms and patronage to induce acceptance from  $C$ . Because by assumption fighting destroys all consumption in the current period, whereas  $G$  consumes  $R - m^* - x^*$  (which by definition is strictly greater than 0 if  $\sigma > \bar{\sigma}$ ) if  $C$  accepts,  $G$  would receive strictly lower utility in the current period if a fight occurred. Furthermore, the best possible outcome is that  $G$  wins the fight—which yields the same future continuation value,  $V^G$ , that  $G$  would have received for sure had it bought  $C$  off. Therefore,  $G$  also receives strictly lower utility in future periods.<sup>75</sup>  $G$ 's strict preference to buy off  $C$  when possible is consistent with a large literature that studies the “inefficiency puzzle” in international warfare.<sup>76</sup>

Combining Lemmas 1 and 2 characterizes strategies in a peaceful equilibrium and the conditions under which a peaceful MPE exists. Furthermore, if a peaceful MPE exists, it is unique.

**Proposition 1.** If  $\sigma > \bar{\sigma}$ , in every strong period  $G$  chooses  $(m_t, x_t) = (m^*, x^*)$ .  $C$  accepts any offer  $x_t \geq \frac{\delta}{(1-\delta)(1+m_t)\theta} \left[ R - \sigma(m^* + (1+\theta)x^*) \right]$  and fights otherwise. In every weak period,  $G$  chooses  $(m_t, x_t) = (0, 0)$  and  $C$  accepts any offer. If  $\sigma < \bar{\sigma}$ , a peaceful equilibrium does not exist.

## 1.4 Main Result #1: How Oil Prevents Center-Seeking Civil Wars

Flipping the logic of conventional conflict resource curse arguments, oil-generated revenues strengthen the government and decrease the probability of center-seeking civil wars. Although oil enhances the prize of capturing the state, the government strategically spends oil-generated revenues on military

<sup>75</sup>Strictly speaking, the assumed order of moves does not allow  $G$  to make a low enough offer to induce  $C$  to fight in a weak period (because  $C$  will accept any offer) nor in a strong period if  $\delta < \delta_2$ . However, granting  $G$  an explicit choice to arm and fight, rather than to arm and make an offer, would not change equilibrium actions for the reasons just discussed.

<sup>76</sup>Fearon 1995; Powell 1999.

capacity—which lowers the challenger’s probability of winning a fight—and on patronage, which increases the challenger’s utility to accepting an offer.

Allowing the government to arm endogenously drives the finding that oil dampens incentives to fight. This is demonstrated by considering a baseline scenario in which  $G$  does not arm, which results in the state prize and revenue-enhancing mechanisms canceling out when  $\theta$  is fixed.<sup>77</sup> Restricting  $m=0$  means  $G$  does not build a military and will for sure lose a fight when  $C$  is strong.<sup>78</sup> If  $m=0$ ,  $G$ ’s total expenditures consist only of the patronage offer:

$$x^*(m=0) = \frac{\delta R}{(1-\delta)\theta + \delta\sigma(1+\theta)} \quad (1.1)$$

Examining Equation 2 explains why the revenue-enhancing and prize effects offset each other. Higher  $R$  implies  $G$  must offer more to compensate  $C$  for not fighting over a larger prize, as shown in the numerator of the term. However, the revenue-generating effect of oil also increases the amount  $G$  has available spend on patronage without hitting the budget constraint,  $R$ , which perfectly offsets the prize effect.

In contrast, removing the  $m=0$  restriction and instead allowing  $G$  to choose its armament level, larger  $R$  does favor the government.  $G$  chooses higher military spending in a strong period in reaction to a larger prize, which partially counteracts the prize effect by lowering  $C$ ’s probability of winning. This ensures  $C$ ’s expected utility from fighting—and, therefore, the patronage offer—does not increase in proportion to any increases in the amount of oil. Most important,  $G$  increases arms spending in reaction to a larger prize precisely because this ensures total government expenditures do not rise as much as increases in  $R$ . When the government can arm endogenously, the coercive possibilities afforded by larger oil streams strengthen the government.

Part a of Proposition 2 formalizes this argument by showing increases in oil revenues lower the  $\bar{\sigma}$  threshold that determines whether or not fighting will occur—therefore implying a smaller range of  $\sigma$  in which center-seeking war occurs. Part b shows this logic is unaltered as long as oil does not exert a large negative effect on institutional quality.

**Proposition 2.** Suppose a discrete increase in oil raises total revenues from  $\underline{R}$  to  $\underline{R} + \Delta_O$ . This changes the threshold in Lemma 2 from  $\bar{\sigma}(\underline{R})$  to  $\bar{\sigma}(\underline{R} + \Delta_O)$ .

**a.** Assuming  $\theta$  is constant, increases in oil revenues weakly decrease  $\bar{\sigma}$ . Formally,  $\bar{\sigma}(\underline{R}) > \bar{\sigma}(\underline{R} + \Delta_O)$  for all  $\Delta_O > 0$ .

**b.** Now assume the amount of oil does affect  $\theta$ , as described in the model setup. As long as oil revenues do not exert a large enough negative effect on institutional quality, the result from Part a is unaltered. Formally, define  $\gamma_O \equiv \frac{\theta(\underline{R} + \Delta_O)}{\theta(\underline{R})}$ . Then there exists  $\bar{\gamma}_O < 1$  such that  $\bar{\sigma}(\underline{R}) > \bar{\sigma}(\underline{R} + \Delta_O)$  if  $\gamma_O > \bar{\gamma}_O$ .

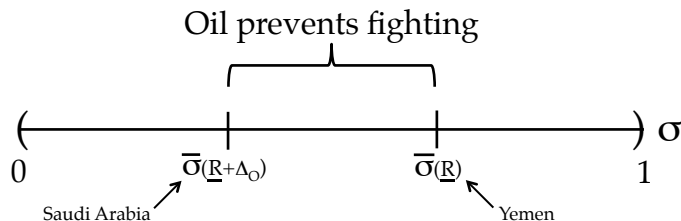
Figure 3 illustrates the substantively relevant parameter range. Assuming Saudi Arabia and Yemen have the same baseline level of revenues, Proposition 2 implies Saudi Arabia should have lower  $\bar{\sigma}$

<sup>77</sup>To focus on the main intuition behind Proposition 2, I assume  $\theta$  is constant in the text preceding the proposition before discussing how the effect of oil on  $\theta$  alters the result.

<sup>78</sup>The following analysis would be identical if  $G$  were granted a costless military endowment, meaning  $G$  wins a fight with positive probability even without investing any revenues into additional military capacity.

than does Yemen because of Saudi Arabia’s large oil endowment  $\Delta_O$ . If these two countries have the same value of  $\sigma$  and it lies in the intermediate range depicted in the figure, then major oil production has prevented fighting that otherwise would have occurred in Saudi Arabia—i.e., in the counterfactual scenario Saudi Arabia did not become a major oil producer and therefore had government revenues commensurate to Yemen’s.

**Figure 3. Oil Decreases the Likelihood of Center-Seeking Civil War**



Examining the conditional element to part b of Proposition 2 further demonstrates the relevance of this core implication. If oil exerts a positive—or even no—systematic effect on institutions, large oil production lowers the probability of center-seeking civil wars.<sup>79</sup> Only if oil exerts a strong enough negative effect on institutions will the logic described above flip, because the deleterious effect on  $G$ ’s ability to translate revenues into patronage would dominate the coercive possibilities afforded by oil. However, as discussed with assumption #5, existing research shows oil does not systematically diminish institutional quality and some even argue oil positively affects institutions.<sup>80</sup> An example grounds why producing oil enables a government to buy off societal actors even though oil ambiguously affects institutional quality. Vandewalle argues Libya became a “distributive state” after discovering oil.<sup>81</sup> Distributive states’ institutions are “created and relied upon purely for economic largesse and distributive purposes.” As a result, “they tend to remain, for regulatory purposes, inefficient and weak.” However, although Libya’s historically weak institutions persisted even after discovering oil, Muammar Gaddafi used vast oil revenues in his early years to buy legitimacy by distributing patronage widely—complemented by an enhanced coercive apparatus.<sup>82</sup>

Overall, this implication flips the logic of conventional resource curse arguments by showing how oil revenue strengthens governments and decreases center-seeking conflict propensity, rather than weakens governments or otherwise empowers rebels.

<sup>79</sup>Using notation from Part b of Proposition 2,  $\gamma_O < 1$  implies oil weakens institutions and  $\gamma_O < \underline{\gamma}_O$  implies oil weakens institutions by a large enough amount that oil increases conflict propensity.

<sup>80</sup>Kennedy and Tiede 2013; Menaldo 2014.

<sup>81</sup>Vandewalle 1999.

<sup>82</sup>Vandewalle 1999, 8, 34-5, 66, 72.

## 1.5 Main Result #2: Distinguishing the “Relative” Conflict Resource Curse Hypothesis

If theoretical reasoning suggests oil exerts an overall effect that depresses propensity for an important type of civil war, why does existing regression evidence consistently support a conflict resource curse? An important reason is that most empirical work tests a *relative* conflict resource curse hypothesis—by including per capita income as a covariate—but does not assess the *overall* effects of oil on conflict. As a preliminary result, Proposition 3 shows large enough increases in non-oil revenues also decrease the probability of center-seeking civil wars.<sup>83</sup>

**Proposition 3.** Suppose a discrete increase in non-oil revenues raises total revenues from  $\underline{R}$  to  $\underline{R} + \Delta_N$ . This changes the threshold in Lemma 2 from  $\bar{\sigma}(\underline{R})$  to  $\bar{\sigma}(\underline{R} + \Delta_N)$ . Increases in non-oil revenues weakly decrease  $\bar{\sigma}$ . Formally,  $\bar{\sigma}(\underline{R}) > \bar{\sigma}(\underline{R} + \Delta_N)$  for all  $\Delta_N > 0$ .

Proposition 3 closely resembles Proposition 2, and similar conclusions drawn about oil in the previous section also apply to other revenues. Increases in non-oil revenues also lower the  $\bar{\sigma}$  threshold needed to prevent fighting and therefore lower the probability of center-seeking civil war.

The key difference is that non-oil revenues reduce  $\bar{\sigma}$  by a larger amount. This relative conflict resource curse finding follows directly from the relative state weakness assumption. If we compare two countries with the same amount of revenues, the relative state weakness assumption implies the country that receives a higher percentage of these revenues from oil will have lower  $\theta$ . The lower is  $\theta$ , the less able is  $G$  to make attractive patronage offers to  $C$ . This implies a larger range of  $\sigma$  values that are low enough for fighting to occur in equilibrium. Therefore, the probability of center-seeking civil war increases when hypothetically fixing the total amount of government revenues and increasing the percentage that derives from oil. Proposition 4 summarizes this relative conflict resource curse result.

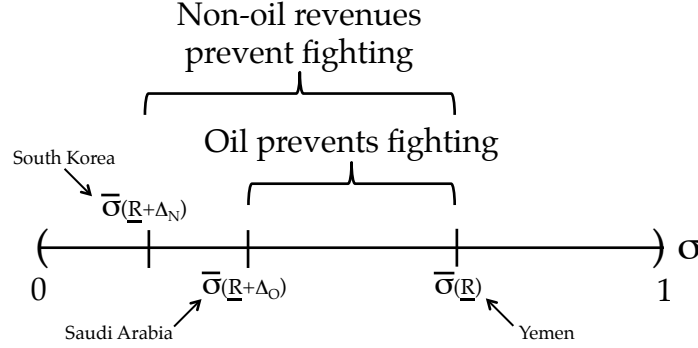
**Proposition 4.** Comparing equal-sized increases in oil revenues and non-oil revenues, center-seeking civil war will be less likely after the non-oil revenue increase; although total government revenues are the same under either intervention,  $\omega$  is lower after the increase in non-oil revenues. Formally, for  $\Delta_O = \Delta_N$ ,  $\bar{\sigma}(\underline{R} + \Delta_O) > \bar{\sigma}(\underline{R} + \Delta_N)$ .

Figure 4 provides an illustrative example. Even though South Korea and Saudi Arabia have comparable levels of income per capita—which is closely associated with government revenues—South Korea’s government is funded by non-oil revenues whereas Saudi Arabia’s is funded primarily by oil revenues. Proposition 4 implies a country with South Korea’s parameter values is less likely to experience center-seeking civil wars than a country with Saudi Arabia’s parameter values.

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<sup>83</sup>As discussed in the conclusion, the implications from this section about conflating overall and relative effects are also relevant for separatist civil wars.

Figure 4. The “Relative” Conflict Resource Curse



Comparing Propositions 2 and 4 highlights a subtle but crucial distinction that provides the second key implication from the model. Oil exerts a negative *overall* effect on the probability of center-seeking civil war because oil raises revenues, but when holding revenues fixed and assessing oil *relative* to other revenue sources, more oil raises conflict propensity.

Distinguishing overall from relative effects is vital because it highlights an important problem with conventional empirical practice in the conflict resource curse literature. Much existing work considers regressions with civil war onset as the dependent variable, oil as one of or the main independent variable, and income per capita as a control variable. As shown when presenting assumption #2, oil production tends to raise income per capita and government revenues by large amounts. Regressions that control for income test the relative effect of oil rather than the overall effect that is relevant for making counterfactual comparisons. In fact, we should not be surprised that existing evidence consistently appears to support a conflict resource curse. Controlling for income *holds fixed* the crucial revenue-enhancing channel through which oil decreases incentives to challenge the center in the model.

To illustrate this point, it is useful to ask: what is the best counterfactual comparison for Saudi Arabia? South Korea does not provide a plausible estimate for a hypothetical oil-poor Saudi Arabia’s conflict trajectory. Saudi Arabia was unlikely to achieve high wealth and large government revenue streams had it not become a major oil producer. But this is exactly the comparison scholars implicitly make by controlling for income, because Saudi Arabia and South Korea have similar levels of income per capita. Instead, a more relevant comparison for Saudi Arabia is Yemen, Saudi Arabia’s relatively oil-poor neighbor that is also poor in overall income and has experienced a history of violent conflict. This counterfactual comparison is premised on the more plausible assumption Saudi Arabia would have remained poor had it not become a major oil producer. Assessing the hypothetical intervention of interest also grounds this consideration. To assess the overall effects of oil, the relevant intervention is whether or not Saudi Arabia discovers oil—which manipulates everything that comes along with oil wealth, including GDP per capita—as opposed to hypothetically manipulating the *mediating* variable so that Saudi Arabia has high oil wealth but does not experience increases in GDP per capita.

Because countries like South Korea are less likely to experience center-seeking conflicts than countries like Yemen, the incorrect counterfactual comparisons generated by controlling for income per

capita should cause estimates of how oil impacts conflict to be upwardly biased—that is, make oil seem like more of a curse than it actually is when the goal is to assess the overall effects of oil. More technically, controlling for income likely induces large and positive post-treatment bias in the regression estimates.

There is, of course, nothing *wrong* with studying the effect of oil relative to other revenue sources. The key problem is instead that most existing work conflates the overall and relative resource curse hypotheses. Widespread misinterpretation of Fearon and Laitin’s influential so-called “state weakness” hypothesis exemplifies this concern.<sup>84</sup> Fearon and Laitin study the effect of oil within a general model on causes of civil wars. They hypothesize that *given the amount of revenue*, a government is better off receiving these revenues from income taxes than from oil because income taxes correspond with higher levels of bureaucratic capacity. This is a relative state weakness argument, and does not imply oil-rich states would have developed large income tax bases had they not become oil-rich. However, this widely cited argument is almost universally interpreted as: oil exerts an overall effect on weakening governance institutions and raising the probability of civil war.<sup>85</sup> Comparing Propositions 2 and 4 from the model demonstrates the important problem with what otherwise may appear to be a minor discrepancy.

## 1.6 Empirical Evidence

In addition to informing influential debates about how the contending effects of oil affect incentives to initiate a center-seeking civil war, the main results from the model also imply an important specification alteration for cross-national regressions, which have provided the empirical foundation for the conflict resource curse hypothesis. One set of regressions below uses the same statistical models as much existing research and demonstrates that simply omitting the income control removes a strong positive correlation between oil wealth and center-seeking civil war onset. Furthermore, statistical models that introduce additional justified modifications demonstrate a consistent negative association between oil and center-seeking conflict, and some of the correlations achieve conventional levels of statistical significance. Overall, the results are more consistent with oil and authoritarian stability implications than oil and civil war arguments—which is striking because they are produced by statistical models similar to the ones that have underpinned the conflict resource curse in existing research.

Despite voluminous scholarship on oil and conflict, less research has empirically examined the effects of oil on center-seeking civil wars specifically. Three contributions that do, however, reach similar conclusions as the broader oil-civil war literature. Buhaug, Wimmer et al., and Ross all find a strong positive effect of oil on center-seeking civil war onset (measured using UCDP/PRIO) in specifications that control for income per capita.<sup>86</sup> Buhaug also includes robustness checks using Fearon’s civil war measure and finds a positive but insignificant effect of oil wealth. These results provide the most direct basis of comparison for the findings presented below.

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<sup>84</sup>Fearon and Laitin 2003, 81; Fearon and Laitin 2006, 2.

<sup>85</sup>Appendix E provides numerous citations.

<sup>86</sup>Buhaug 2006, 700; Wimmer et al. 2009, 333; Ross 2012, 182-3.

### 1.6.1 Results from Existing Models: Implications of Conflating Overall and Relative Effects

The first set of results replicate statistical models from Ross—which closely resemble those from the broader conflict resource literature—and compare specifications that include a per capita income control to those that do not.<sup>87</sup> Annual log oil income per capita (lagged one year) is used to measure oil wealth. I use two civil war datasets to code onsets, UCDP/PRIO and Fearon. For both, I only include center-seeking civil wars. Ross’ dataset also provides additional covariates including annual log total per capita income (lagged one year), a set of region dummies, and control variables from Fearon and Laitin: log population, ethnic fractionalization, religious fractionalization, log of percent mountainous terrain, a dummy for noncontiguous states, a dummy for new states, Polity, Polity squared, and political instability.<sup>88</sup> The data range from 1960 to 2006 with broad global coverage. The logistic regression models include temporal dependence controls and cluster standard errors by country.

Panel A of Table 3 uses UCDP/PRIO data to measure center-seeking civil war onset and Panel B uses Fearon’s data. Odd-numbered columns control for per capita income whereas even-numbered columns do not. To make the paired specifications directly comparable, the even-numbered columns exclude observations missing per capita income data. The five sets of paired specifications draw from the full-sample robustness checks in Ross.<sup>89</sup> Columns 1 and 2 estimate a core model that additionally controls for population. Columns 3 and 4 add the Fearon and Laitin controls to the core model. Columns 5 and 6 add region dummies to the core model. Columns 7 and 8 estimate the core model but exclude countries from the Middle East and North Africa. Columns 9 and 10 estimate the core model but exclude Iraq and Iran, whose “colonial histories ... arguably make them special cases and unusually prone to conflict.”<sup>90</sup>

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<sup>87</sup>Ross 2012.

<sup>88</sup>Fearon and Laitin 2003.

<sup>89</sup>Ross 2012, 185.

<sup>90</sup>Ross 2012, 185.

**Table 3. Oil Wealth and Center-Seeking Civil War Onset, Existing Models**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Dependent Variable: UCDP/PRIO Center-Seeking Civil War Onset										
Log oil income per capita	0.139 (0.002)	0.024 (0.543)	0.118 (0.012)	0.071 (0.060)	0.100 (0.035)	0.025 (0.519)	0.117 (0.019)	-0.004 (0.932)	0.097 (0.021)	-0.020 (0.591)
Observations	6426	6426	5538	5538	6426	6426	5771	5771	6351	6351
Panel B. Dependent Variable: Fearon Center-Seeking Civil War Onset										
Log oil income per capita	0.083 (0.244)	-0.074 (0.236)	0.048 (0.560)	-0.067 (0.284)	0.033 (0.648)	-0.084 (0.120)	-0.040 (0.676)	-0.197 (0.034)	0.026 (0.730)	-0.128 (0.064)
Observations	6426	6426	5538	5538	6426	6426	5771	5771	6351	6351
	Yes	Yes	Yes	Yes	Peace years and cubic splines?			Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Log population covariate?			Yes	Yes	Yes
	Yes	No	Yes	No	Income per capita covariate?			No	Yes	No
	None	None	F&L	F&L	Additional covariates/Sample modifications					
					Region FE	Region FE	Drop MENA	Drop MENA	Drop IRN/IRQ	Drop IRN/IRQ

*Notes:* Table 3 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Other coefficient estimates are suppressed for expositional clarity.

Table 3 strongly supports the second implication from the formal model. The odd-numbered specifications in Panel A closely resemble existing results by estimating a strong positive correlation between oil wealth and center-seeking civil war onset. The even-numbered specifications, however, demonstrate how drastically dropping the income control changes the estimates. Only one specification remains statistically significant at even the 10% level, as can be seen from the p-values presented in parentheses, and the coefficient estimate flips signs in two of the five specifications. Panel B provides less support for a relative resource curse for center-seeking wars, but again demonstrates the empirical relevance of dropping the income control. Every even-numbered specification estimates a negative correlation, and two of the five achieve statistical significance at either the 5% or 10% level. Although these findings in no way “prove” the income per capita regressions are positively biased, the theoretically rooted concerns about conflating the overall and relative effects of oil carry important empirical implications. Namely, there is little evidence that oil raises center-seeking civil war propensity when making a single, justified change to existing models.

The models, however, do not demonstrate *any* systematic relationship between oil and center-seeking civil war—positive or negative. The UCDP/PRIO regressions on balance support conflict-inducing effects whereas the Fearon regressions support conflict-depressing effects, but the results are inconsistent.

### 1.6.2 Results from Modified Models: Consistent Negative Correlation

In addition to controlling for per capita income, other conventional coding practices and specification choices from the conflict resource curse literature also deserve scrutiny. This section previews the changes that Table 4 incorporates, and Appendix B provides additional details. Modifying the



statistical models from Table 3 demonstrates stronger support for implications from authoritarianism research than for a center-seeking conflict resource curse.

Of the following, the most consequential revision addresses how conflict incidence data from the UCDP/PRIO Armed Conflict Database is translated into civil war onsets, as Appendix B.1 discusses. The UCDP/PRIO dataset codes whether or not a particular government-rebel interaction produces at least 25 battle deaths in a given year but does not explicitly code when distinct civil wars start or end.<sup>91</sup> Most empirical work uses a two-year lapse rule to code conflict onset. If a particular government-rebel dyad crosses the 25 death threshold, but is followed by at least two years in which the annual battle death toll remains under 25, then any future years with at least 25 battle deaths are coded as a new civil war. As Fearon and Laitin assert, however, this onset rule is somewhat arbitrary and tends to overcount onsets for long-running conflicts that periodically exceed the 25 death threshold.<sup>92</sup> I have revised UCDP/PRIO center-seeking onset years using Fearon and Laitin’s more systematic procedure for coding conflict initiation and termination.<sup>93</sup> Additionally, I do not count coup attempts with large death tolls as center-seeking civil wars for reasons discussed in Appendix B.1.

Existing results also usually include cases that fall outside the scope of conflict resource curse hypotheses, as Appendix B.2 details. The formal model presented here assumes a weakly institutionalized environment—as implicitly do most theories in the conflict resource curse literature. Excluding OECD members therefore removes countries that are largely irrelevant for the hypothesis. Furthermore, it is also appropriate to exclude occupied countries (whether colonized or otherwise forcibly controlled) because conflicts in these countries usually revolve around overthrowing the occupying country, which is very different in nature from a civil war. Finally, Appendix B.3 discusses additional minor changes.

The Table 4 specifications correspond to those from Table 3 but incorporate these changes. The oil coefficient estimate is negative in *every* specification without the income control. Furthermore, many of the correlations in even-numbered specifications achieve conventional levels of statistical significance. The models also estimate a sizable conflict-depressing effect for oil. In Column 2 of Panel A, for example, increasing annual oil income per capita from \$0 to \$1,000 predicts a decrease in center-seeking civil war propensity of 37%.

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<sup>91</sup>Other applied research has acknowledged this issue. For example, when discussing how to code repeat civil wars, Walter (2014, 9) states the Armed Conflict Database “does not provide any scheme for identifying when exactly civil wars begin and end and, therefore, does not define an *episode* of civil war” [emphasis in original].

<sup>92</sup>Fearon and Laitin 2013, 25.

<sup>93</sup>Fearon and Laitin 2003, 76, fn. 4.

**Table 4. Oil Wealth and Center-Seeking Civil War Onset, Modified Models**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Dependent Variable: UCDP/PRIO Center CW Onset (revised)										
Log oil income per capita	0.011 (0.809)	-0.078 (0.041)	0.008 (0.860)	-0.061 (0.100)	-0.007 (0.893)	-0.052 (0.233)	-0.046 (0.465)	-0.145 (0.015)	-0.009 (0.853)	-0.100 (0.015)
Observations	5460	5460	4870	4870	5316	5316	4683	4683	5371	5371
Panel B. Dependent Variable: Fearon Center CW Onset										
Log oil income per capita	-0.005 (0.936)	-0.078 (0.125)	-0.043 (0.479)	-0.086 (0.097)	-0.039 (0.519)	-0.076 (0.161)	-0.070 (0.435)	-0.156 (0.066)	-0.030 (0.643)	-0.106 (0.072)
Observations	5460	5460	4870	4870	5316	5316	4683	4683	5371	5371
	Yes	Yes	Yes	Yes	Peace years and cubic splines?			Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	None	None	F&L	F&L	Region FE	Region FE	Drop MENA	Drop MENA	Drop IRN/IRQ	Drop IRN/IRQ

*Notes:* Table 4 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Other coefficient estimates are suppressed for expositional clarity.

An important caveat to interpreting the oil coefficient estimates in the even-numbered specifications in Table 4 is that omitting the income control is no panacea for eliminating bias. Omitted variable bias is always problematic in observational studies, and income per capita intuitively seems like an attractive variable to control for because it is highly correlated with civil war onset. However, reasonable considerations suggest including the income control will induce sizable post-treatment bias that favors finding a conflict resource curse. In contrast, no existing arguments suggest omitted variables—such as income per capita or any other possibly relevant controls—should *negatively* bias oil-conflict regressions, as would be needed to argue the evidence here incorrectly rules against a center-seeking conflict resource curse. Instead, many existing arguments imply the bias may be positive. Recall from the discussion accompanying assumption #2 that many oil-rich countries were impoverished prior to discovering oil, and from assumption #5 that Haber and Menaldo argue fiscally starved rulers in historically weak states have frequently selected into higher levels of oil production.<sup>94</sup> Both these factors suggest oil-rich countries should have been *more* likely to experience conflict than oil-poor countries had they not become major oil producers.

In addition to thinking about the expected direction of the bias, it is also possible to try to control for the counterfactual non-oil income levels that oil-rich countries would have obtained had they not become major oil producers. Herb and Alexeev and Conrad have attempted different procedures, although Herb cautions that “any possible calculation of counterfactual GDP requires major, perhaps heroic, assumptions.”<sup>95</sup> Appendix C.1 discusses numerous difficulties involved and presents results using four different counterfactual income variables. Although none of these procedures are particularly satisfactory, it is notable that the sign of the oil estimate remains consistently negative. This is also true when controlling for country fixed effects (Appendix C.2) and modifying the sample

<sup>94</sup>Haber and Menaldo 2011.

<sup>95</sup>Herb 2005, 302; Alexeev and Conrad 2009.

in additional ways suggested by Ross (Appendix C.3).<sup>96</sup> Finally, Appendix D provides qualitative evidence. Supporting the absence of statistical evidence for a center-seeking conflict resource curse, the cases show that appealing to oil can explain less than a handful of major center-seeking civil war onsets.

## 1.7 Conclusion

This article presented a game theoretic model explaining why oil wealth should decrease center-seeking civil war propensity. The theoretical framework jointly evaluated oil’s revenue-enhancing and vulnerability effects to explain why mechanisms proposed by oil-authoritarianism research should dominate mechanisms from the oil-civil war literature. The model analysis also distinguished between the overall and relative effects of oil, which suggested the widespread empirical practice of controlling for per capita income should yield upwardly biased oil-conflict estimates. Using implications from the formal model to revise conventional statistical models in the conflict resource curse literature provided evidence more consistent with authoritarian stability arguments than with a center-seeking conflict resource curse.

The formal model presented here incorporated distinctive aspects of oil production to extend conflict bargaining games originally developed to explain international warfare. This theoretical approach carries broad implications for studying the “resource curse” debated by scholars across international relations and comparative politics. The model not only provides insight into competing resource curse arguments and applies them to studying center-seeking civil wars, but also delivers theoretical and empirical implications for oil and separatist civil wars. This article argued the within-country location of oil reserves should strongly affect prospects for separatist wars but not center-seeking wars. Regarding separatist wars, other conflict resource curse theories argue oil production in ethnic minority areas causes deep grievances and raises separatist civil war propensity because the government redistributes wealth away from the ethnic group’s territory.<sup>97</sup> However, revisiting Table 2, although the revenue-enhancing effects of oil may work less effectively when the government fights away from the capital, this does not imply oil wealth should *strongly impede* government-challenger bargaining. Furthermore, existing contributions often do not clearly answer questions about why oil—as opposed to other sources of revenue—causes such strong grievances, nor what prevents the government from strategically reducing these grievances to facilitate peaceful bargaining. These questions motivate [AUTHOR]’s extension of the framework presented here to study oil and separatist civil wars.

An additional implication from distinguishing the heterogeneous effects of oil location on different types of civil wars is that country-level oil income measures should only be relevant for testing theories about center-seeking wars, whereas oil-separatism theories should instead be tested with subnational data. Because location conditions whether oil should increase or decrease separatist civil war propensity, there should not be any clear trends in country-level data. Appendix Section C.4 shows this implication is indeed validated when replicating Tables 3 and 4 for either separatist wars only or all types of civil wars. These additional empirical results also demonstrate the broader

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<sup>96</sup>Ross 2012, 154.

<sup>97</sup>Sorens 2011, 574-5; Ross 2012, 151-2.

importance of the formal model’s implication about post-treatment bias induced by controlling for income per capita for evaluating the conflict resource curse.

This article has also shown how seemingly disparate resource curse debates—about conflict, authoritarianism, and even economic development (see assumption #2)—can inform each other. The implications from the formal model might therefore also help reconcile competing empirical findings about oil and democracy. Alternative theories presented in critiques of earlier conclusions that oil hinders democracy do not focus on how governments can strategically combine coercion and patronage to reduce incentives for violent rebellions or pro-democracy movements.<sup>98</sup> However, the scope conditions from the model appear relevant for explaining why highly uncompetitive and oil-rich authoritarian regimes rarely democratize—because oil revenues can be used to deter and buy off popular protests.<sup>99</sup>

Considering these additional applications to separatist civil wars and democratization, using the theoretical approach pursued here in future work should help narrow the differences between broad arguments for and against an oil curse.

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<sup>98</sup>Menaldo 2014; Brooks and Kurtz 2015.

<sup>99</sup>Some existing empirical results support this conditional oil-democracy hypothesis, e.g., Wiens et al. 2014.

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Appendix to accompany  
*Rethinking the Conflict “Resource Curse”:*  
*How Oil Wealth Prevents Center-Seeking Civil Wars*

## A. Theoretical Appendix

### A.1. Proofs from the Article

Appendix A.1 proves results from the article. Lemma A1 provides a more nuanced statement of Lemma 1.

**Lemma A1.** Assume  $G$  maximizes Equation 1 subject to C1, C2, and C3. If  $\delta < \delta_1$  (for  $\delta_1$  defined below), then  $(m^*, x^*) = \left(0, \frac{\delta R}{(1-\delta)\theta + \delta\sigma(1+\theta)}\right)$ . If  $\delta > \delta_1$ , then  $(m^*, x^*)$  is unique and defined implicitly below.

*Proof.* The proof proceeds in five steps.

1. *Implicitly characterize interior optima for  $m_t$  and  $x_t$ .* When neither C2 nor C3 bind,  $G$  solves Equation 1 subject to C1 treated as an equality constraint (because  $G$  will never make an offer that  $C$  strictly prefers to accept), resulting in the Lagrangian:

$$\begin{aligned} \max_{m_t, x_t, \lambda} \mathcal{L}(m_t, x_t, \lambda) \equiv & R - m_t - x_t + \frac{\delta}{1-\delta} \left\{ R - \sigma[m_t + x^*(m_t)] \right\} \\ & + \lambda \left\{ x_t - \frac{\delta}{(1-\delta)(1+m_t)\theta} \left[ R - \sigma[m_t + (1+\theta)x^*(m_t)] \right] \right\} \end{aligned} \quad (\text{A1})$$

Equations A2 and A3, respectively, represent the first order conditions  $\frac{\partial \mathcal{L}}{\partial x_t} = 0$  and  $\frac{\partial \mathcal{L}}{\partial \lambda} = 0$ :

$$\lambda = 1 \quad (\text{A2})$$

$$x_t = \frac{\delta}{(1-\delta)(1+m_t)\theta} \left\{ R - \sigma[m_t + (1+\theta)x^*(m_t)] \right\} \quad (\text{A3})$$

The left-hand side of A2 expresses the marginal effect of increasing  $x_t$  on relaxing the constraint in A1—i.e., the marginal benefit of spending on patronage. The right-hand side expresses the marginal cost (i.e., how much each increases expenditures), which is constant at 1. The first order condition for  $x_t$  states the marginal benefit to increasing the patronage offer is constant at 1.

In equilibrium,  $G$  will choose a constant level of arms in all strong periods, implying  $m_t = \tilde{m}$  for all  $t$ . Furthermore,  $G$  will choose the same patronage function in all strong periods, implying  $x_t = x^*(\tilde{m})$  for all  $t$ . Substituting these terms and A2 into A3 and re-arranging expresses the



optimal patronage offer as a function of the armament amount chosen in each strong period:

$$x^*(\tilde{m}) = \frac{\delta(R - \sigma\tilde{m})}{(1 - \delta)(1 + \tilde{m})\theta + \delta\sigma(1 + \theta)} \quad (\text{A4})$$

The key takeaway from A4 is that the amount  $G$  has to offer  $C$  to induce acceptance is a strictly decreasing function of armament spending, which can be easily verified because  $\tilde{m}$  enters as a negative term in the numerator and as a positive term in the denominator. Arms substitute for patronage because higher  $\tilde{m}$  reduces  $C$ 's expected utility to fighting. This mechanism resonates with other recent models that feature coercion. In principal-agent terms, allowing the government to invest in military capacity resembles actions taken by a principal to relax an agent's participation constraint by lowering the agent's reservation value, as in Acemoglu and Wolitzky (2011). Powell (2013) refers to this possibility as “coercive power.”

Substituting A2 and A4 into A1 yields a single-dimensional optimization problem for armament:

$$\max_{\tilde{m}} \frac{R - [1 - \delta(1 - \sigma)] \left[ \tilde{m} + \frac{\delta(R - \sigma\tilde{m})}{(1 - \delta)(1 + \tilde{m})\theta + \delta\sigma(1 + \theta)} \right]}{1 - \delta} \quad (\text{A5})$$

Solving for the first order condition implicitly characterizes the optimal armament amount as a function of parameters:

$$\text{MB}(m^*) \equiv \frac{\delta(1 - \delta)\theta(R + \sigma) + \delta^2\sigma^2(1 + \theta)}{[(1 - \delta)(1 + m^*)\theta + \delta\sigma(1 + \theta)]^2} = 1 \quad (\text{A6})$$

The left-hand side of A6 expresses the marginal benefit to higher  $m^*$  and the right-hand side presents the marginal cost. The most important takeaway from Equation A6 is that the marginal benefit of military spending strictly decreases in the amount of arms.

2. *C2 never binds.* Because of the assumption that C4 does not bind, implying that  $R > m^* + x^*$ , then it must also be true that  $R > \sigma m^*$ . This implies  $x^*(m^*)$  from A4 is strictly positive and therefore C2 does not bind. In words, the government will never spend exclusively on the military to deter  $C$  from fighting. Because  $G$  cannot drive the probability of winning down to 0, the expected utility of fighting is always positive. However, if  $x^* = 0$ , the expected utility to accepting and maintaining the status quo would be 0, implying  $C$  would fight.

3. *C3 binds when  $R < \bar{R}$ .* If the marginal benefit of arming is lower than the marginal benefit of patronage when arms are 0, C3 binds and  $m^* = 0$ . Mathematically, assessing whether C3 binds requires substituting  $m^* = 0$  into the left-hand side of A6 and setting strictly less than 1. This yields  $R < \bar{R} \equiv \frac{[1 - \delta(1 - \sigma)][\theta + \delta(\sigma - \theta + \sigma\theta)]}{\delta(1 - \delta)}$ . Intuitively, larger  $R$  raises  $G$ 's marginal benefit to arming because, for fixed  $m$ , larger  $R$  increases the expected utility of fighting for  $C$ .

4. *Unique solution when C3 binds.* When  $R < \bar{R}$ , step 3 establishes  $m^* = 0$  is the unique armament solution. Substituting  $m^* = 0$  into A4 yields the optimal patronage offer,  $x^*(0) = \frac{\delta R}{(1 - \delta)\theta + \delta\sigma(1 + \theta)}$ , which is a unique function of parameter values. Therefore, when C3 binds there exists a unique pair  $(m^*, x^*) = \left(0, \frac{\delta R}{(1 - \delta)\theta + \delta\sigma(1 + \theta)}\right)$  that solves the program.

5. *Unique solution when C3 does not bind.* The optimal armament choice  $m^*$  must satisfy  $\text{MB}(m^*)$

= 1. Applying the intermediate value theorem establishes that if  $R > \bar{R}$  there exists at least one  $m^* \in (0, \hat{m})$  (for  $\hat{m}$  defined below) that satisfies  $\text{MB}(m^*) = 1$ .

- Step 3 implies  $\text{MB}(0) > 1$  if  $R > \bar{R}$ .
- Because  $\text{MB}(\tilde{m})$  strictly decreases in  $m$  and  $\lim_{\tilde{m} \rightarrow \infty} \text{MB}(\tilde{m}) = 0$ , for all parameter values there exists a finite  $\hat{m}$  such that  $\text{MB}(\hat{m}) < 1$ .
- $\text{MB}(\tilde{m})$  is a continuous function.

The strict monotonicity of  $\text{MB}(\tilde{m})$  in  $\tilde{m}$  implies  $m^*$  is unique. Finally, because  $x^*(m^*)$  is strictly monotonic in  $m^*$ , there exists a unique pair  $(m^*, x^*)$  that solves the program. ■

**Proof of Lemma 2.** The proof proceeds in five steps.

1. Show  $\frac{d}{d\sigma}(m^* + x^*) < 0$ . This result will be used in several of the following steps. Intuitively, total expenditures decrease in  $\sigma$  because higher  $\sigma$  raises the utility of the status quo for  $C$ , therefore requiring  $G$  to spend less to buy off  $C$ . Mathematically, because  $G$  minimizes  $m^* + x^*$  with respect to  $\sigma$ , the constrained envelope theorem implies

$\frac{d}{d\sigma}(m_t + x_t)|_{(m_t, x_t) = (m^*, x^*)} = \frac{\partial}{\partial \sigma}(m_t + x_t)|_{(m_t, x_t) = (m^*, x^*)} + \lambda \frac{\partial}{\partial \sigma} \left\{ \frac{\delta}{(1-\delta)(1+m_t)\theta} \left[ R - \sigma(m^* + (1+\theta)x^*) \right] - x_t \right\} |_{(m_t, x_t) = (m^*, x^*)}$ . That is, we only need to assess the direct effects of  $\sigma$  on the constrained expenditure function. After substituting in Equation A2 for  $\lambda$ , this sum of derivatives reduces to  $-\frac{\delta[m^* + (1+\theta)x^*]}{(1-\delta)(1+m^*)\theta}$ , a strictly negative term.

2. *Fighting never occurs when  $\delta < \delta_1$ .* Step 1 implies total government expenditures reach their upper bound when  $\sigma = 0$ , i.e.,  $C$  is strong in the current period but will never be strong in the future. Solving Equations A4 and A6 when  $\sigma = 0$  shows  $G$  must spend a total of  $2\sqrt{\frac{\delta R}{(1-\delta)\theta}} - 1$  to buy  $C$  off. This amount is less than  $R$  when  $\delta < \delta_1 \equiv \frac{(R+1)^2}{\theta(R^2+1)+4R(1+\theta)}$  because  $C$  is impatient enough that it prefers to accept the offer and consume in the current period rather than fight, even though  $C$  foregoes consumption in all future periods because it will never be strong again.

3. *When  $\delta > \delta_1$ , there exists at least one value of  $\sigma$ —defined as  $\bar{\sigma}$ —such that  $m^* + x^* = R$  if  $\sigma = \bar{\sigma}$ .* Applying the intermediate value theorem establishes the set  $\bar{\sigma} \equiv \{\sigma \mid m^* + x^* = R\}$  is non-empty.

- By definition of  $\delta_2$ ,  $m^* + x^* > R$  when  $\sigma = 0$  and  $\delta > \delta_1$ .
- The following shows  $m^* + x^* < R$  when  $\sigma = 1$  and  $\delta > \delta_2$ . Substituting  $\sigma = 1$  into Equation A4, adding  $m^*$  to this term, and setting strictly less than  $R$  yields  $m^* + \frac{\delta(R-m^*)}{(1-\delta)(1+m^*)\theta + \delta(1+\theta)} < R$ . Subtracting  $m^*$  from both sides, dividing by  $R - m^*$ , and rearranging leads to  $(1-\delta)(1+m^*)\theta + \delta\sigma > 0$ , a true statement.
- Because the implicit characterizations of both  $x^*$  and  $m^*$  are each continuous functions of  $\sigma$ , their sum is also continuous in  $\sigma$ .

4.  $\bar{\sigma}$  is unique. Suppose not, and  $\{\sigma \mid m^* + x^* = R\}$  contains two or more elements. By definition, if  $\sigma_1 \in \{\sigma \mid m^* + x^* = R\}$ , then  $m^*(\sigma_1) + x^*(\sigma_1) = R$ . However, because step 1 shows  $m^* + x^*$  is

a strictly monotonic function of  $\sigma$ ,  $m^*(\sigma_2) + x^*(\sigma_2) \neq R$  for any  $\sigma_2 \in \{\sigma \mid m^* + x^* = R\}$  (assuming  $\sigma_2 \neq \sigma_1$ ), providing a contradiction.

5.  $m^* + x^* < R$  if  $\sigma > \bar{\sigma}$  and  $m^* + x^* > R$  if  $\sigma < \bar{\sigma}$ . This also follows from step 1, specifically, that  $m^* + x^*$  is a strictly decreasing function of  $\sigma$ .

**Proof of Proposition 1.** Follows directly from Lemmas 1 and 2 and the discussion in the text of why  $G$  will always buy  $C$  off if possible.

**Proof of Proposition 2.** This is easiest to establish by showing total expenditures relative to per-period revenues decrease if  $R > \bar{R}$ .  $\frac{d}{dR}\left(\frac{m^* + x^*}{R}\right) = \frac{\frac{d}{dR}(m^* + x^*)R - (m^* + x^*)}{R^2}$ . Applying the envelope theorem to A5 solves  $\frac{d}{dR}(m^* + x^*)$  because if  $R$  exerts a particular-signed effect on the military expenditure choice that maximizes  $\frac{R - [1 - \delta(1 - \sigma)][\tilde{m} + x^*(\tilde{m})]}{1 - \delta}$ , it will exert the same-signed effect on the choice that minimizes  $\tilde{m} + x^*(\tilde{m})$ .  $\frac{d}{dR}(m^* + x^*) = \frac{\delta}{(1 - \delta)(1 + m^*)\theta + \delta\sigma(1 + \theta)}$ . The entire term equals  $\frac{\frac{\delta R}{(1 - \delta)(1 + m^*)\theta + \delta\sigma(1 + \theta)} - (m^* + x^*)}{R^2}$ , which achieves its maximum point at  $R = \bar{R}$ , i.e., where  $m^* = 0$ . Because  $\frac{m^* + x^*}{R}$  is strictly concave in  $R$ , this implies  $\frac{d}{dR}\left(\frac{m^* + x^*}{R}\right)$  is negative if  $R > \bar{R}$ . Therefore, for all  $R > 0$ , more revenue either decreases or has no effect on center-seeking civil war propensity. Applying the intermediate value theorem demonstrates that even if  $\theta_R < 0$ , this same result holds as long as  $\theta_R$  is not too large in magnitude. ■

**Proof of Proposition 3.** The proof strategy is identical to that in Proposition 2. ■

**Proof of Proposition 4.** For  $\Delta = \Delta_O = \Delta_N$ , by assumption  $\theta$  is higher when revenues equal  $\underline{R} + \Delta_N$  than  $\underline{R} + \Delta_O$  because the increase in non-oil revenues exerts a larger positive effect on  $\omega$ . To prove the claim it suffices to show  $\frac{\partial}{\partial\theta}(m^* + x^*) < 0$ , i.e., higher  $\theta$  reduces the likelihood that total equilibrium expenditures exceed  $R$ . Applying the envelope theorem to A5 will provide the solution because if  $\theta$  exerts a particular-signed effect on the military expenditure choice that maximizes  $\frac{R - [1 - \delta(1 - \sigma)][\tilde{m} + x^*(\tilde{m})]}{1 - \delta}$ , it will exert the same-signed effect on the choice that minimizes  $\tilde{m} + x^*(\tilde{m})$ . By the envelope theorem,  $\frac{d}{d\theta}\left(\tilde{m} + \frac{\delta(R - \sigma\tilde{m})}{(1 - \delta)(1 + \tilde{m})\theta + \delta\sigma(1 + \theta)}\right)\Big|_{\tilde{m}=m^*} = \frac{\partial}{\partial\theta}\left(\tilde{m} + \frac{\delta(R - \sigma\tilde{m})}{(1 - \delta)(1 + \tilde{m})\theta + \delta\sigma(1 + \theta)}\right)\Big|_{\tilde{m}=m^*} < 0$ . The strict negativity can be easily verified because  $\theta$  enters only as a negative term in the denominator of the second term within the parentheses. ■

## A.2. Comparison to Unrestricted MPE

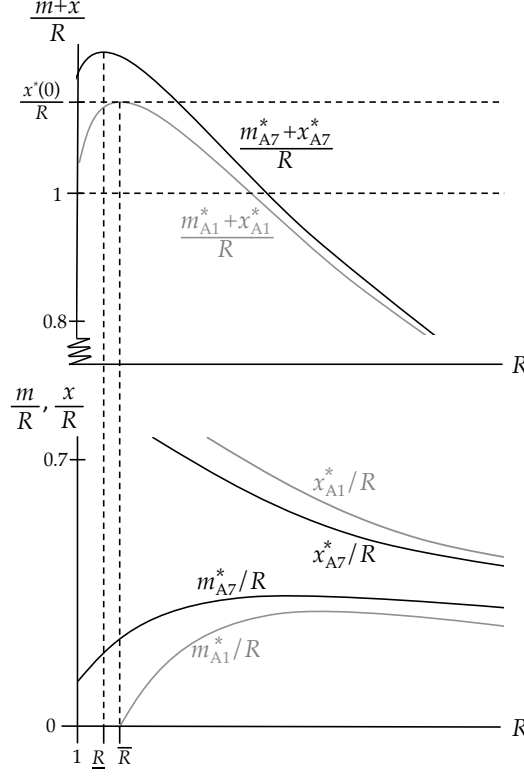
As stated in the text, I solve the model using a modification of Markov Perfect Equilibrium in which  $G$  can only consider Markovian deviations from the level of  $m_s^*$  posited in the strategy profile, i.e., if  $G$  changes  $m_t$  in a particular strong period,  $G$  internalizes the effects of changing armament expenditures in the current period choice in *all* periods. If  $G$  could consider any possible deviation, A1 would be replaced by:

$$\begin{aligned} \max_{m_t, x_t, \lambda} \mathcal{L}(m_t, x_t, \lambda) \equiv & R - m_t - x_t + \frac{\delta}{1 - \delta} (R - \sigma(m^* + x^*)) \\ & + \lambda \left\{ x_t - \frac{\delta}{(1 - \delta)(1 + m_t)\theta} \left[ R - \sigma(m^* + (1 + \theta)x^*) \right] \right\} \end{aligned} \quad (\text{A7})$$

The difference from A1 is that in A7, the equilibrium level of armament expenditures  $m^*$  posited in the strategy profile will be chosen in future periods even if  $G$  deviates to a different military spending amount in the current period. Regarding incentives, the difference is that in the modified MPE (A1),  $G$  internalizes the effect of higher military spending in all periods, whereas in the unrestricted MPE (A7),  $G$  overspends on the military because it does not internalize the effect of higher military spending in the future. Another way of stating this difference is that in the unrestricted MPE, the current-period  $G$  faces a commitment problem with any future-period governments: its utility in a peaceful equilibrium would be higher (and the probability of fighting would be lower) if  $G$  could commit not to overspend on the military in the present, but deviating to higher military spending is profitable if  $G$  does not internalize the higher future costs. Imposing the restriction from the text eliminates this feature of the unrestricted MPE.

Regarding the substantive questions from the article, the unrestricted MPE may induce a parameter range in which increases in revenues *raise* center-seeking civil war propensity if  $R$  is small. This result follows directly from  $G$ 's overspending on the military when not restricted to Markovian deviations. Figure A1 illustrates this argument for a constant  $\theta$  by plotting government expenditures as a percentage of per-period revenues (vertical axes) as a function of per-period revenues (horizontal axes). The bottom panel presents separate lines for  $\frac{m}{R}$  and  $\frac{x}{R}$  whereas the top panel plots  $\frac{m+x}{R}$ . The gray curves capture optimal choices defined by A1 (restricted MPE) whereas the black solid curves capture optimal choices defined by A7 (unrestricted MPE).

Figure A1. Comparing Restricted and Unrestricted Markovian Strategies



Notes: Figure A1 sets  $\delta = 0.7$ ,  $\theta = 1$ , and  $\sigma = 0.25$ .

Examining the gray curves, for reasons discussed above,  $m_{A1}^* = 0$  at  $R = \bar{R}$ . This is the same  $R$  value at which total government expenditures  $\frac{m_{A7}^* + x_{A7}^*}{R}$  achieve their highest value.<sup>100</sup> Therefore, in the restricted MPE,  $G$  chooses  $(\tilde{m}, \tilde{x}) = (0, x^*(0))$  for all  $R < \bar{R}$  and  $(m_{A7}^*, x_{A7}^*)$  for all  $R > \bar{R}$ . Importantly, as discussed above, total government expenditures as a percentage of per-period revenues,  $\frac{m_{A7}^* + x_{A7}^*}{R}$ , are strictly decreasing in  $R$  in the range of  $R$  values for which  $G$  chooses an interior solution.

As shown with the black curves,  $m_{A7}^* > m_{A1}^*$  for all  $R$ .  $G$  derives a benefit from choosing higher military expenditures because this lowers the patronage offer, explaining why  $x_{A7}^* < x_{A1}^*$  for all  $R$ . However, consistent with the argument that  $G$  overspends on armaments in the unrestricted MPE,  $m_{A7}^* + x_{A7}^* > m_{A1}^* + x_{A1}^*$  for all  $R$ . Therefore,  $G$  achieves strictly higher utility when restricting its possible deviations.

<sup>100</sup>The text discusses why  $\frac{x^*(0)}{R}$ , as defined in A4, is constant in  $R$ .

When  $R \in (1, \underline{R})$ ,  $\frac{m_{A7}^* + x_{A7}^*}{R}$  increases in  $R$ , which highlights the existence of a parameter range in which increases in revenues raise center-seeking civil war propensity. This parameter range is strange in the sense that  $G$  would improve its utility if it commit to set military expenditures to 0 in every strong period—i.e., granting the government an additional choice variable *decreases* its utility in the unrestricted MPE.

The existence of this parameter range does not alter the main conclusions from the article for at least three reasons. First, it appears more reasonable to focus attention on the restricted Markovian strategies because these provide incentives for behavior more consistent with  $G$  being able to use its two choice variables to maximize utility. Second, this parameter range only exists when  $R$  is small and we consider small increases in  $R$ . Therefore, this parameter range is not relevant either for countries that have discovered their first major oil fields or for established oil-rich countries that experience an additional change in revenues. Empirically, commercial oil fields tend to produce large windfalls for governments (assumption #2), implying that countries starting with low  $R$  will achieve revenues greater than  $\underline{R}$  after the oil discovery—implying the revenue increase diminishes center-seeking civil war propensity even when A7 characterizes the equilibrium. Furthermore, for oil-rich governments that already have revenues exceeding  $\underline{R}$ , any sized increase in revenues will reduce prospects for violence. Third, this puzzling parameter range exists for *any* type of revenues, not just oil. Therefore, arguing that this parameter range strongly underpins the conflict resource curse is equivalent to arguing that governments collecting high levels of income taxes may, in some circumstances, also be more susceptible to center-seeking civil war than governments with lower income tax revenues.

## B. Data Details for Table 4

### B.1. Coding Center-Seeking UCDP/PRIO Onsets

The coding procedure for UCDP/PRIO data used in Table 4 departs in two major ways from conventional codings of center-seeking civil war onsets. First, it does not count military coups with large death tolls as civil wars. Second, it does not follow the widely used two-year lapse rule for coding onsets. These choices are consequential. Nineteen of the 36 (53%) center-seeking civil war onsets in country-years producing at least \$100 of oil income per capita—as coded by conventional procedures—are either coup attempts or a continuation of an existing civil war. Below, “oil-rich country-years” refers to country-years producing at least \$100 of per capita oil income.

Table B1 shows that seven UCDP/PRIO civil wars in oil-rich country-years are coup attempts, but involved a high enough number of deaths to meet UCDP/PRIO’s civil war criteria. Results that exclude UCDP/PRIO coup attempts should be favored for two reasons. First, consistent with the broader literature on oil and civil wars, the formal model in this article implicitly assumes the government has perfect control over its military and derives implications for an interaction between a government and a *non-state* challenger. Civil wars and coup attempts are distinct phenomena, which is why work such as Wimmer, Min, and Cederman (2009) distinguishes between them. Second, the UCDP/PRIO database only includes coup attempts with a sufficiently high death toll. This means that results including UCDP/PRIO coups implicitly provide insight into how oil wealth affects coup attempts *that create high death tolls*—but not other coup attempts. At the very least,

at present we lack a theoretical defense for why this is a relevant hypothesis.

**Table B1. UCDP/PRIO Coup Attempts in Oil-Rich Countries**

Country	Year
Azerbaijan	1993
Cameroon	1984
Gabon	1964
Iraq	1963
Trinidad and Tobago	1990
Venezuela	1962
Venezuela	1992

An additional issue with UCDP/PRIO data arises because UCDP/PRIO provides information on conflict incidence but does not distinguish between unique civil wars. To convert UCDP/PRIO incidence data into onset data, scholars frequently use a two-year lapse rule to consider a conflict year as an “onset.” That is, if the 25 death threshold is not met for at least two years after being met in the past, any future years with at least 25 battle deaths are coded as a new civil war. Fearon and Laitin (2013) critique the somewhat arbitrary nature of this approach:

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

In contrast, the Fearon dataset uses the following rule to code initiation and termination: “War ends are coded by observation of a victory, wholesale demobilization, truce, or peace agreement followed by at least two years of peace” (Fearon and Laitin 2003, 76, fn. 4).<sup>101</sup> This procedure appears to better capture the concept of a civil war “onset.” Importantly, to reiterate, Fearon’s dataset specifically attempts to code distinct civil wars, whereas UCDP/PRIO does not.

With regard to testing hypotheses about oil wealth, the distinction between these two procedures is consequential. According to conventional coding procedures, twelve—i.e., 33%—PRIO center-seeking civil war “onsets” in oil-rich country-years follow temporary lapses in fighting rather represent a distinct civil war initiation.

I use the following rules to apply Fearon and Laitin’s more systematic procedure to create a revised UCDP/PRIO center-seeking civil war onset variable. First, I select every country that has multiple UCDP/PRIO center-seeking civil war onsets (that were not coded as coup attempts) using Ross’ (2012) dataset. Second, I match the conflicts with wars from Fearon’s dataset. I use Fearon’s onset scores whenever UCDP/PRIO and Fearon code the same onset but either (a) the two datasets disagree on whether there were distinct conflicts and hence multiple onset years or (b) the two

<sup>101</sup>Fearon and Laitin (2013, 21-6) provide additional discussion about their coding rules as well as how the two-year lapse rule for coding UCDP/PRIO onsets tends to overstate the number of distinct conflicts.

datasets agree there were multiple conflicts but disagree on the start year for conflicts after the first one. Third, for conflicts coded by UCDP/PRIO but not by Fearon that occur in a country with multiple onset years using the two-year lapse rule, I use the UCDP/PRIO online conflict encyclopedia to assess whether the same or distinct rebel groups participated. That is, I do not *exclude* UCDP/PRIO conflicts that are not also coded by Fearon, but instead apply a systematic onset/termination rule to those conflicts. Table B2 presents the specific country scores.

**Table B2. Countries with Multiple Center-Seeking UCDP/PRIO Onsets Using Two-Year Lag Rule**

Country	UCDP/PRIO Incidence Years	Fearon Incidence Years	Notes	Revised UCDP/PRIO Onset Years
Angola	1975*-95; 1998*-2002	1975-2002	Fearon and UCDP/PRIO include the same conflict, Fearon onset year used.	1975
Cambodia	1967-75; 1978-98	1967-75; 1978-98	Fearon and UCDP/PRIO include the same conflicts and agree on onset years.	1967, 1978
Chad	1966-72; 1976-84, 86-94; 1997-2002; 2005*-	1965-; 1992-8	Fearon and UCDP/PRIO include the same conflicts, Fearon onset years used.	1965, 1992
Congo, DR	1964-5, 67; 1977-8; 1996-2001; 2006-	1977-8; 1996-7; 1998-	UCDP/PRIO conflict in 1960s is not included by Fearon, all subsequent conflicts are included for both. Fearon onset years are used for later conflicts.	1964, 1977, 1996, 1998
Congo, Rep.	1993*; 1997*-9; 2002*	1997-9	UCDP/PRIO and Fearon both include 1997-9, the period of major fighting that led to government overthrow. UCDP/PRIO encyclopedia refers to 1993 and 2002 as the first and final phases, respectively, of intrastate conflict following 1992-3 elections.	1997
Eritrea	1997, 1999; 2003	n.a.	Periodic conflict with same rebel group.	1997
India	1969-71; 1990-4, 96-	1998-	Fearon and UCDP/PRIO include the same 1990s conflict. 1990s rebel group is a splinter group from the earlier insurgency.	1969



Country	PRIO Incidence Years	Fearon Incidence Years	Notes	Revised UCDP/PRIO Onset Years
Iran	1979*-82; 1986*-88; 1991*-93; 1997*, 99-01; 2005*-	1978-9	No agreement between UCDP/ PRIO and Fearon. UCDP/PRIO: Periodic conflict with MEK 1979-2001. New challenger PJAK in 2005, this conflict involves a second challenger Jondullah starting in 2006. Fearon: Iranian Revolution.	1979, 2005
Iraq	1982*-4; 1987*; 1991*-6	1991	No agreement between UCDP/ PRIO and Fearon. UCDP/PRIO: Periodic conflict with SCIRI. Fearon: Shi'a uprising after 1991 Persian Gulf war.	1982
Laos	1959-61, 63-73; 1989-90	1960-73	First UCDP/PRIO spell corresponds with Fearon war. Different challenger in 1989 after Pathet Lao won first civil war and then lost power.	1960, 1989
Liberia	1989-90; 2000-3	1989-96; 2000-3	Fearon and UCDP/PRIO include same conflicts and agree on onset years.	1989, 2000
Malaysia	1958-60; 1974*-5; 1981*	n.a.	Continuation of decolonization struggle against the Communist Party of Malaya, periodic fighting after independence.	1960
Nepal	1960-2; 1996-2006	1997-2006	Second UCDP/PRIO spell corresponds with Fearon war. Distinct rebel groups in UCDP/PRIO spells.	1960, 1996
Pakistan	1990; 95-6	n.a.	Same rebel group involved in periodic conflict.	1990
Peru	1965; 1982*-99	1981-95	Second UCDP/PRIO spell corresponds with Fearon war. Distinct left-wing challengers in UCDP/PRIO spells.	1965, 1982
Somalia	1982-4, 86-96; 2001-2; 2006	1981-91; 1991-	Fearon and UCDP/PRIO include the same conflicts. Fearon years are used to distinguish pre- and post-1991 conflicts.	1982, 1991

Country	UCDP/PRIO Incidence Years	Fearon Incidence Years	Notes	Revised UCDP/PRIO Onset Years
Sri Lanka	1971; 1989-90	1971; 1987-9	Fearon and UCDP/PRIO include the same conflicts. Fearon years used for second war.	1971, 1989
Sudan	1971; 1976; 1983-	1983-05; 2003-	Fearon does not include two brief conflicts in 1970s fought against distinct rebel groups. UCDP/PRIO and Fearon agree on 1983 war, although SPLA possessed both center-seeking and separatist aims (Ross does not code this as center-seeking). Fearon and UCDP/PRIO both include war with Darfur that begins in 2003.	1971, 1976, 1983, 2003
Turkey	1991-2; 2005	1977-80	No agreement between UCDP/ PRIO and Fearon. The two UCDP/PRIO conflict spells involve distinct leftist groups.	1991, 2005
Uganda	1972; 1979-92, 94-	1981-88; 1988-	Fearon does not code the short conflict in 1972. Both UCDP/PRIO and Fearon code the same subsequent wars. Fearon's distinction between pre- and post-1988 conflict spells is used.	1972, 1981, 1988
Uzbekistan	1999*-2000; 2004*	n.a.	Second conflict initiated by a splinter group of the first Islamic challenger ( <a href="http://www.nctc.gov/site/groups/iju.html">http://www.nctc.gov/site/groups/iju.html</a> ).	1999
Yemen	1962-70; 1979-82	2004-	No agreement between UCDP/ PRIO and Fearon. War between republicans and royalists ends with power-sharing deal in 1970. Second challenger was a leftist group. Fearon codes a distinct conflict from either UCDP/PRIO one.	1962, 1979

*Notes:* UCDP/PRIO conflict incidence years are coded using the UCDP/PRIO database. Semi-colons are used whenever there is a multiple-year gap in fighting to denote that a distinct conflict would be coded using the two-year lapse rule. Commas are used whenever there is a one-year lapse. There are minor discrepancies with Ross' (2012) coding of center-seeking civil wars, presumably from using a revised version of UCDP/PRIO. Fearon conflict incidence years are coded using Fearon's database, which explicitly codes distinct civil wars that are separated by a semicolon. Note that several "Revised UCDP/PRIO Onset Years" are set as 1960 even though the conflict began earlier. This is because Ross' (2012) dataset begins in 1960.

\* Country produced at least \$100 in oil income per capita in a UCDP/PRIO onset year using the two-year lapse rule.

## B.2. Sample

Table 4 excludes two types of country-years that are included in Table 3. First, it excludes countries that joined the OECD in the 1960s and 1970s, which includes Western Europe and offshoots (Australia, Canada, New Zealand, United States) and Japan. These rich countries had consolidated states at the outset of the time period covered and faced essentially no prospect of an internal fight for the center regardless of their amount of oil. They do not fit the scope conditions of the formal model—or, implicitly, any variant of the conflict resource curse hypothesis.<sup>102</sup> Hence, dropping these countries properly excludes countries that are largely irrelevant for the hypothesis. However,

<sup>102</sup>Another way of stating this is that all conflict resource curse hypotheses implicitly assume heterogeneous treatment effects.

more recent OECD members—such as South Korea—are included for the duration of the sample because of the possibility that their successful late development was endogenous to not having oil. This corresponds directly with dropping all country-years with OECD=1 in Ross’ dataset. For example, his variable codes New Zealand as OECD=1 in all years despite New Zealand not joining the OECD until 1973, and codes South Korea as OECD=0 in all years despite South Korea joining the OECD in 1996.

Second, Table 4 excludes non-sovereign countries. Specifically, never colonized countries and former Western European colonies achieving independence before 1960 are included in all years. Countries that gained independence after 1960 are included starting from their year of independence. Former Soviet republics are included from 1991 onward. Non-Soviet former Eastern bloc countries and Mongolia are included starting in 1990. Former Yugoslavian countries are included from their year of independence onward. Albania, USSR/Russia, and Yugoslavia/Serbia would be included for the entire period, however, they are effectively dropped for most of the Cold War period because of missing income data. Occupied territories as coded by Geddes, Wright, and Frantz (2014) are excluded: Afghanistan 2001-, Bosnia and Herzegovina 1996-, Dominican Republic 1965-6, Iraq 2003-, and Lebanon 1976-2005.

The impetus behind excluding non-sovereign states is that conflicts in these countries usually revolve around overthrowing the occupying country, which is very different in nature from a civil war.

### B.3. Additional Modifications

#### Imputing Missing Income Data

Ross’ (2012) per capita income variable is missing for 500 of the 5555 observations in the core sample. As described in his book and in his STATA replication data, he uses World Development Indicators data when available and data from Penn World Table 6.2 when not. Fortunately, Penn World Table 6.2 does contain *rgdpch* data for 270 of the 500 missing observations. Using data for 2005 and 2006 from Penn World Table 7.1 yields an additional 4 data points.

An additional 131 data points are imputed. Imputing missing income data will undoubtedly introduce some measurement error, although this appears better than the alternative of dropping a large number of country-years. Many countries lack income data in early years in the dataset. To address this, I imputed income data from the first measured year backwards up to 10 years. In sum, these additions to Ross’ (2012) dataset recover 405 of the 500 country-years that were originally missing income data.

#### Excluding/Modifying Other Post-Treatment Covariates

Rather than control for annual population data, to avoid post-treatment issues that arise because oil booms tend to raise population (e.g., Cotet and Tsui 2010), I instead control for log population measured in 1950. Note that the issue of *controlling* for pre-oil population—in which the goal is to distinguish the effect of oil from the effect of what population would have been had the country not discovered oil—is distinct from the issue of *dividing* oil income by annual population to generate an oil income per capita variable. For the purpose of assessing the effects of the oil income per capita

“treatment,” the issue of how much per capita oil income a country would have had if oil had not raised population is not relevant because one consequence of gaining the oil treatment is, indeed, raising population.

Additionally, Columns 3 and 4 in Table 4 exclude three of Fearon and Laitin’s covariates because they are post-treatment: Polity, Polity squared, and political instability.

## Recoding 1960 Civil War Onsets

Five center-seeking wars coded as 1960 onsets in Ross’ (2012) dataset are implicitly dropped because the dataset begins in 1960 and oil income per capita is lagged one year in the regressions. These five civil wars are recoded to begin in 1961.

## Coding Region Dummies

Ross (2012) includes region dummies for the Middle East and North Africa, Sub-Saharan Africa, Latin America, and East Asia. This yields a somewhat heterogeneous basis region of Eastern European and former Soviet states, South Asia, and Mediterranean and Pacific islands. To minimize heterogeneity in the basis region I include additional dummies for Eastern European and former Soviet states, and South Asia.

# C. Additional Empirical Results

## C.1. Controlling for Counterfactual Non-Oil Income

The key comparative statics prediction from Proposition 2 about the effects of increases in oil revenues is premised on holding non-oil revenues fixed. Implementing this control using statistical modeling, however, is extremely difficult. Controlling for factual income per capita data induces post-treatment bias, and constructing counterfactual income measures poses severe concerns. One author who has attempted this task acknowledges “any possible calculation of counterfactual GDP requires major, perhaps heroic, assumptions” (Herb 2005, 302). There are two important impediments to accurately estimating counterfactual non-oil income per capita data for oil-rich countries. The first is that we have only scant income per capita data prior to initial oil discoveries for most major oil producers. This poses difficulties for estimating a country’s *pre-oil* income per capita. The second is that even with such data, it would still be extremely difficult to estimate how these countries’ economies would have evolved over time had they not become major oil producers. This poses difficulties for estimating an oil-rich country’s *annual* counterfactual non-oil income per capita. Given the issues raised below, there is no reason to believe that regressions controlling for counterfactual non-oil income will produce stronger insights than regressions that entirely omit an income control.

Even acknowledging these caveats, however, the results do not support a center-seeking conflict resource curse when controlling for different counterfactual non-oil income estimates. The first two procedures estimate pre-oil income—meaning for each country the same non-oil income estimate

is used in every year—and the last two procedures estimate annual counterfactual non-oil income, meaning each country-year has a unique income estimate. All these results use the coding modifications described in Appendix B. The five columns in Tables C1 through C4 correspond to the odd-numbered specifications from Table 4 except the different counterfactual income per capita variables described below replace the per capita income variable in Table 4.

Providing one possibility for estimating pre-oil income, Angus Maddison provides the most comprehensive estimates available for historical income per capita. Although some data points go back as far as 0 CE, the global sample only becomes broad starting in 1950. By this date, many major oil-producers had already begun oil production and had achieved considerably higher incomes per capita than would have been imaginable had they not been major oil producers (see Table 1 from Alexeev and Conrad 2009, 587). Unfortunately, the next most recent year that has any degree of coverage for the non-European world, 1913, still has considerable missing data (only 30% of the countries from the core sample have data). However, because this variable is truly pre-oil for almost every country, it may be useful to consider how controlling for this initial income estimate impacts the results after imputing missing data. One possible procedure is, for each country/colony with missing 1913 data, to set its income equal to the lowest income value among countries/colonies in its geographic region. The idea here is that countries with missing data are, on average, more likely to be poor. Table C1 shows the negative correlation remains relatively strong after controlling for imputed 1913 income per capita.

**Table C1. Counterfactual Non-Oil Income: 1913 Income**

	(1)	(2)	(3)	(4)	(5)
	Panel A. DV: UCDP/PRIO Center CW Onset (modified)				
Log oil income per capita	-0.076 (0.049)	-0.061 (0.112)	-0.052 (0.232)	-0.141 (0.021)	-0.097 (0.020)
Observations	5460	4870	5316	4683	5371
	Panel B. DV: Fearon Center CW Onset				
Log oil income per capita	-0.082 (0.107)	-0.097 (0.066)	-0.078 (0.146)	-0.152 (0.075)	-0.110 (0.060)
Observations	5460	4870	5316	4683	5371
	Peace years and cubic splines?				
	Yes	Yes	Yes	Yes	Yes
	Log population covariate?				
	Yes	Yes	Yes	Yes	Yes
	1913 income per capita covariate?				
	Yes	Yes	Yes	Yes	Yes
	Additional covariates/Sample modifications				
	None	F&L	Region FE	Drop MENA	Drop IRN/IRQ

*Notes:* Table C1 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Robust standard errors are clustered at the country level. Other coefficient estimates are suppressed for expositional clarity.

Alexeev and Conrad (2009) suggest another alternative for estimating pre-oil income per capita. They regress income per capita in 1970 on “strongly exogenous variables” (specifically, region dummies for Latin America and East Asia, and absolute latitude) and use the predicted values for income per capita to estimate pre-oil income. Given constraints on the set of possible strongly exogenous variables, it appears reasonable to focus on regional location because this is known to be a strong predictor of income per capita. Alexeev and Conrad chose the year 1970 because most economic growth regressions use 1970 as the initial year (presumably because Penn World Table data only gains widespread global coverage starting in 1970), but this year is also attractive specifically for learning about counterfactual income for oil-rich countries. Although many oil-rich countries had achieved high incomes per capita by 1970, only after 1973 did oil transform *neighboring* countries’ economies as well, particularly in the Middle East and North Africa. Therefore, there are no strong spillover effects from pre-1973 data that impede using neighboring countries’ income per capita as counterfactuals for oil-rich countries (which is largely what using regional dummies to generate fitted values achieves). In the regressions in Table C2, each country’s counterfactual income is generated using fitted values from the following model (which was itself estimated by regressing log 1970 income on these covariates using OLS):

$$Y_{it} = 5.915 - 0.025 \cdot \text{ABSLAT}_i + 1.275 \cdot \text{LATIN}_i - 0.031 \cdot \text{EASIA}_i$$

Table C2 shows that although the strength of the negative correlation weakens in some of the specifications when controlling for the fitted 1970 income values, the results continue to be more consistent with authoritarianism than conflict resource curse arguments.

**Table C2. Counterfactual Non-Oil Income: Estimated 1970 Income**

	(1)	(2)	(3)	(4)	(5)
	Panel A. DV: UCDP/PRIO Center CW Onset (modified)				
Log oil income per capita	-0.051 (0.140)	-0.024 (0.479)	-0.074 (0.115)	-0.100 (0.076)	-0.071 (0.058)
Observations	5460	4870	5316	4683	5371
	Panel B. DV: Fearon Center CW Onset				
Log oil income per capita	-0.048 (0.321)	-0.047 (0.349)	-0.105 (0.070)	-0.105 (0.189)	-0.073 (0.188)
Observations	5460	4870	5316	4683	5371
	Peace years and cubic splines?				
	Yes	Yes	Yes	Yes	Yes
	Log population covariate?				
	Yes	Yes	Yes	Yes	Yes
	Estimated 1970 income per capita covariate?				
	Yes	Yes	Yes	Yes	Yes
	Additional covariates/Sample modifications				
	None	F&L	Region FE	Drop MENA	Drop IRN/IRQ

*Notes:* Table C2 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Robust standard errors are clustered at the country level. Other coefficient estimates are suppressed for expositional clarity.

Additional problems arise when attempting to estimate *annual* counterfactual non-oil income per capita, rather than *pre-oil* income per capita. One possibility is to subtract oil income per capita from total income per capita to generate non-oil income data. That is, an oil-rich country's actual non-oil income is used to estimate what its income per capita would have been had it not become a major oil producer. Herb (2005) critiques this approach: "Rent or oil wealth can not be subtracted from existing per capita GDP figures, thus 'unmixing' the two types of wealth. The effect of oil (or other rents) on the economies of the rich rentier states is transformative, not additive. The non-oil economy that Kuwait might have had without oil is no longer there. Oil destroyed it" (302). However, this may still provide an attractive strategy (among a set of imperfect alternatives) because the bias generated by this procedure is ambiguous. On the one hand, to the extent that oil creates "Dutch disease" by substituting away from non-oil industries, the true counterfactual for non-oil income may be higher than estimated when subtracting oil income from total income. On the other hand, especially in countries with minimal economic activity prior to oil (e.g., the Arabian peninsula), there was not much of a non-oil economy to substitute away from—implying oil either creates no, or even positive, spillovers. In this scenario, the true counterfactual for non-oil income is lower than estimated when subtracting oil income from total income. The implausibly high non-oil income estimates generated by this procedure for many Arabian peninsula countries suggests the latter effect may dominate, i.e., this procedure biases against finding a negative relationship between oil income per capita and center-seeking civil war onset. Still, as Table C3 shows, the negative correlation remains relatively strong after controlling for this variable.

**Table C3. Counterfactual Non-Oil Income: Actual Non-Oil Income**

	(1)	(2)	(3)	(4)	(5)
	Panel A. DV: UCDP/PRIO Center CW Onset (modified)				
Log oil income per capita	-0.080 (0.035)	-0.060 (0.098)	-0.062 (0.176)	-0.138 (0.021)	-0.101 (0.014)
Observations	5460	4870	5316	4683	5371
	Panel B. DV: Fearon Center CW Onset				
Log oil income per capita	-0.084 (0.104)	-0.088 (0.087)	-0.097 (0.117)	-0.150 (0.069)	-0.106 (0.068)
Observations	5460	4870	5316	4683	5371
	Peace years and cubic splines?				
Yes	Yes	Yes	Yes	Yes	Yes
	Log population covariate?				
Yes	Yes	Yes	Yes	Yes	Yes
	Non-oil income per capita covariate?				
Yes	Yes	Yes	Yes	Yes	Yes
	Additional covariates/Sample modifications				
None	F&L	Region FE	Drop MENA	Drop IRN/IRQ	

*Notes:* Table C3 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Robust standard errors are clustered at the country level. Other coefficient estimates are suppressed for expositional clarity.

Herb (2005) uses a different procedure for estimating annual counterfactual non-oil income. Rather than estimate the counterfactual non-oil economy using actual non-oil income data, he instead compares oil-rich countries to selectively chosen baskets of neighbors.<sup>103</sup> Alexeev and Conrad (2009, 593) note that Herb uses a “somewhat similar approach” to theirs, although critique it for being “somewhat ad hoc” relative to their “fitted values of GDP [which] are obtained according to a significantly more rigorous procedure.” Another problem with Herb’s procedure relates to an issue noted above: after 1973, oil-rich countries’ neighbors were also transformed by their proximity to oil-rich countries. Although Herb acknowledges this point (302), it is not clear why he dismisses the non-oil income estimation procedure used in Table C3 when the same critique applies to his own procedure. The non-oil economy that the Middle East and North Africa, and other oil-rich regions, might have had without oil is no longer there because oil destroyed it. Furthermore, in contrast to the discussion preceding Table C3, Herb’s measure almost certainly biases against finding a negative relationship between oil and center-seeking civil war onset by overestimating oil-rich countries’ counterfactual incomes because of remittances and aid to neighboring oil-poor countries (e.g., Jordan). However, contrary to the conflict resource curse hypothesis, Table C4 shows the oil coefficient estimate continues to be negative, although considerably smaller in magnitude than in Table 4.

<sup>103</sup>See Herb (2005, 302) and his footnote 25 for his coding discussion.



**Table C4. Counterfactual Non-Oil Income: Estimates from Neighbors**

	(1)	(2)	(3)	(4)	(5)
	Panel A. DV: UCDP/PRIO Center CW Onset (modified)				
Log oil income per capita	-0.023 (0.543)	-0.015 (0.706)	-0.039 (0.397)	-0.062 (0.292)	-0.043 (0.287)
Observations	5460	4870	5316	4683	5371
	Panel B. DV: Fearon Center CW Onset				
Log oil income per capita	-0.032 (0.536)	-0.054 (0.332)	-0.067 (0.235)	-0.080 (0.343)	-0.059 (0.308)
Observations	5460	4870	5316	4683	5371
	Peace years and cubic splines?				
	Yes	Yes	Yes	Yes	Yes
	Log population covariate?				
	Yes	Yes	Yes	Yes	Yes
	Counterfactual non-oil income per capita covariate?				
	Yes	Yes	Yes	Yes	Yes
	Additional covariates/Sample modifications				
	None	F&L	Region FE	Drop MENA	Drop IRN/IRQ

*Notes:* Table C4 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Robust standard errors are clustered at the country level. Other coefficient estimates are suppressed for expositional clarity.

## C.2. Addressing Endogeneity Concerns

This article argues the common practice in the conflict resource curse literature of regressing civil war onset on oil income per capita while controlling for total income per capita will produce incorrect counterfactual comparisons—specifically, upwardly biased estimates for the oil coefficient. Other recent contributions focus on a different reason that conventional model specifications may produce incorrect counterfactual comparisons: oil income is not exogenous “manna from heaven” but is instead affected by systematic factors such as fiscal needs (Haber and Menaldo 2011; Menaldo 2014), the form of oil ownership (Jones Luong and Weinthal 2010), and industrialization (Brooks and Kurtz 2015). This section discusses why the results from the article are relevant despite these endogeneity concerns, and presents additional statistical results.

The empirical results from the present article are informative because it was previously believed that regression models estimated with pooled time-series cross-sectional data at the country-level supported a conflict resource curse—in fact, these are the foundational empirical results for the conflict resource curse hypothesis. Table 3 demonstrates existing regressions consistently find evidence for a conflict resource curse in large part because they include a theoretically problematic control variable, income per capita (see Table 3 for center-seeking wars, Table C8 for separatist wars, and Table C9 for both types of civil wars). Regarding Table 4, it is striking that statistical models thought to strongly support a conflict resource curse instead more consistently support the *opposite* hypothesis for center-seeking wars when addressing a major theoretical concern and several other seemingly minor specification choices—a distinct issue from endogeneity concerns about sources of bias.

Furthermore, although research that critiques models based on pooled time-series cross-sectional variation delivers valuable insights, there are still crucial issues that require attention in future research. First, nearly all the recent contributions mentioned above control for country fixed effects to eliminate bias from unobserved time invariant factors. Although reasonable, this strategy also raises econometric concerns. It is well known that including country fixed effects in a logit model in with rare events data will drop many countries from the regressions (Beck and Katz 2001; Wiens, Poast, and Clark 2014). This issue is intertwined with more specific concerns that country fixed effects models reduce efficiency (Clark and Linzer 2014) and produce biased estimates when treatment effects are heterogeneous (Imai and Kim 2014). Thus, although country fixed effects regressions address one specific concern with models that base identification off pooled time-series cross-sectional variation, pending further analysis it is not clear that results from country fixed effects models should necessarily be preferred over pooled models for the purposes of evaluating the conflict resource curse.

Having acknowledged these limitations, Table C5 presents country fixed effects results for center-seeking civil wars. Because nearly every regressor used in Table 4 is time invariant, C5 presents results from specifications that regress center-seeking civil war onset (either UCDP/PRIO or Fearon) on oil income per capita, temporal dependence controls, and country fixed effects. The sample is identical to that in Column 2 of Table 4, except countries that never experience a center-seeking civil war are dropped because their country fixed effect perfectly predicts the outcome. The results continue to support oil-authoritarianism implications more than oil-civil war arguments, and the UCDP/PRIO specification achieves statistical significance despite losing considerable statistical power by dropping 54% of the country-year observations (the Fearon regression drops 68%).

**Table C5. Country Fixed Effects Regressions**

	(1)	(2)
	DV: UCDP/PRIO	DV: Fearon
Log oil income per capita	-0.329 (0.002)	-0.179 (0.204)
Observations	2498	1764
	Country fixed effects?	
	Yes	Yes
	Peace years and cubic splines?	
	Yes	Yes

*Notes:* Table C5 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Robust standard errors are clustered at the country level. Other coefficient estimates are suppressed for expositional clarity.

Second, some recent work analyzes the effects of oil field *discoveries* rather than annual oil income.<sup>104</sup> Although the instruments and matching strategies used in these works produce perhaps the strongest identification strategies in the literature (see each article/manuscript for a lengthier discussion), oil discoveries do not provide a relevant “treatment” variable for empirically assessing

<sup>104</sup>These analyses have reached mixed findings. Lei and Michaels 2014 find a strong positive effect of oil discoveries on civil war onset, Cotet and Tsui 2013 report null results, and Blair 2014 shows onshore oil discoveries in densely populated areas raise the probability of separatist civil wars but not the probability of center-seeking wars.

the theory presented in this article. Scrutinizing the effects of oil discoveries is only appropriate for learning about the short-term effects of oil production. For example, Lei and Michaels' (2014) core results analyze civil war onset within 4, 6, and 8 years of a major oil field discovery. The theory presented here assumes the government has consolidated control over the country's oil production—which corresponds with much existing research—but this assumption may not be valid within a small window after major oil discoveries. Therefore, aggregate oil production is the more theoretically relevant variable for evaluating the debate between oil-authoritarianism and oil-civil war mechanisms.

Third, an even smaller body of work endogenizes annual oil production (Menaldo 2014; Brooks and Kurtz 2015). These two contributions reach contradictory conclusions about non-geological causes of oil production. Whereas Brooks and Kurtz (2015) provide evidence that more industrialized countries tend to produce more oil, Menaldo (2014) argues revenue-starved rulers in weak states have often provided strong incentives to international oil companies to extract oil at above-optimal rates. Additional research is needed to reconcile these competing arguments. As a preliminary consideration, among the weakly institutionalized and mainly authoritarian states analyzed here, many countries that provide strong support for the article's theory by having high levels of oil production and no major center-seeking civil war onsets in the time period analyzed—including Bahrain, Brunei, Equatorial Guinea, Gabon, Kuwait, Libya, Qatar, and Saudi Arabia—had minimal industrial capacity prior to becoming oil-rich (see the discussion accompanying assumption #2). Instead, international oil companies facilitated oil discoveries and production. Therefore, it does not appear likely that the conditions needed for the oil coefficient estimates from Table 4 to be negatively biased—oil-rich countries in the sample had higher industrialization levels prior to major oil discoveries—are true.

### C.3. Sample Alterations

Re-running the regressions on two subsamples of the main dataset provides a “hard” test for the present argument. Following Ross' (2012) arguments for where the conflict resource curse should be strongest, Table C6 only includes post-1990 data points and Table C7 only includes country-years with less than \$5,000 in income per capita. The two main conclusions from Table 4 hold under each alteration: the sign of the oil estimate supports authoritarianism arguments rather than a center-seeking conflict resource curse, and dropping the income control greatly impacts the regression estimates. However, the magnitude of the negative effect estimate varies across the two sample alterations. These specifications incorporate the modifications described in Appendix B.

Ross' (2012, 154) disaggregated data analysis shows oil wealth appears to exert a stronger positive effect on civil war onset from 1990 onward. Table C6, however, shows the sign of the oil coefficient estimate remains negative for center-seeking civil war onsets when excluding the income control. Comparing the magnitude of the coefficient estimates in the even-numbered specifications to those from Table 4, the UCDP/PRI estimates tend to be larger in magnitude in the post-1990 sample whereas the Fearon estimates tend to be smaller. Notably, dropping three decades of data diminishes the sample size considerably.

**Table C6. Only Post-1990 Years**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. DV: UCDP/PRIO Center CW Onset (modified)										
Log oil income per capita	0.050 (0.547)	-0.121 (0.071)	0.085 (0.359)	-0.076 (0.237)	0.017 (0.872)	-0.060 (0.436)	0.059 (0.536)	-0.165 (0.091)	0.032 (0.708)	-0.143 (0.044)
Observations	2423	2423	1893	1893	2100	2100	2119	2119	2392	2392
Panel B. Dependent Variable: Fearon Center CW Onset										
Log oil income per capita	0.158 (0.204)	-0.066 (0.511)	0.140 (0.298)	-0.024 (0.824)	0.095 (0.478)	-0.024 (0.799)	-0.19 (0.924)	-0.255 (0.216)	0.122 (0.395)	-0.120 (0.298)
Observations	2423	2423	1893	1893	1641	1641	2119	2119	2392	2392
Peace years and cubic splines?										
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log population covariate?										
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income per capita covariate?										
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Additional covariates/Sample modifications										
	None	None	F&L	F&L	Region FE	Region FE	Drop MENA	Drop MENA	Drop IRN/IRQ	Drop IRN/IRQ

*Notes:* Table C6 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Robust standard errors are clustered at the country level. Other coefficient estimates are suppressed for expositional clarity.

Ross (2012, 154) also provides evidence that the conflict resource curse is stronger in poor countries, i.e., those with income per capita below \$5,000. Intriguingly, the model anticipates this prediction in two different ways. First, low income is partly endogenous low amounts of oil. The smaller the amount of oil, the higher the probability of center-seeking civil war should be. Second, to the extent that oil wealth does not translate effectively into income per capita or government revenues, again, the higher the probability of center-seeking civil war should be. Therefore, we should not expect to find a strong negative relationship in this subsample even if oil does exert an overall effect of reducing center-seeking civil war propensity. Strikingly, the coefficient estimates remain negative although, as expected, the magnitude of the negative coefficient estimates is smaller in even-numbered specifications in Table C7 compared to those in Table 4.

**Table C7. Only Poor Countries**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. DV: UCDP/PRIO Center CW Onset (modified)										
Log oil income per capita	0.010 (0.837)	-0.057 (0.215)	0.013 (0.787)	-0.039 (0.380)	-0.001 (0.987)	-0.029 (0.561)	-0.060 (0.400)	-0.146 (0.037)	-0.015 (0.776)	-0.085 (0.094)
Observations	4715	4715	4309	4309	4615	4615	4239	4239	4630	4630
Panel B. Dependent Variable: Fearon Center CW Onset										
Log oil income per capita	0.018 (0.776)	-0.041 (0.478)	-0.019 (0.773)	-0.056 (0.347)	-0.003 (0.957)	-0.028 (0.637)	-0.077 (0.437)	-0.150 (0.117)	-0.011 (0.882)	-0.072 (0.290)
Observations	4715	4715	4309	4309	4615	4615	4239	4239	4630	4630
Peace years and cubic splines?										
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log population covariate?										
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income per capita covariate?										
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Additional covariates/Sample modifications										
	None	None	F&L	F&L	Region FE	Region FE	Drop MENA	Drop MENA	Drop IRN/IRQ	Drop IRN/IRQ

*Notes:* Table C7 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Robust standard errors are clustered at the country level. Other coefficient estimates are suppressed for expositional clarity.

#### C.4. Results for Separatist and All Civil Wars

The argument that controlling for per capita income induces post-treatment bias should also apply to regressions that use either separatist wars only or all civil wars as the dependent variable. Tables C8 and C9—which present the same specifications as Table 3 except they change the dependent variable—provide evidence for this implication. Specifically, they demonstrate a strong positive relationship between oil and civil war onset in regressions that control for per capita (odd-numbered columns) but either a weak positive correlation or a negative correlation in regressions that omit the per capita income control (even-numbered columns).

**Table C8. Oil Wealth and Separatist Civil War Onset, Existing Models**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Panel A. Dependent Variable: UCDP/PRIO Separatist Civil War Onset									
Log oil income per capita	0.158 (0.008)	0.022 (0.694)	0.141 (0.017)	0.011 (0.834)	0.158 (0.016)	0.097 (0.094)	0.171 (0.013)	0.020 (0.767)	0.137 (0.041)	-0.004 (0.949)
Observations	6426	6426	5538	5538	5211	5211	5699	5699	6351	6351
	Panel B. Dependent Variable: Fearon Separatist Civil War Onset									
Log oil income per capita	0.167 (0.022)	-0.006 (0.931)	0.073 (0.310)	-0.039 (0.569)	0.0154 (0.059)	0.079 (0.260)	0.166 (0.056)	-0.037 (0.669)	0.120 (0.142)	-0.062 (0.426)
Observations	6426	6426	5538	5538	6426	6426	5699	5699	6351	6351
	Peace years and cubic splines?									
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Log population covariate?									
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Income per capita covariate?									
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	Additional covariates/Sample modifications									
	None	None	F&L	F&L	Region FE	Region FE	Drop MENA	Drop MENA	Drop IRN/IRQ	Drop IRN/IRQ

*Notes:* Table C8 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Other coefficient estimates are suppressed for expositional clarity.

**Table C9. Oil Wealth and All Civil War Onset, Existing Models**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Panel A. Dependent Variable: UCDP/PRIO All Civil War Onset									
Log oil income per capita	0.133 (0.001)	0.010 (0.789)	0.109 (0.004)	0.026 (0.455)	0.123 (0.001)	0.035 (0.326)	0.124 (0.004)	-0.011 (0.806)	0.100 (0.008)	-0.025 (0.472)
Observations	6426	6426	5538	5538	6426	6426	5699	5699	6351	6351
	Panel B. Dependent Variable: Fearon All Civil War Onset									
Log oil income per capita	0.135 (0.011)	-0.023 (0.638)	0.093 (0.107)	-0.023 (0.640)	0.088 (0.081)	-0.023 (0.579)	0.079 (0.194)	-0.100 (0.086)	0.083 (0.104)	-0.076 (0.106)
Observations	6426	6426	5538	5538	6426	6426	5699	5699	6351	6351
	Peace years and cubic splines?									
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Log population covariate?									
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Income per capita covariate?									
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	Additional covariates/Sample modifications									
	None	None	F&L	F&L	Region FE	Region FE	Drop MENA	Drop MENA	Drop IRN/IRQ	Drop IRN/IRQ

*Notes:* Table C9 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Other coefficient estimates are suppressed for expositional clarity.

The discussion accompanying assumption #6 also implies that location should condition the relationship between oil wealth and separatist civil wars. Therefore, because standard cross-national oil measures do not take location into account, oil income should not correlate strongly with either separatist war onset or all civil war onset in cross-national regressions. Tables C10 and C11

demonstrates the null relationship from Tables C8 and C9 remains in models that impose the same changes as used in Table 4.<sup>105</sup>

**Table C10. Oil Wealth and Separatist Civil War Onset, Revised Models**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Panel A. Dependent Variable: UCDP/PRIO Separatist Civil War Onset (revised)									
Log oil income per capita	0.094 (0.150)	0.037 (0.510)	0.045 (0.519)	0.020 (0.732)	0.043 (0.560)	0.022 (0.751)	0.079 (0.306)	0.028 (0.693)	0.052 (0.479)	-0.003 (0.957)
Observations	5460	5460	4870	4870	4278	4278	4683	4683	5371	5371
	Panel B. Dependent Variable: Fearon Separatist Civil War Onset									
Log oil income per capita	0.134 (0.057)	0.041 (0.503)	0.072 (0.337)	-0.005 (0.941)	0.104 (0.140)	0.073 (0.265)	0.112 (0.158)	0.012 (0.867)	0.068 (0.370)	-0.026 (0.687)
Observations	5460	5460	4870	4870	5460	5460	4683	4683	5371	5371
	Peace years and cubic splines?									
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Log population covariate?									
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Income per capita covariate?									
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	Additional covariates/Sample modifications									
	None	None	F&L	F&L	Region FE	Region FE	Drop MENA	Drop MENA	Drop IRN/IRQ	Drop IRN/IRQ

*Notes:* Table C10 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Other coefficient estimates are suppressed for expositional clarity.

<sup>105</sup>This required recoding repeated UCDP/PRIO civil war onsets for separatist wars using the guidelines discussed in Section B.1. The case-by-case onset codings are available upon request.

**Table C11. Oil Wealth and All Civil War Onset, Revised Models**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Dependent Variable: UCDP/PRIO All Civil War Onset (revised)										
Log oil income per capita	0.030 (0.396)	-0.043 (0.181)	0.007 (0.855)	-0.047 (0.161)	0.007 (0.854)	-0.025 (0.474)	0.002 (0.959)	-0.074 (0.099)	0.007 (0.852)	-0.068 (0.043)
Observations	5460	5460	4870	4870	5460	5460	4683	4683	5371	5371
Panel B. Dependent Variable: Fearon All Civil War Onset										
Log oil income per capita	0.071 (0.127)	-0.004 (0.920)	0.031 (0.531)	-0.023 (0.606)	0.041 (0.353)	0.009 (0.826)	0.038 (0.486)	-0.047 (0.357)	0.030 (0.532)	-0.046 (0.259)
Observations	5460	5460	4870	4870	5460	5460	4683	4683	5371	5371
Peace years and cubic splines?										
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log population covariate?										
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income per capita covariate?										
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Additional covariates/Sample modifications										
	None	None	F&L	F&L	Region FE	Region FE	Drop MENA	Drop MENA	Drop IRN/IRQ	Drop IRN/IRQ

*Notes:* Table C11 summarizes a series of logistic regressions by presenting the coefficient estimate for log oil income per capita (lagged one year) and the p-value in parentheses. Other coefficient estimates are suppressed for expositional clarity.

## D. Case Evidence

In addition to regression evidence that rejects a conflict resource curse for center-seeking civil wars, it is also striking how few major center-seeking wars have occurred in oil-rich countries and that most of these conflicts do not strongly suggest a conflict-inducing role for oil. Table D1 presents a  $2 \times 2$  tabulation for whether or not oil income per capita is above \$100 in a given country-year, and whether or not a Fearon center-seeking conflict begins. Among cases with oil income per capita above the \$100 threshold in the core sample, a center-seeking civil war onset occurred in only ten country-years in Fearon's dataset, with the oil income per capita level in the onset year listed in parentheses (recall that Ross' sample ends in 2006).



**Table D1.  $2 \times 2$  Table of Oil and Fearon Center-Seeking Civil War Onset**

	Onset = 0	Onset = 1	Percentage
<b>Oil = 0</b>	3898 observations	47 observations	1.19%
<b>Oil = 1</b>	1132 observations	Algeria 1962 (\$147) Algeria 1992 (\$431) Angola 1975 (\$321) Argentina 1973 (\$108) Congo, Rep. 1997 (\$556) Iran 1978 (\$1,763) Iraq 1991 (\$142) Peru 1981 (\$295) Syria 1979 (\$553) Yemen 2004 (\$246)	0.88%

The causal role for oil on civil war onset is unclear in four cases. Civil wars broke out in Argentina in 1973 and Peru 1981 in two countries that only recently crossed the \$100/capita threshold. Qualitative sources do not suggest that oil motivated the left-wing insurgencies in either case (Skidmore and Smith 2005, 94-8 and 214). Additionally, civil wars that “began” in the first year of independence in Algeria and Angola were continuations of anti-colonial struggles. Oil likely played an important role in the *continuation* of conflict in Angola (Le Billon 2007), but this is distinct from oil contributing to civil war *initiation*. Oil perhaps could have contributed to France’s and Portugal’s attempts to maintain colonial control of Algeria and Angola, respectively. This is an intriguing possibility for future research to analyze. Still, even if oil did contribute to the post-independence civil wars in these two cases, it did so through a channel that lies outside the broad array of existing theories that connect oil to civil war initiation.

Perhaps surprising, qualitative evidence from four other oil-rich/civil war cases highlights the coercive possibilities afforded by oil. Uprisings occurred after Iraq lost the Persian Gulf War. The Iraqi government had defeated the uprisings by the end of 1991, backed by its large and modern army (Fearon and Laitin 2006, 11). The Syrian army grew rapidly in size during the 1970s (Correlates of War dataset), and took the additional step in 1979 of arming party members to root out urban guerrillas (Seale 1988, 327). The government was successful at recruiting citizens to fight against the rebels (327), and the military eradicated the Muslim Brotherhood in 1982 by shelling the city of Hama for a month. The Algerian war lasted considerably longer than the previous two, at nearly a decade, but Fearon and Laitin (2006a, 27-9) stress the army was strong in this case as well. Even in Iran, where the government actually fell, Skocpol (1982, 270) asserts that “all of the [many] vulnerabilities of the prerevolutionary Iranian regime could well have had little significance. The Shah, after all, had both munificent wealth and ominous repressive power at his disposal.”

The final two cases exhibit different patterns. Yemen was weak, but Yemen also had a long history of state weakness and civil wars prior to discovering oil in the 1980s. Furthermore, Yemen does not have much oil. Congo-Brazzaville provides the most notable exception. Rebels’ desire to capture oil wealth clearly motivated a fight that eventually led to government overthrow. However, even this case lies outside the scope of the formal model because “booty futures” finance from

an international oil company (contrary to argument #1 above about government control of oil revenues) proved crucial to the rebels' success (Ross 2012, 174-6).

## E. Examples of Misinterpreting Fearon and Laitin

For examples of research that cites Fearon and Laitin (2003) or Fearon (2005) as positing a hypothesis about the overall effects of oil—that is, dropping the conditionality about income—see Humphreys (2005, 512-3), Basedau and Lay (2009, 759), Glynn (2009, 1), Lujala (2009, 52), Hendrix (2010, 275), Sobek (2010, 269), Morrison (2012, 18), Ross (2012, 162), Cotet and Tsui (2013, 52), Cederman, Gleditsch, and Buhaug (2013, 16), Kennedy and Tiede (2013, 760), Waldner and Smith (2013, 21), and Koubi et al. (2014, 232).

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## Chapter 2

# Irreconcilable Grievances? Why Oil-Rich Ethnic Minority Groups Fight Separatist Civil Wars

### Abstract

Providing one of the strongest empirical regularities related to the prominent conflict resource curse hypothesis, separatist civil wars occur more frequently in territories populated by ethnic minority groups. However, crucial questions remain about the strategic foundations for this relationship. What properties of oil production, as opposed to other types of economic activity, cause bargaining breakdown? This concern is especially pressing because oil revenues provide governments with revenues to *deter* insurgencies. And what prevents the government from strategically reducing grievances to prevent costly fighting? This paper presents a game theoretic model featuring an interaction between a government and ethnic minority group. Because the government can extract oil revenues with minimal local participation, it can enact high tax rates on oil production. This creates grievances. Furthermore, the government chooses not to lower tax rates to alleviate grievances when oil revenues are large relative to other revenue sources, because the lost consumption from fighting is lower than the opportunity costs of lowering taxes on the “prize.” Finally, the model also yields a novel conditional conflict resource curse hypothesis that finds statistical support for ethnic civil war onsets: local oil wealth should only raise separatist civil war propensity for groups with weak institutional ties to the center, but the conflict-inducing parameter range is not empirically relevant for center-seeking civil wars.

## 2.1 Introduction

Grievances by ethnic minority groups are an important explanation for civil wars (Gurr 1969; Horowitz 1985; Cederman et al. 2013). Separatist civil wars in particular—in which combatants fight to create an autonomous government—frequently feature ethnically oriented grievances. Combatants have proclaimed ethnic-related goals in 39 of 40 major separatist wars since 1945 (Denny and Walter 2014, 201).<sup>1</sup> Related to this pattern, regional concentration of a self-identified group within a circumscribed territory—as ethnic groups often are—is a near precondition for initiating a separatist civil war (Toft 2014, 191).

Ethnic grievances provide an especially prominent explanation linking oil production to higher rates of separatist civil war onset.<sup>2</sup> Although this literature has used the term “grievance” in different ways,<sup>3</sup> scholars commonly invoke inter-ethnic wealth disparities, also known as horizontal inequalities (e.g., Humphreys 2005, 512; Ross 2007, 245; Basedau and Lay 2009, 759; Morrison 2012, 7-8; Cederman et al. 2013, 84; Smith 2015, 7). Regarding empirical trends, there is consistent evidence that ethnic minority groups in oil-rich territories fight separatist civil wars at elevated rates (Sorens 2011; Ross 2012, 165-6; Condra 2013; Blair 2014; Morelli and Rohner 2014). Among numerically small and politically relevant ethnic groups in Africa and Asia, oil-rich groups initiated separatist civil wars in 2.4% of group-years between 1945 and 2009, compared to 0.5% among oil-poor groups.<sup>4</sup> In total, 15 of 16 separatist civil wars fought over oil-rich territories between 1960 and 2006 were initiated by an ethnic or religious minority group (Ross 2012, 165-6).

Why should local oil wealth exacerbate ethnic grievances and cause separatist civil wars? Making additional progress on this question requires scrutinizing properties of oil that prevent successful bargaining between the government and a minority group—because in principal the parties should prefer a negotiated settlement to costly fighting.<sup>5</sup> As one possibility, oil may trigger fighting by creating a valuable prize that a group can seize by seceding (Collier and Hoeffler 2005; Le Billon 2006).<sup>6</sup> This explanation on its own, however, is unsatisfying because oil production also exerts a strong countervailing effect: providing the government with revenues to build a strong coercive apparatus and to distribute patronage. Focusing on center-seeking civil wars, Chapter 1 argues these revenue-enhancing mechanisms tend to overwhelm the prize effect to lower center-seeking conflict propensity. Why should the effect of oil wealth on *separatist* civil wars differ?

As another possibility, local oil wealth may not only create a valuable prize, but also exacerbate grievances by causing redistribution of wealth away from the ethnic group’s territory (e.g., Sorens

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<sup>1</sup>This contrasts with 33 out of 73 center-seeking civil wars, in which combatants fight to capture the capital.

<sup>2</sup>Major academic contributions to the broader intra-state conflict resource curse literature include Collier and Hoeffler (2004), Fearon and Laitin (2003), Fearon (2005), Hegre and Sambanis (2006), Ross (2004, 2012), and Lei and Michaels (2014). According to Google Scholar these articles have a combined citation count of 11,620 (accessed 12/16/14). Ross (2013) reviews this voluminous literature.

<sup>3</sup>As examples, Humphreys (2005, 511-2) discusses four variants of natural resource-based grievances and Smith (2015, 6-7) discusses two.

<sup>4</sup>Author’s calculation. Section 7 describes the sample and data in more depth.

<sup>5</sup>Fearon (1995) raised this concern about theories of international warfare. Walter (2009) summarizes its widespread applications in studies of civil war.

<sup>6</sup>Toft (2014, 188-9) reviews widespread arguments about valuable territory and civil war. Laitin (2007, 22) and Fearon (2008, 8) present broad statements about the oil prize argument. Prize-based arguments derive mainly from economic theories of conflict (e.g., Garfinkel and Skaperdas 2006), which provided the original theoretical insights linking oil wealth to civil wars according to (Ross 2013, 13).

2011, 574-5; Ross 2012, 151-2; Condra 2013). If this redistribution tension is irreconcilable, it may indeed overwhelm the revenue-enhancing effects of oil production. However, this explanation for high rates of separatist civil wars in oil-rich territories also raises crucial questions. Why does *oil production*—as opposed to other forms of economic output—cause such strong grievances? Furthermore, what prevents the government from *strategically reducing* redistribution to alleviate tensions and facilitate peaceful bargaining?

This paper addresses these questions by presenting a novel formal model to explain the separatist conflict resource curse. The model in the second section features an interaction between a government and a minority group in an infinite horizon game. The game features shifts across periods in the group’s probability of winning a separatist war as well as limited ability for the government to commit to bargaining offers in future periods. In each period, the government sets a tax rate on the group’s taxable economic output and the group decides how much labor effort to allocate between producing a taxable and nontaxable good. These choices determine the government’s revenues in the period. Next, the government makes a patronage offer. The group either accepts the offer or fights to create a separate state—which, if successful, prevents the government from taxing the group’s economic production in future periods. The third section solves the equilibria of the model.

Two key attributes of oil production explain higher separatist civil war propensity. First, the fourth section explains why local oil production enables government territorial encroachment, which creates grievances. Empirically, oil production requires minimal local participation because of the high capital costs and frequent need for assistance from international corporations to produce oil, which implies higher tax rates do not strongly decrease output of the taxable good. This key feature of oil production enables governments to levy high tax rates on oil-rich regions—i.e., encroach upon their territory—without high labor substitution adversely affecting its revenue intake, which increases the interior optimal tax rate. The territorial encroachment effect decreases the government’s ability to buy off the group, thereby increasing incentives for the minority group to fight to secede.

Local oil production *enables* territorial encroachment but does not imply the government will necessarily *choose* a high tax rate. The government faces a tradeoff when interacting with an oil-rich group: the government can prevent fighting by lowering the tax rate and strategically alleviating the group’s grievances, or the government can choose a higher tax rate to collect a larger percentage of the group’s taxable economic output—albeit at the cost of triggering a separatist civil war. The fifth section focuses on a second key attribute of oil production to explain how the government solves this tradeoff. Although *ceteris paribus* the government does not *want* separatist wars to happen—because fighting destroys surplus—the government’s lost consumption from costly fighting is lower than the opportunity costs of reducing oil taxes if the minority group’s oil production is large relative to the government’s other revenue sources. This parameter range is particularly relevant for previously impoverished countries that have subsequently become oil-rich because of the key property that oil production tends to produce large revenue windfalls. Intriguingly, this implication of prize-induced fighting stems from the *government’s* strategic choices, rather than the group fighting because the prize is valuable. In a more general theoretical sense, this result also extends commitment problem models to address the relevant question for domestic politics of why governments may sometimes *forego* actions that would increase their commitment ability and prevent costly fighting.

The sixth section concludes the theoretical analysis by deriving differential implications for sepa-

ratist and center-seeking civil wars. It first shows these two core properties of oil production only trigger separatist wars when the government and oil-rich ethnic group share weak institutionalized ties, which highlights a crucial conditional effect. This implication also facilitates a comparison between separatist and center-seeking civil wars. Most important, the territorial encroachment mechanism should exert a stronger positive effect on separatist than center-seeking conflicts. Numerically small ethnic groups—which, empirically, are most likely to fight separatist civil wars—tend to experience weaker institutional ties with the center, whereas larger ethnic groups at higher risk for center-seeking wars tend to experience stronger ties. This implies the conditions under which local oil wealth raises separatist civil war propensity are not empirically relevant for center-seeking wars.

To empirically test this implication, I use spatial data from the Ethnic Power Relations database (Cederman et al. 2010) to match the location of ethnic groups with oil fields, and use various measures of institutional ties between each ethnic group and the center. The seventh section provides strong evidence that the conditional conflict resource curse holds for ethnic separatist civil wars but not for ethnic center-seeking civil wars, followed by the conclusion.

## 2.2 A Model of Taxation, Bargaining, and Separatist Civil Wars

A government ( $G$ ) and ethnic minority group ( $M$ ) engage in taxation and economic production, respectively, and bargain over the distribution of state revenues in an infinite time horizon. Future payoffs are discounted by a common rate of  $\delta \in (0, 1)$  and time is denoted by  $t \in \mathcal{Z}_+$ . There are two components of the per-period stage game. The first is the production and taxation phase, which unfolds as follows.  $G$  proposes a tax rate  $\tau_t \in [0, 1]$  to  $M$ . Next,  $M$  allocates its one unit of time between labor  $L_t \geq 0$  used to produce a taxable good, and “safe” economic activities  $s_t \geq 0$  to produce a nontaxable good, with  $L_t + s_t \leq 1$ . Taxable economic activity in  $M$ ’s territory equals  $\theta(L_t)Y^M$  and non-taxable output equals  $u(s_t)$ . The function  $\theta(\cdot)$  captures how labor effort affects production of the taxable good.  $\theta(\cdot)$  strictly increases in  $L_t$ ,  $\theta(L_t) \in [0, 1]$  for all  $L_t$ , and  $\theta(1) = 1$ . Therefore, when  $M$  devotes all its time to labor, taxable good output achieves its maximum of  $Y^M$ , whereas choosing  $L_t < 1$  yields taxable economic output  $\theta(L_t)Y^M < Y^M$ . Denote the percentage of potential output from  $M$ ’s territory that derives from oil as  $\omega \in [0, 1]$ . For the nontaxable good,  $u(\cdot)$  is also a strictly increasing function of  $s_t$ . Both  $\theta(\cdot)$  and  $u(\cdot)$  are weakly concave and twice differentiable.

These moves determine  $G$ ’s revenues in the period, which derive from two sources. The first is an exogenously determined constant per-period amount  $R^G$ , which captures  $G$ ’s revenues from other areas of the country. Second,  $M$ ’s economic production yields an additional  $\tau_t\theta(L_t)Y^M$  in revenues. Therefore, before the bargaining stage of the interaction in each period begins,  $G$  has access to total revenues  $\tau_t\theta(L_t)Y^M + R^G$  and  $M$  possesses  $(1 - \tau_t)\theta(L_t)Y^M + u(s_t)$  in assets.

The bargaining phase follows the taxation phase. Nature moves first, deciding whether  $M$  is strong (probability  $\sigma$ ) or weak (probability  $1 - \sigma$ ) in the period, terms that will be defined below. A degenerate move follows in which  $G$  gives  $\alpha \in [0, 1]$  percent of its revenues from  $M$ ’s territory back to  $M$ . The parameter  $\alpha$  captures the quality of institutionalized ties between  $G$  and  $M$ . For ethnic groups with a pre-colonial history of fighting against the group that controls the government, or

groups that belonged to different colony prior to independence,  $\alpha$  should be low. In contrast, if  $M$  is not an ethnic minority group but instead a co-ethnic to  $G$ , or if  $M$  and  $G$  belong to the same inter-ethnic political party,<sup>7</sup>  $\alpha$  should be high. This institutions parameter does not affect the analysis until the sixth section, which discusses the conditional conflict resource curse and different types of civil war.

Next,  $G$  makes a patronage offer to  $M$  of  $x_t \in [0, (1 - \alpha)\tau_t\theta(L_t)Y^M + R^G]$ , meaning the offer cannot be negative and cannot exceed  $G$ 's per-period budget.  $M$  either accepts the offer or fights to create its own state. If  $M$  accepts,  $M$  consumes the assets it produced earlier in the period plus the patronage offer,  $[1 - (1 - \alpha)\tau_t]\theta(L_t)Y^M + u(s_t) + x_t$ ;  $G$  consumes the remaining government revenues from that period,  $(1 - \alpha)\tau_t\theta(L_t)Y^M + R^G - x_t$ ; and the game moves to the next period.

If instead  $M$  fights, neither actor consumes in the period of the fight. Regardless of the outcome of the war,  $G$  consumes  $R^G$  in all future periods and the bargaining phase of the game becomes degenerate. If  $M$  successfully separates, the tax rate drops permanently to 0. Therefore,  $M$  achieves utility  $\theta(L_t)Y^M + u(s_t)$  in each period and  $G$  receives  $R^G$ . If  $M$  loses, it cannot fight in any future period and continues to be subject to  $G$ 's taxes. Therefore, in periods after an unsuccessful separatist attempt,  $M$ 's and  $G$ 's respective per-period utility amounts are  $[1 - (1 - \alpha)\tau_t]\theta(L_t)Y^M + u(s_t)$  and  $(1 - \alpha)\tau_t\theta(L_t)Y^M + R^G$ .<sup>8</sup>

$M$ 's probability of winning a separatist fight depends on the Nature move that occurs at the beginning of the bargaining phase of the stage game.  $M$  wins with probability  $p > 0$  when it is strong and probability 0 when it is weak. Therefore, following existing prominent formal theories of civil wars that feature stochastic shifts in the distribution of power (Fearon 2004; Powell 2012), the model assumes there are events  $M$  does not control that affect  $M$ 's probability of winning. One plausible microfoundation for this assumption is 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), in particular when the government is temporarily weak. As an example, the fall of the Iranian shah in 1979 created perceptions of temporary regime weakness by oil-rich Arab and Kurd minorities in Iran and facilitated separatist attempts (Ward 2009, 230-3). 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). As another example, Angola's long-running major center-seeking civil war resumed after the opposition party UNITA rejected election

<sup>7</sup>Magaloni (2008) and Svobik (2012) discuss how authoritarian parties can improve commitment ability.

<sup>8</sup>Notably,  $M$  is assumed to continue to receive  $\alpha$  percent of its taxed production even after losing a separatist war. This assumption, which simplifies notation but does not qualitatively alter any of the main results, can be defended in several different ways. First, if  $\alpha$  represents the overall quality of state institutions (rather than capturing specifics of the interaction between the government and the particular ethnic group  $M$ ), a war would not necessarily alter this parameter. Second, if  $\alpha$  is based on long-term historical interactions between  $G$  and  $M$ , one war will not necessarily alter  $\alpha$ . Third, if  $\alpha$  instead captures more short-term factors such as whether  $M$  is included or excluded from the ruling coalition,  $G$  may optimally choose to co-opt  $M$  to terminate the war—implying continued payments afterwards for  $M$ .

Additionally, assuming bargaining ceases after a fight is without loss of generality and simply reduces notation. After a successful separatist war, under the implicit assumption  $M$  cannot to fight to capture  $G$ 's resources, there are no incentives to fight and therefore no incentives for  $G$  to make a patronage offer (and under the substantive interpretation that  $M$  now belongs to its own state, it would be strange to conceptualize  $M$  bargaining with  $G$  over patronage). After an unsuccessful separatist war,  $G$  would never optimally choose a positive patronage offer because  $M$  cannot fight.



results in 1992. The rebel group FLEC-FAC escalated its low-intensity separatist fight over the oil-rich Cabinda province 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 to gain concessions from the government.

The solution concept is Markov Perfect Equilibrium (MPE), which requires every player to choose optimal actions by conditioning only on the current state of the world and on prior actions in the current period. There are two state variables.  $F_t \in \{n, m, g\}$  captures whether no fight ( $n$ ) has occurred in the history of the game, whether a fight occurred that  $M$  won ( $m$ ), or whether a fight occurred that  $G$  won ( $g$ ).  $\Sigma_t \in \{s, w\}$  captures whether  $M$  is strong ( $s$ ) or weak ( $w$ ) in the current period. Because the production and taxation choices occur before  $M$ ’s strength in the period is revealed, only  $F_t$  affects  $\tau_t$ ,  $L_t$ , and  $s_t$ . By the Markov assumption, we need to specify one choice of each of these three variables for each of the three elements of  $F_t$ . By assumption (because  $G$  cannot tax  $M$  following a successful separatist attempt),  $\tau_m^* = 0$ . The other equilibrium amounts are denoted as  $\{\tau_n^*, L_n^*, s_n^*, L_m^*, s_m^*, \tau_g^*, L_g^*, s_g^*\}$ . Furthermore, the setup assumes the bargaining phase of the stage game is degenerate in any period with  $F_t = \{m, g\}$ . If  $F_t = n$ ,  $G$  will use one patronage offer function in every period  $M$  is strong,  $x_s^*(\tau_t, L_t, s_t)$ , and another in every weak period,  $x_w^*(\tau_t, L_t, s_t)$ . Similarly if  $F_t = n$ ,  $M$  will use one acceptance/rejection rule in every strong period (accept if  $x_t \geq \underline{x}_s(\tau_t, L_t, s_t)$ ; reject otherwise) and another in every weak period (accept if  $x_t \geq \underline{x}_w(\tau_t, L_t, s_t)$ ; reject otherwise).

In sum, the sequence of moves within each period unfold as follows: If no fight has occurred in the past, (1)  $G$  offers a tax rate, (2)  $M$  allocates between labor effort to produce a taxable good and safe effort to produce a nontaxable good, (3) Nature decides whether  $M$  is strong or weak in the period, (4)  $G$  makes a patronage offer to  $M$ , and (5)  $M$  either accepts the patronage offer or fights to create its own state. If a fight has occurred in the past that  $M$  won, only move 2 occurs in each period. If a fight has occurred in the past that  $M$  lost, only moves 1 and 2 occur.

## 2.3 Equilibrium Analysis

I solve backwards on the stage game to present the equilibria of the game. First, I characterize  $M$ ’s optimal patronage acceptance/fighting rule and  $G$ ’s optimal patronage offer as a function of  $\Sigma_t$  and of the choices earlier in the period. Second, I solve for  $M$ ’s optimal labor allocation as a function of the tax rate. Lemma 1 uses these two steps to characterize how the tax rate affects prospects for fighting in a strong period. Finally, I analyze  $G$ ’s optimal tax rate by discussing the two main tradeoffs involved with setting higher tax rates (Lemmas 2 and 3). Proposition 1 uses these steps to state the equilibria.

### 2.3.1 Bargaining Phase

Analyzing the bargaining phase yields  $G$ ’s optimal patronage offer and  $M$ ’s optimal accept/reject rule as a function of the vector of choices  $(\tau_t, L_t, l_t)$  made earlier in the period. The bargaining phase only occurs if no fight has occurred in the past, implying  $F_t = n$ . If  $M$  is weak in the current period,  $M$  will not receive a positive patronage offer regardless of previous actions in the period. Because  $M$  cannot coerce  $G$ , the government faces no incentives to choose  $x_w^* > 0$ .

$G$  may, however, make a positive patronage offer in a strong period. To reduce notation, I will denote  $x_s^*$  as  $x^*$ . It is optimal for  $G$  to choose the patronage offer that makes  $M$  indifferent between accepting and fighting, which requires calculating the expected utility for both of  $M$ 's actions. If  $G$  offers  $x_t$  and  $M$  accepts, then  $M$  will retain  $1 - (1 - \alpha)\tau_t$  percent of the labor good produced in the current period, which is valued at  $\theta(L_t)Y^M$ ; consume utility  $u(s_t)$  from the safe good; plus  $x_t$  in patronage. These terms sum to  $[1 - (1 - \alpha)\tau_t]\theta(L_t)Y^M + u(s_t) + x_t$ . Furthermore, the future continuation value for  $M$  from accepting is  $V_n^M = \frac{\delta}{1-\delta} \{ [1 - (1 - \alpha)\tau_n^*]\theta(L_n^*)Y^M + u(s_n^*) + \sigma x^* \}$ . We get this term because in equilibrium the labor/safe allocation in all future periods will be  $(L_n^*, s_n^*)$ , yielding utility of  $[1 - (1 - \alpha)\tau_n^*]\theta(L_n^*)Y^M + u(s_n^*)$ , and in  $\sigma$  percentage of periods  $M$  will additionally receive a patronage offer  $x^*$ . If instead  $M$  fights,  $M$  does not consume in the current period and its future consumption depends on whether the secession attempt succeeds or not:  $\frac{\delta}{1-\delta} \{ p[\theta(L_m^*)Y^M + u(s_m^*)] + (1-p)[(1 - (1 - \alpha)\tau_g^*)\theta(L_g^*)Y^M + u(s_g^*)] \}$ . Setting these expected utility terms equal to each other yields  $G$ 's interior optimal current-period offer as a function of  $(\tau_t, L_t, s_t)$ :

$$\begin{aligned} x^*(\tau_t, L_t, s_t) = & \frac{\delta}{1-\delta} \{ p[\theta(L_m^*)Y^M + u(s_m^*)] + (1-p)[(1 - (1 - \alpha)\tau_g^*)\theta(L_g^*)Y^M + u(s_g^*)] \} \\ & - \{ [1 - (1 - \alpha)\tau_t]\theta(L_t)Y^M + u(s_t) \} \\ & - \frac{\delta}{1-\delta} \{ [1 - (1 - \alpha)\tau_n^*]\theta(L_n^*)Y^M + u(s_n^*) + \sigma x_n^* \}. \end{aligned} \quad (1)$$

### 2.3.2 Labor Allocation

Anticipating how choices earlier in the stage game will affect the patronage offer shapes the equilibrium labor/safe allocation.  $M$ 's labor and safe good efforts determines the amount produced of both goods. Furthermore, if the equilibrium is peaceful, there is a  $\sigma$  percent chance Nature will make  $M$  strong in the current period, in which case  $M$  will consume an additional amount  $x^*(\tau_t, L_t, s_t)$  (see Equation 1). Therefore, the optimal labor and safe choice satisfies:

$$\begin{aligned} (L^*(\tau_t), s^*(\tau_t)) \in & \arg \max_{L_t, s_t} [1 - (1 - \alpha)\tau_t]\theta(L_t)Y^M + u(s_t) + \sigma x^*(\tau_t, L_t, s_t) + \delta V_n^M \\ \text{s.t. } & L_t + s_t \leq 1, \end{aligned}$$

where  $V_n^M$  is the future continuation value for  $M$  with  $F_z = n$  in future periods  $z$ . In equilibrium, the constraint  $L_t + s_t \leq 1$  binds because  $M$ 's consumption strictly increases in both inputs. The optimal labor choice as a function of the current-period tax rate is implicitly defined by the first-order condition:

$$[1 - (1 - \alpha)\tau_t]\theta_L(L^*(\tau_t))Y^M - u_L(1 - L^*(\tau_t)) = 0. \quad (2)$$

Combining Equation 2 and the equation  $s^*(\tau_t) = 1 - L^*(\tau_t)$  yields the equilibrium labor and safe good allocations in each state of the world. In periods for which no fight has occurred in the past and  $G$  chooses the equilibrium tax rate  $\tau_n^*$ , Equation 2 characterizes  $L_n^*$ . It therefore also yields  $s_n^* = 1 - L_n^*$ . If  $G$  has successfully seceded, by assumption  $\tau_t = 0$ . Therefore, setting  $\tau_t = 0$  in Equation 2 and defining  $L_m^* = L^*(0)$  engenders  $G$ 's allocation  $(L_m^*, s_m^*)$  following a victorious

separatist campaign. Finally, setting  $\tau_t = \tau_g^*$  in Equation 2 and defining  $L_g^* = L^*(\tau_g^*)$  produces  $G$ 's allocation  $(L_g^*, s_g^*)$  following a failed separatist war.

### 2.3.3 Prospects for Fighting as a Function of the Tax Rate

$G$  will be able to buy off  $M$  in a strong period when total per-period revenues are at least as large as the required patronage offer:  $x^*(\tau_n^*, L_n^*, s_n^*) \leq (1 - \alpha)\tau_n^*\theta(L_n^*)Y^M + R^G$ . Furthermore, when possible,  $G$  will always make a high enough patronage offer that  $M$  will accept. Because  $G$  makes all the offers, it pockets the surplus saved by not fighting.

We can solve for  $x^*$  by substituting  $(\tau_t, L_t, s_t) = (\tau_n^*, L_n^*, s_n^*)$  into Equation 1. Then, substituting  $x^*(\tau_n^*, L_n^*, s_n^*)$  into  $G$ 's budget constraint produces the inequality needed for fighting not to occur:

$$[1 + \delta(1 - \sigma)(1 - \alpha)\tau_n^*\theta(L_n^*)Y^M + [1 - \delta(1 - \sigma)]R^G + u(1 - L_n^*) - \delta\{p[\theta(L_m^*)Y^M + u(1 - L_m^*)] + (1 - p)[(1 - (1 - \alpha)\tau_g^*)\theta(L_g^*)Y^M + u(1 - L_g^*)]\} \geq 0 \quad (3)$$

Although fighting is costly because it eliminates consumption in the period of a fight, bargaining breakdowns will occur when  $M$  is only rarely strong and  $G$ 's commitment ability is low. In this model,  $\sigma$  captures shifts in the distribution of power and  $\alpha$  and  $\tau_n^*$  determine  $G$ 's ability to commit to higher consumption for  $M$ . Even though  $G$  chooses the same tax rate and  $M$  chooses the same labor effort in every period,  $M$ 's consumption fluctuates across periods because it will only receive a patronage offer in strong periods. Smaller  $\sigma$  therefore implies a lower expected stream of future payments in the status quo regime—which increases incentives to launch a separatist war in a rare period  $M$  is strong.<sup>9</sup> However, even when  $\sigma$  is low,  $M$  faces few incentives to secede if  $G$  can commit to not expropriate  $M$ . The benefit of fighting is that  $M$  consumes all the economic production in its territory if it wins. But if either  $\alpha$  is high or  $\tau_n^*$  is low,  $M$  already consumes a high percentage of its economic production even in periods it does not receive a patronage offer. In fact, if either  $\alpha = 1$  or  $\tau_n^* = 0$ , then  $M$  achieves the same utility in the status quo regime as it would if it successfully seceded—implying  $G$  faces no incentives to sacrifice current-period consumption.

Because  $G$  chooses the tax rate, it is useful to summarize this intuition by showing how  $\tau_n^*$  affects incentives to fight for different values of the parameters  $\alpha$  and  $\sigma$ .

**Lemma 1.** If either  $\alpha$  or  $\sigma$  is sufficiently high, fighting will not occur regardless of  $G$ 's tax rate. If both  $\alpha$  and  $\sigma$  are low enough, fighting will occur if  $G$ 's tax rate is sufficiently high, but not if it is low. Formally, there exists a threshold  $\hat{\alpha}(\sigma)$  such that if  $\alpha > \hat{\alpha}(\sigma)$ , then  $x^*(\tau_n^*) < (1 - \alpha)\tau_n^*\theta(L_n^*)Y^M + R^G$  regardless of  $\tau_n^*$ . If  $\alpha < \hat{\alpha}(\sigma)$ ,  $x^*(\tau_n^*) \leq (1 - \alpha)\tau_n^*\theta(L_n^*)Y^M + R^G$  if  $\tau_n^* \leq \underline{\tau}$  and  $x^* > (1 - \alpha)\tau_n^*\theta(L_n^*)Y^M + R^G$  if  $\tau_n^* > \underline{\tau}$ . Setting the left-hand side of Equation 3 equal to 0 implicitly defines  $\underline{\tau}$ .

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<sup>9</sup>Powell (2004) discusses these incentives in a more general setup.

### 2.3.4 Tax Rate

$G$  faces two tradeoffs when setting its tax rate. First, on the one hand,  $G$  benefits from a higher tax rate because it increases  $G$ 's share of  $M$ 's labor good. On the other hand, as formalized in Lemma 2, higher tax rates cause  $M$  to substitute effort away from taxable labor. Higher tax rates decrease  $M$ 's takeaway from taxable good production and therefore decrease the utility of labor relative to safe effort for the nontaxable good.

**Lemma 2.**  $M$  chooses less labor in response to a higher tax rate. Formally,  $L_\tau^* < 0$ .

Taking this tradeoff into account,  $G$ 's optimal *interior* tax rate in a peaceful equilibrium,  $\tilde{\tau}_n^*$ , solves:

$$\tilde{\tau}_n^* \in \arg \max_{\tau_t \in [0,1]} (1-\alpha)\tau_t \theta(L^*(\tau_t))Y^M + Y^G - \sigma x^*(\tau_t, L^*(\tau_t), l^*(\tau_t)) + \delta V^G,$$

where  $V^G$  is the future continuation value for the government. The first order condition implicitly characterizes  $\tilde{\tau}_n^*$ :

$$[\sigma + (1-\sigma)(1-\alpha)\tilde{\tau}_n^*]\theta_L(L^*(\tilde{\tau}_n^*))Y^M \cdot L_\tau^* + (1-\sigma)(1-\alpha)\theta(L^*(\tilde{\tau}_n^*))Y^M - \sigma u_L(1-L^*(\tilde{\tau}_n^*))L_\tau^* = 0. \quad (4)$$

$G$ 's second tradeoff is relevant when  $\tilde{\tau}_n^* > \underline{\tau}$ , which Lemma 1 introduced as the threshold level of taxation such that fighting will occur in the first period  $M$  is strong if the equilibrium tax rate exceeds  $\underline{\tau}$ . On the one hand, choosing  $\tau_t \leq \underline{\tau}$  is advantageous because it prevents fighting. On the other hand, choosing a higher tax rate allows  $G$  to capture a higher percentage of  $M$ 's economic output in every period before the fight, and  $G$  can continue to levy a high tax rate afterwards if the separatist attempt fails.

In equilibrium,  $G$  will only ever choose either the tax rate that maximizes its lifetime utility in a peaceful path of play or the tax rate that maximizes utility in a conflictual path of play, as characterized in Lemma 3.

**Lemma 3.** In the optimal peaceful path of play for  $G$ ,  $G$  sets the highest possible tax rate that enables  $G$  to make a high enough patronage offer to buy off strong  $M$ . In the optimal conflictual path of play for  $G$ ,  $G$  sets the tax rate to maximize expected per-period revenues. Formally, when  $F_t = n$ , in the optimal peaceful path of play  $G$  sets  $\tau_t = \underline{\tau}$  and in the optimal conflictual path of play  $G$  sets  $\tau_t = \bar{\tau}$  (for  $\bar{\tau}$  defined below).

To explain Lemma 3, if  $G$  chooses  $\tau_t$  to induce peaceful play,  $G$  will choose the lowest possible tax rate that allows it to buy off  $M$  in a strong period—implying  $G$  transfers all its revenues to  $M$  in every strong period.  $G$ 's utility is higher when  $\tau_t = \underline{\tau}$  compared to any  $\tau_t < \underline{\tau}$ , which would also induce peace along the equilibrium path, because  $G$  collects taxes from  $M$  in every period but only makes a patronage payment in  $\sigma$  percentage of periods. Even considering the higher patronage payments necessitated by lower  $\tau_t$ ,  $G$ 's utility strictly decreases in  $\tau_t$  for all  $\tau_t < \underline{\tau}$ .

In the optimal path of play for  $G$  that features fighting,  $G$  faces similar incentives as the ones that define  $\tilde{\tau}_n^*$ —which, as an interior solution, does not incorporate a no-fighting constraint. The main

difference is that  $G$  will not make patronage offers if fighting occurs along the equilibrium path. When  $\tilde{\tau}_n^* > \underline{\tau}$ , setting  $\sigma = 0$  in Equation 4 provides the optimal tax rate in a conflictual path of play, denoted by  $\bar{\tau}$ . Additionally, because  $G$  faces identical incentives in any history featuring a failed separatist fight by  $M$ —because  $M$  cannot fight again—this consideration also yields  $\tau_g^* = \bar{\tau}$ .

Table 1 compares  $G$ 's utility in the optimal peaceful and optimal conflictual paths of play. In all periods before the first strong period,  $G$  consumes  $(1 - \alpha)\tau_t$  percent of  $M$ 's production plus  $R^G$ . Because  $\bar{\tau}$  uniquely maximizes  $G$ 's revenues,  $G$ 's consumption will be strictly higher in every period before the first strong period in a conflictual path of play.  $G$  achieves the same utility in the first strong period in both sequence of play. In the peaceful sequence  $G$  offers its entire budget to  $M$  to prevent fighting, whereas in the conflictual path of play  $M$  will launch a separatist war in the first strong period—implying no consumption by either player. Finally, in the peaceful path of play,  $G$ 's per-period utility after the first strong period is a weighted average of its per-period consumption before the first strong period and in the first strong period. In  $1 - \sigma$  periods  $G$  will not make a patronage offer and consumes its entire budget, whereas in  $\sigma$  percentage of periods it will consume 0. In the conflictual equilibrium, with probability  $1 - p$ ,  $G$  wins the separatist war and can continue to tax  $M$ ; with probability  $p$ ,  $M$  successfully separates and  $G$  cannot tax  $M$  anymore; and  $G$  continues to consume  $R^G$  in all periods regardless of the outcome of the war.

**Table 1. Comparing  $G$ 's Consumption in the Optimal Peaceful and Conflictual Paths of Play**

History/Period	Per-Period Expected Consumption in Peaceful Eq.	Per-Period Expected Consumption in Conflictual Eq.
Before first strong period	$(1 - \alpha)\underline{\tau}\theta(L^*(\underline{\tau}))Y^M + R^G$	$(1 - \alpha)\bar{\tau}\theta(L^*(\bar{\tau}))Y^M + R^G$
First strong period	0	0
After first strong period	$(1 - \sigma)[(1 - \alpha)\underline{\tau}\theta(L^*(\underline{\tau}))Y^M + R^G]$	$(1 - p)(1 - \alpha)\bar{\tau}\theta(L^*(\bar{\tau}))Y^M + R^G$

Discounting payoffs based on the expected time until each history in Table 1 and rearranging yields:

$$\begin{aligned}
& E[U_G(\text{peace} \mid \tau^* = \underline{\tau})] - E[U_G(\text{conflict} \mid \tau^* = \bar{\tau})] = \\
& \frac{\sigma\delta(1 - \alpha)Y^M[(1 - \sigma)\underline{\tau}\theta(L^*(\underline{\tau})) - (1 - p)\bar{\tau}\theta(L^*(\bar{\tau}))] - \delta\sigma^2 R^G}{1 - \delta(1 - \sigma)} \\
& - \frac{(1 - \delta)(1 - \sigma)(1 - \alpha)Y^M[\bar{\tau}\theta(L^*(\bar{\tau})) - \underline{\tau}\theta(L^*(\underline{\tau}))]}{1 - \delta(1 - \sigma)} \tag{5}
\end{aligned}$$

$G$  sets  $\tau_n^* = \underline{\tau}$  if  $E[U_G(\text{peace} \mid \tau^* = \underline{\tau})] > E[U_G(\text{conflict} \mid \tau^* = \bar{\tau})]$  and  $\tau_n^* = \bar{\tau}$  if  $E[U_G(\text{peace} \mid \tau^* = \underline{\tau})] < E[U_G(\text{conflict} \mid \tau^* = \bar{\tau})]$ . This discussion facilitates the equilibria of the game.<sup>10</sup>

<sup>10</sup>When fighting does not occur along the equilibrium path of play, the equilibrium is unique. When fighting occurs along the equilibrium path of play, there are an infinite number payoff-equivalent equilibria. Because  $M$  fights in response to any patronage offer in a strong period,  $G$  is indifferent among all possible patronage offers.

**Proposition 1.** *If the history does not include a fight in a previous period.  $G$  chooses  $\tau_t = \underline{\tau}$  if  $E[U_G(\text{peace} \mid \tau^* = \underline{\tau})] > E[U_G(\text{conflict} \mid \tau^* = \bar{\tau})]$  and  $\tau_t = \bar{\tau}$  if  $E[U_G(\text{peace} \mid \tau^* = \underline{\tau})] < E[U_G(\text{conflict} \mid \tau^* = \bar{\tau})]$ .  $M$  chooses  $(L_t, s_t)$  such that  $L_t$  solves Equation 2 and  $s_t = 1 - L_t$ . If  $M$  is weak in the period,  $M$  accepts any offer and  $G$  sets  $x_t = 0$ . If  $M$  is strong in the period,  $M$  accepts  $x_t \geq x^*(\tau_t, L_t, s_t)$ , for  $x^*(\tau_t, L_t, s_t)$  defined in Equation 1.  $G$  sets  $x_t = x^*(\tau_t, L_t, s_t)$  if  $\tau_t \leq \underline{\tau}$  and  $x_t \in [0, (1 - \alpha)\tau_t\theta(L_t)Y^M + R^G]$  if  $\tau_t > \underline{\tau}$ .*

*If the history includes a successful secession fight in a previous period.  $M$  chooses  $(L_t, s_t)$  such that  $L_t$  solves Equation 2 with  $\tau_t = 0$ , and  $s_t = 1 - L_t$ .*

*If the history includes a failed secession fight in a previous period.  $G$  chooses  $\tau_t = \bar{\tau}$ .  $M$  chooses  $(L_t, s_t)$  such that  $L_t$  solves Equation 2 and  $s_t = 1 - L_t$ .*

## 2.4 Local Oil Wealth, Territorial Encroachment, and Incentives to Secede

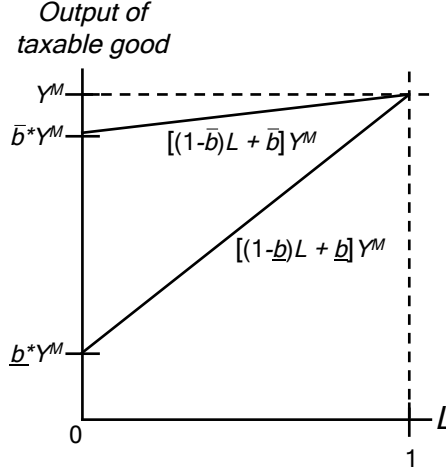
This section explains why local oil production enables government territorial encroachment, which creates grievances. Empirically, oil production requires minimal local participation because of the high capital costs and frequent need for assistance from international corporations to produce oil, which implies higher tax rates do not strongly decrease output of the taxable good. This key feature of oil production enables governments to levy high tax rates on oil-rich regions—i.e., encroach upon their territory—without high labor substitution adversely affecting its revenue intake, which increases the interior optimal tax rate. The territorial encroachment effect increases incentives for the minority group to fight to secede by decreasing the government’s ability to buy off the group.

Assumption 1 captures this key property of oil production.

**Assumption 1.** The elasticity of taxable good production with respect to labor decreases in the percentage of  $M$ ’s economic activity that derives from oil production,  $\omega$ . Formally,  $\frac{d^2\theta}{dLd\omega} < 0$ .

Figure 1 illustrates Assumption 1 using the functional form  $\theta(L) = (1 - b)L + b$ . For both  $\underline{b}$  and  $\bar{b} > \underline{b}$ , more labor increases total taxable output  $[(1 - b)L + b]Y^M$ . However, the slope of the function is higher when  $b = \underline{b}$ . Assumption 1 implies higher  $\omega$  increases the parameter  $b$  in this function. When  $b = \bar{b}$ , corresponding with oil as the territory’s primary economic activity,  $\theta(L)$  will be close to 1 regardless of labor supplied—implying  $M$ ’s labor choice only minimally impacts output of the taxable good.

Figure 1. How Oil Affects the Elasticity of Taxable Good Output



Assumption 1 receives strong substantive support. Oil production requires large capital investments (Gause 1994, 42). 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. Similarly, Alnaswari (1994, 1) states, “Foreign capital and technology had to be called upon to develop oil resources since capital requirements for developing, producing, transporting, refining, and finally marketing oil products were well beyond the capabilities of [developing] countries.” Furthermore, because lower-level oil company employees need only minimal knowledge of local circumstances, it is easy for the government to import labor. Consequently, local (i.e.,  $M$ ’s) labor effort minimally affects oil production. Using the functional form from Figure 1,  $b$  is low. In more general terms from the model,  $\frac{d\theta}{dL}$  is small in magnitude.<sup>11</sup>

Low elasticity with respect to labor input distinguishes oil production from economic activities such as agricultural production or service provision. Especially in less developed economies, these activities rely heavily on local labor input. When bargaining over agricultural revenues, a government risks killing the goose that lays the golden egg if it sets a high tax rate because high taxes strongly decrease labor effort for and therefore production of the taxable good. As one 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 shift from producing cash crops to producing subsistence crops, or to smuggle cash crops across international borders, rather than to sell cash crops their government (Bates 1983, 85-6)—i.e., substituting nontaxable for taxable economic activity.

Another, more subtle, aspect of Assumption 1 states that oil production should be conceived as the taxable rather than nontaxable good in the model. Supporting this assumption, the large capital costs and high level of technical knowledge needed to extract oil also distinguish it from other natural

<sup>11</sup>In the empirical context of oil production, if  $M$  anticipates conflictual relations with  $G$  it can also attempt to steal government-produced oil or to bomb pipelines. I focus on the labor/safe good tradeoff to compare oil with other types of economic activity. Furthermore, regarding looting and bombing, Paine (2015a, 7-9) discusses how these options have only greatly disrupted  $G$ ’s oil revenues in extreme empirical cases.

resources such as alluvial diamonds and drugs. Implicit in the distinction between the taxable good and the nontaxable good in the model,  $G$  can perfectly enforce tax rates on the taxable good whereas  $G$  cannot enforce any taxes on the nontaxable good. Because governments can relatively easily monitor production and enforce military control over oil fields, taxing oil production requires minimal bureaucratic capacity (Dunning 2008, 40). In contrast, it is much easier to hide many other types of natural resources. This implies oil is a “less loatable resource” (Humphreys 2005, 523) and oil revenues are “easily controlled by the central government” (Colgan 2013, 4).

Recall from Lemma 2 that the constraint limiting the interior optimal tax rate is that higher taxes cause  $M$  to substitute effort away from taxable good production. Lemma 4 shows that because higher  $\omega$  weakens this constraint, the interior optimal tax rate increases. Therefore, oil production in  $M$ ’s territory enables  $G$  to encroach upon  $M$ ’s economic production.

**Lemma 4.** The interior optimal tax rate increases in the percentage of  $M$ ’s economic activity that derives from oil production, i.e., oil wealth enables government territorial encroachment. Formally,  $\frac{d\tilde{\tau}_n^*}{d\omega} > 0$ .

Assuming the government chooses the interior optimal tax rate—an assumption the next section relaxes— $M$ ’s oil wealth exerts a positive overall effect on separatist civil war propensity because of the territorial encroachment effect. Equation 6 shows how the percentage of  $M$ ’s wealth that derives from oil production affects  $G$ ’s ability to make a high enough patronage offer in a period  $M$  is strong (see Equation 3) and highlights the three main effects of oil.

$$\begin{aligned} & \frac{d}{d\omega} \left\{ E \left[ U_M(\text{consumption from the taxable good} \mid \tilde{\tau}_n^*(\omega), \omega) \right] \right\} - \\ & \frac{d}{d\omega} \left\{ \delta p \cdot E[U_M(\text{fight} \mid \text{win}, \omega)] + \delta(1-p) \cdot E[U_M(\text{fight} \mid \text{lose}, \omega)] \right\}. \end{aligned} \quad (2.1)$$

First, a larger prize increases incentives to fight by raising the value of winning, as shown in the bottom line of Equation 6. The oil prize does not cause fighting in this model, however, because oil also increases  $G$ ’s revenues by raising  $Y^M$ . Therefore, for a constant tax rate, more oil also improves  $G$ ’s ability to make attractive patronage offers to  $M$ . The direct effect of oil in the top line of Equation 6 captures this effect by increasing the amount  $M$  consumes from the taxable good in the status quo regime. Oil exerts an ambiguous overall effect on the probability of fighting when only considering these two effects.<sup>12</sup>

The third effect of oil in the model is decisive: territorial encroachment. A higher tax rate implies  $G$  takes a higher percentage of  $M$ ’s output in every period, whereas  $M$  will only receive a patronage offer in periods it is strong. Combining all three mechanisms, if the territorial encroachment mechanism is strong enough, local oil wealth increases the expected utility of secession more than the expected utility of the status quo regime because the territorial encroachment effect partially offsets the revenue-enhancing effects. Proposition 2 summarizes this implication.

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<sup>12</sup>Paine (2015a, 29-30) presents a special case of his model with exogenous oil production in which the revenue-enhancing and prize effects perfectly offset each other. Generically, this will not happen in the current model because endogenous taxation and labor decisions cause the amount produced to differ depending on whether the subgame contains a separatist war in its history.



**Proposition 2.** Assuming  $G$  chooses the interior optimal tax rate,  $G$ 's ability to buy off  $M$  decreases in the percentage of  $M$ 's economic activity that derives from oil production. Formally, subtracting the equilibrium patronage offer in a strong period from  $G$ 's equilibrium level of revenues, and deriving with respect to  $\omega$ , yields a negative term:

$$\frac{d}{d\omega} \left[ (1 - \alpha) \cdot \tilde{\tau}_n^*(\omega) \cdot \theta(L^*(\tilde{\tau}_n^*(\omega), \omega)) Y^M + R^G - x(\tilde{\tau}_n^*(\omega), \omega) \right] < 0.$$

## 2.5 Why the Government Chooses Not to Alleviate Grievances

Local oil production *enables* territorial encroachment but does not imply the government will necessarily *choose* a high tax rate. The government faces a tradeoff when interacting with an oil-rich group: the government can prevent fighting by lowering the tax rate and strategically alleviating the group's grievances, or the government can choose a higher tax rate to collect a larger percentage of the group's taxable economic output—albeit at the cost of triggering a separatist civil war. This section focuses on a second key attribute of oil production to explain how the government solves this tradeoff. Although *ceteris paribus* the government does not *want* separatist wars to happen—because fighting destroys surplus—the government's lost consumption from costly fighting is lower than the opportunity costs of reducing oil taxes if the minority group's oil production is large relative to the government's other revenue sources. This parameter range is particularly relevant for previously impoverished countries that have subsequently become oil-rich because of the key property that oil production tends to produce large revenue windfalls. Intriguingly, this implication of prize-induced fighting stems from the *government's* strategic choices, rather than the group fighting because the prize is valuable. In a more general theoretical sense, this result also extends commitment problem models to address the relevant question for domestic politics of why governments may sometimes *forego* actions that would increase their commitment ability and prevent costly fighting.

$Y^M$  is often large relative to  $R^G$  when major oil fields are discovered in previously impoverished countries. Ross (2012, 27-33) lists the “exceptionally large size” of oil revenues as a central characteristic of oil production and provides supporting cross-national evidence. Oil revenues are also large even compared to rents from other natural resources. In Haber and Menaldo's (2011) dataset on oil, natural gas, coal, and metals income for a global sample of countries, oil and natural gas composed 90% of all global resource income from 1960 to 2006. Furthermore, in 76% of country-years with more than \$500 in resource income per capita in this global sample, at least half the income came from oil and gas. According to Colgan (2013, 12), “The global trade of oil generates revenues that are somewhere between ten and a hundred times larger than the next largest natural resource.”<sup>13</sup>

The reason larger economic production in  $M$ 's territory increases  $G$ 's desire to choose  $\tau^* = \bar{\tau}$  over  $\tau^* = \underline{\tau}$  is that a larger  $\frac{Y^M}{R^G}$  ratio raises the opportunity cost of lowering the tax rate on  $M$ 's economic production while decreases the relative costs of fighting. When  $Y^M$  is large,  $G$  loses more consumption for every percentage it lowers the tax rate. Additionally, the costs of fighting are relatively low when  $Y^M$  is large relative to  $R^G$  because  $R^G$ —which gets destroyed along with all other economic activity in the period of the fight—has less of an effect on enabling  $G$  to buy

<sup>13</sup>Chapter 1 provides additional evidence for this argument.

off  $M$ . Therefore, the higher is  $Y^M$  relative to  $R^G$ , the lower is  $\underline{\tau}$ , creating a greater disparity in  $G$ 's percentage takeaway from  $M$ 's production when  $\tau_t = \bar{\tau}$  as opposed to  $\tau_t = \underline{\tau}$ . When  $Y^M$  is high,  $G$  will not take actions that decrease its takeaway from  $M$ 's economic production—even if the consequence is grievances that cause fighting.

**Proposition 3.** When  $\tilde{\tau}_n^* > \underline{\tau}$ , higher  $\omega$  increases the likelihood  $G$  chooses  $\tau_t = \bar{\tau}$  over  $\tau_t = \underline{\tau}$  in every period  $t$ . Formally,

$$\frac{d}{d\omega} \left\{ E[U_G(\text{peace} \mid \tau^* = \underline{\tau})] - E[U_G(\text{conflict} \mid \tau^* = \bar{\tau})] \right\} < 0.$$

Propositions 2 and 3 provide similar implications as existing theories but rest on very different microfoundations. Much existing work argues large oil rents cause separatist civil wars in part by increasing the prize of secession for the groups located in oil-rich territory (Collier and Hoeffler 2005; Le Billon 2005; Sorens 2011, 574-5; Ross 2012, 149-50; Condra 2013, 6-10; Morelli and Rohner 2014, 3). Many of these theories assert local oil wealth triggers separatist civil wars because incumbents face insurmountable incentives to redistribute a region's oil wealth to its core political constituency, which creates grievances among residents of the oil-rich region (Sorens 2011, 574-5; Ross 2012, 149-50; Condra 2013, 6-10).<sup>14</sup> In particular, these authors assume the government cannot simultaneously satisfy greedy oil-poor political insiders and equity-motivated oil-rich political outsiders.

The central concern with these arguments, however, is that they do not specify *how* a large prize creates these redistribution incentives. If a group has a weak bargaining position, why would a government only redistribute away from that region if it produced a *valuable* commodity? Why would it not also redistribute less lucrative revenue sources? These concerns persist even if a third actor (a political insider) is explicitly modeled. Why would a larger prize encourage political insiders to pressure the government to demand a larger *percentage* of the prize, hence leaving oil-rich outsiders relatively worse off relative to the size of their economic production? Why does the costliness of fighting not cause oil-poor insiders to lessen their demands?

The current model provides a simpler setup—that is, does not require modeling a third actor—that addresses these questions and shows how oil wealth can cause bargaining breakdown. The government is *able* to take a large percentage of an oil-rich minority group's economic production because of low output elasticity with respect to  $M$ 's labor input, *not* because  $M$ 's oil prize is large. Furthermore,  $G$  *chooses* to encroach upon  $M$ 's territory—rather than reduce the tax rate to strategically alleviate grievances—because of the opportunity costs of taking a lower cut of a larger prize.

Also important, existing conflict resource curse arguments *assume* oil wealth causes irreconcilable grievances without engaging why  $G$  is unwilling to take actions that would prevent costly fighting. In fact,  $G$ 's unwillingness to lower taxes may appear puzzling from the perspective of existing “commitment problem” theories (Fearon 1995; Powell 2004). The current model resembles many bargaining models of conflict by assuming  $M$ 's ability to coerce  $G$  varies over time and  $G$  cannot commit to make patronage offers independent of  $M$ 's probability of winning a fight in the current period. When war occurs along the equilibrium path in these models,  $G$  commitment inability

<sup>14</sup>Highlighting similarities in setup between these three theories and the present model, they all espouse language related to bargaining theory, despite not being formalized. Sorens (2011, 575) explicitly uses a commitment problem framework.

is frequently termed a commitment *problem*. The model here enables  $G$  to take an action that would solve this “problem,” i.e., to increase  $G$ ’s ability to let  $M$  retain a higher percentage of  $M$ ’s economic output. It explains why  $G$  chooses to forego this action—implying the costly fighting that results from a high tax rate is not “problematic” relative to the alternative choice of lowering tax rates over  $M$ ’s valuable oil prize.<sup>15</sup>

## 2.6 The Conditional Conflict Resource Curse and Different Types of Civil Wars

This section concludes the theoretical analysis by deriving differential implications for separatist and center-seeking civil wars. It first shows the two core properties of oil production discussed above only trigger separatist wars when the government and oil-rich ethnic group share weak institutionalized ties, which highlights a crucial conditional effect. This implication also facilitates a comparison between separatist and center-seeking civil wars. Most important, the territorial encroachment mechanism should exert a stronger positive effect on separatist than center-seeking conflicts. Numerically small ethnic groups—which, empirically, are most likely to fight separatist civil wars—tend to experience weaker institutional ties with the center, whereas larger ethnic groups at higher risk for center-seeking wars tend to experience stronger ties. This implies the conditions under which local oil wealth raises separatist civil war propensity are not empirically relevant for center-seeking wars.

### 2.6.1 The Conditional Resource Curse for Separatist Civil Wars

Lemma 1 anticipates the conditional effect of local oil wealth on raising separatist civil war propensity by showing that if the commitment parameter  $\alpha$  is sufficiently large,  $M$  will not fight regardless of the tax rate. This conditional result demonstrates how the model can be conceptualized to explain broader societal interactions than only between a government and ethnic minority group. For example, suppose all the country’s oil wealth is located in territory populated by the ethnic group that controls the government. This does not mean an oil-rich faction cannot threaten secession, but does imply the government’s co-ethnics would compose the faction. Consistent with assumptions from Condra’s (2013) analysis of oil and separatist civil wars, we should expect  $G$ ’s co-ethnics to have stronger institutionalized ties with the ruling faction—implying oil should not trigger secession. In fact, using Ethnic Power Relations (EPR) data, co-ethnics of the ruling ethnic group have never initiated a separatist civil war.<sup>16</sup> As another example of high  $\alpha$ , the high commitment ability of Western democratic governments should also undermine incentives for secession by their oil-rich regions.

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<sup>15</sup>This resembles parameter ranges in Acemoglu and Robinson’s (2006) model of political transitions in which elites engage in costly repression rather than expand the franchise to the masses to prevent violence.

<sup>16</sup>Although EPR only codes ethnic civil wars, the Denny and Walter (2014, 201) citation above shows nearly all separatist civil wars are ethnic conflicts.

## 2.6.2 Distinguishing Mechanisms for Separatist and Center-Seeking Civil Wars

The analysis thus far has followed the existing literature by *assuming* ethnic grievances are more relevant for explaining separatist civil wars, without closely engaging whether and why the effects should differ for center-seeking civil wars. Juxtaposing the present analysis with Chapter 1’s theoretical implications that more country-level oil wealth should decrease center-seeking civil war propensity uncovers heterogeneous effects. In that model,  $G$  endogenously uses its revenues to build military capacity and can therefore use oil revenues to—using the notation from the present model—increase its  $1 - p$  percent chance of winning a civil war. The key result is that the revenue-enhancing effects of oil dominate the prize effects in empirically relevant parameter values.

Table 2 facilitates a comparison between the separatist implications derived here and the center-seeking implications that Chapter 1 derives by summarizing the prize, revenue-enhancing, and territorial encroachment mechanisms for both types of civil wars. The sign of each effect points in the same direction for both civil war types: the prize and territorial encroachment mechanisms increase prospects for violence whereas the revenue-enhancing effects decrease civil war propensity. However, the magnitude of the expected effects differs.

**Table 2. Comparing Separatist and Center-Seeking Civil War Incentives for Oil-Rich Groups**

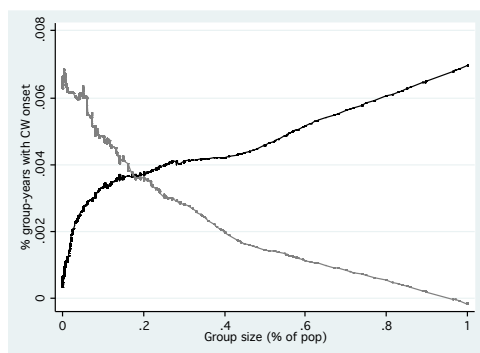
	<b>Separatist motives</b>	<b>Center-seeking motives</b>
<b>Prize</b>	Increases	Increases (less strongly)
<b>Revenue</b>	Decreases	Decreases (more strongly)
<b>Territorial encroachment</b>	Increases	Increases (less strongly)

First, if  $M$ ’s territory has high oil wealth per capita compared to other parts of the country, the prize effect increases separatist motives more strongly than center-seeking motives because secession eliminates the need for  $M$  to bargain with other parts of the country over its oil wealth. As an example, the separatist group GAM spread pamphlets proclaiming Aceh would be as rich as nearby country Brunei if Aceh gained independence from Indonesia (Ross 2005, 49).

Second, the revenue-enhancing effects of oil—particularly, the deterrence effects of investing oil revenues in government military capacity—should weaken incentives to attack the center by a greater amount than incentives to launch a separatist war. The farther away and the rougher the terrain in the group’s area, the more feasible guerrilla warfare against a stronger government becomes. The key idea here, drawing from Buhaug’s (2010) argument and evidence, is that the marginal effect of buying a tank on raising the government’s probability of winning is larger when the government defends the capital than when it fights in the periphery. Therefore, the revenue-enhancing mechanism Chapter 1 focuses on to explain why oil causes lower center-seeking civil war propensity will be less effective at counteracting the territorial encroachment mechanism when considering prospects for separatist civil wars.

Third, explaining the differential territorial encroachment effects requires scrutinizing baseline characteristics of ethnic groups—distinct from local oil wealth—that impacts their propensity to fight one type of civil war versus another. Group size as a percentage of the population provides an important conditioning factor. Small groups face considerable difficulties capturing and defending the center, implying small aggrieved groups are likely to fight separatist but not center-seeking civil wars. It is more feasible for larger groups, by contrast, to capture the center. When possible, groups should prefer to capture a governmental seat that already has international recognition.<sup>17</sup> Figure 2 shows indeed that larger groups are more likely to fight center-seeking civil wars whereas smaller groups are more likely to fight separatist civil wars.

**Figure 2. Group Size and Onset of Different Types of Civil War**



*Notes:* Using EPR ethnic groups as the unit of analysis and a sample described in the next section, Figure 2 presents lowess curves showing how the empirical frequency of group-level civil war onsets changes in the group's percentage share of its country's total population. The black line depicts center-seeking civil war onsets and the gray line depicts separatist civil war onsets.

Crucially, group size should also be positively correlated with the commitment parameter  $\alpha$  in the model, which implies groups large enough to capture the center will rarely experience strong enough grievances—even if they are oil-rich—to fight against the government. Larger groups are more likely to either control the state themselves or to enjoy stronger institutionalized relations with the government because governments fear groups that can threaten the center (Roessler and Ohls 2015). Showing the empirical relevance of this implication, the EPR dataset provides one measure of the extent of institutionalized relationships between an ethnic group and the state: whether the group is included in, as opposed to systematically excluded from, power at the center. Evidence from this measure is consistent with implications that large, oil-rich groups rarely experience weak institutionalized ties with the state. Only five EPR ethnic groups totaling at least 20% of their country's population (which is roughly where the center-seeking and separatist onset lines intersect

<sup>17</sup>Caspersen and Stansfeld (2011) list numerous states that are de facto independent but have failed to win widespread international recognition. Furthermore, in Sub-Saharan Africa for example, the Organization of African Unity (OAU) has been successful at convincing member states to respect territorial demarcations inherited at independence (Herbst 2000, 98-112), which has likely diminished separatist civil war propensity in the region (Englebert 2009).

in Figure 2) that contain a major oil field in their homeland have ever been excluded from power, in a sample of African and Asian countries from 1945 to 2009.<sup>18</sup>

### 2.6.3 Generating Hypotheses

Three hypotheses arise directly from the preceding considerations about the prize, revenue-enhancing, and territorial encroachment mechanisms.

**H1.** *Unconditional hypothesis for separatist.* There should be a strong positive relationship between local oil wealth and group-level separatist civil war onset.

**H2.** *Unconditional hypothesis for center-seeking.* There should not be a strong positive relationship between local oil wealth and group-level center-seeking civil war onset.

**H3.** *Conditional hypothesis for separatist.* There should be a strong positive relationship between local oil wealth and group-level separatist civil war onset for groups with weakly institutionalized ties to the government, but no systematic relationship for groups with strongly institutionalized ties to the government.

The only ambiguities arise when considering an unconditional hypothesis for center-seeking wars. Although the unconditional effect of local oil wealth on center-seeking civil war onset should not produce clear trends in the data (H2) because large groups with weak institutionalized ties to the center are empirically rare, it is unclear what to expect for large groups that do have weak institutional ties with the government. Although the conflict-inducing territorial encroachment effect should be relevant for these groups, as Table 2 summarizes, the prize effect should not strongly increase center-seeking incentives and the revenue-enhancing effects should strongly deter attacks on the center. Furthermore, from a statistical power perspective, the empirical rarity of large groups with weak inter-ethnic ties should also diminish the ability to statistically distinguish their effect even if there is a clear trend in one direction or the other. Therefore, other than implying any conditional effect for center-seeking civil wars is not empirically important for explaining unconditional effects, the analysis does not yield clear implications for a conditional hypothesis for center-seeking civil wars.

## 2.7 Statistical Results

This section demonstrates statistical support for these three hypotheses. The unit of analysis is ethnic group-years, with ethnic groups coded by EPR. This dataset codes politically relevant ethnic groups in all country-years since either 1945 or their country's independence. The main advantage of this dataset over others that provide ethnic group-level data, such as Minorities at Risk, is that EPR provides data points for *all* politically relevant ethnic groups, not just discriminated minorities. The availability of ethnic group-specific location data, discussed below, provides another advantage of EPR over other ethnicity datasets.

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<sup>18</sup>The next section provides additional details about the sample.

The sample consists of all ethnic groups in Africa and Asia (including the Middle East) in every year their country was independent from 1945 to 2009. Although this truncated sample limits the generality of the results, this is not particularly problematic because the main goal is evaluate *conditional* effects. All Western European countries and offshoots clearly fall outside the scope conditions of conflict resource curse arguments because these consolidated democracies have strong institutions, and therefore  $\alpha$  is high for all ethnic groups in these countries. Excluding Latin America follows Ross' (2010) argument that the absence of oil-related separatist conflicts in this region does not reflect special properties of Latin American oil, but instead results from longer-term historical factors that have made the region essentially secession-proof despite the existence of ethnic tensions. Eastern European countries are excluded for a different reason. In Africa and Asia, it is straightforward to distinguish post-colonial separatist civil wars from anti-colonial separatist rebellions, and only the former are included in the analysis below. However, the differences are less clear in Eastern Europe following the fall of the Soviet Union. Regions such as Chechnya in Russia could be conceptualized either as post-colonial or anti-colonial. These caveats about other regions highlight clear advantages to focusing on the relatively large sample of ethnic groups in African and Asian countries that provides wide variance in inter-ethnic relationships and should better isolate the effects of local oil wealth.

There are two dependent variables: group-level separatist civil war onset and group-level center-seeking civil war onset. These are coded using the ACD2EPR dataset, which links conflicts in the Armed Conflict Database to EPR groups (Wucherpfennig et al. 2012). Importantly, ACD2EPR only includes *ethnic* civil wars, meaning the rebel group recruited from a clear ethnic base and proclaimed ethnically related goals. This poses few limitations for studying separatist civil wars, almost all of which are ethnic civil wars. The tradeoffs are sharper for studying center-seeking conflicts. On the one hand, because the formal model focuses on how ethnic cleavages mitigate the effect of oil on civil wars, examining ethnic center-seeking civil wars is theoretically relevant. On the other hand, the results do not provide insight into the effect of local oil wealth on center-seeking civil wars more generally—which, in addition to the ambiguous theoretical implications discussed above, may provide another contributing factor to finding null results for center-seeking civil wars.<sup>19</sup>

A binary variable denotes whether each ethnic group's territory contains at least one giant oilfield. Resembling a procedure used by Hunziker and Cederman (2012), I used GIS methods to match GeoEPR group location polygons (Wucherpfennig et al. 2011) with the location of giant oilfields from Horn's (2003) data, which are oil fields that contain at least 500 million barrels in ultimately recoverable reserves.

I consider two proxies for the credible commitment parameter  $\alpha$ . The first is commonly used in existing civil war research: EPR's measure of whether an ethnic group is systematically excluded from, as opposed to included in, the ruling coalition in a particular year.<sup>20</sup> This variable has the advantage of directly measuring commitment ability, but the disadvantage of possibly being endogenous to group-level oil production. I therefore also consider two historical proxies for inter-

<sup>19</sup>Because it is difficult to use ethnic groups as the unit of analysis to study non-ethnic civil wars, this caveat highlights why country-level data also provide insight into the center-seeking conflict resource curse (see Chapter 1 for additional details).

<sup>20</sup>The results using this variable are similar to those from Hunziker and Cederman (2012), albeit here I distinguish different types of civil war, and do not control for the problematic post-treatment variable of income per capita (Chapter 1 provides an extended discussion).

ethnic institutions. The first is a binary measure, for each ethnic group’s country, of whether or not the ethnic group that controlled the government at independence was organized as a hierarchical kingdom prior to colonization. Chapter 3 argues pre-colonial kingdom groups impeded inter-ethnic institution formation and caused violence in post-colonial Sub-Saharan Africa. The current coding scheme extends this variable to North Africa and Asia as well. Notably, all countries that were never colonized were organized as a kingdom at the turn of the 20<sup>th</sup> century and therefore ethnic groups in these countries are also coded as 1 on this variable. The second historical proxy for inter-ethnic institutions is a binary measure of whether the ethnic group participated in a rebellion to resist the onset of colonization, coded using Clodfelter’s (2002) encyclopedia on historical wars. Crucially, many of these wars were fought not only to prevent European control over their territory, but also to prevent Europeans from placing them into undesired colonial units. For example, after European Allies reneged on an earlier promise to grant Kurds an independent state, Iraqi Kurds fought against Britain to contest their integration with Arabs to the south.

The core regression models include standard temporal dynamics controls (peace years and cubic splines) in addition to oil and an institutions measure. Tables 3 and 4 present unconditional results that do not include an interaction term, whereas Figures 3 and 4 present conditional results that include an interaction between oil and institutions. The models with additional covariates also control for an ethnic group’s log percentage of their country’s population and two geographic factors that should affect separatist civil war propensity. These are a binary indicator of whether the ethnic group resides in territory discontinuous from the capital city, and the log of the group’s distance from the capital. A higher value of either variable increases the difficulty of putting down an insurgency for the government, and rebel groups can use their geographically distinct territory to help frame grievances (e.g., Cabinda in Angola, Porto 2003). Importantly, these geographical factors are independent of oil production. The final two covariates are region fixed effects for Sub-Saharan Africa and the Middle East and North Africa, leaving other Asian countries as the excluded basis region. All models are estimated using OLS with robust standard errors clustered by ethnic group.

Table 3 presents results from eight regressions for separatist civil wars. The first four specifications use EPR exclusion to proxy for weak inter-ethnic institutions, whereas the last four specifications code institutions as weak if the group either belongs to a country in which the ethnic group that controlled the government at independence was organized as a hierarchical kingdom prior to colonization, or if the group fought against their colonizer.<sup>21</sup> The first two specifications for each institutions measure (Columns 1, 2, 5, and 6) only include ethnic groups composing less than 20% of their country’s population. As discussed above, these are the groups with the strongest separatist potential and for which local oil wealth should exert the strongest positive effects on separatist civil war onset if the conditional separatist conflict resource curse hypothesis is correct. The last two specifications for each institutions measure (Columns 3, 4, 7, and 8) include all groups in the sample described above. Odd-numbered specifications include only the covariates from the core model whereas even-numbered specifications include all the covariates described above.

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<sup>21</sup>Therefore, all the institutions variables equal 1 when inter-ethnic institutions are weak, and 0 when strong. Also, combining the two historical variables into one obviates the need to examine a third-order interaction term that includes oil and both historical institutions measures individually in the regressions with conditional effects (Figures 3 and 4).



**Table 3. Unconditional Results for Separatist Civil Wars**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent Variable: ACD2EPR Separatist Civil War Onset							
Giant oil field	0.019 (0.003)	0.017 (0.003)	0.012 (0.008)	0.011 (0.012)	0.018 (0.004)	0.017 (0.005)	0.011 (0.016)	0.010 (0.020)
EPR excluded	0.008 (0.003)	0.007 (0.000)	0.008 (0.000)	0.007 (0.000)				
Historical grievances					0.005 (0.008)	0.004 (0.255)	0.004 (0.002)	0.003 (0.158)
Observations	12,005	9,951	16,552	14,321	14,406	11,866	21,612	16,401
	Peace years and cubic splines?							
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Sample							
Small groups	Small groups	Small groups	All groups	All groups	Small groups	Small groups	All groups	All groups
	Core model or full model with covariates?							
	Core	Full	Core	Full	Core	Full	Core	Full

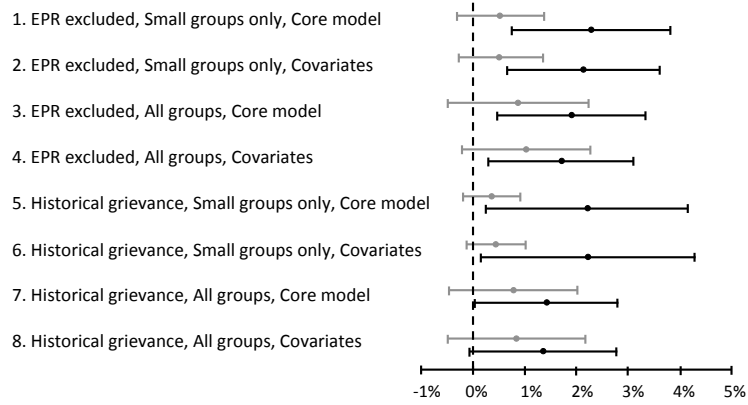
*Notes:* Table 3 summarizes a series of OLS regressions by presenting the coefficient estimate for the effect of having a giant oil field located in the ethnic group's home territory, for the EPR exclusion institutions measure, for the historical grievances institutions measure, and the p-value in parentheses. Other coefficient estimates are suppressed for expositional clarity.

Table 3 strongly supports H1. The estimates imply a large conflict-inducing effect of oil. Because the oil variable and dependent variable are both binary, the oil coefficients can be interpreted as the percentage increase in the probability of separatist civil war onset when a group moves from oil-poor to oil-rich. In Column 1, for example, the estimated 1.9% increase is very large relative to the sample average of separatist onsets in 0.6% of all ethnic group-years. The coefficient estimates are larger for the specifications that only include small ethnic groups, although all the correlations are statistically distinguishable from 0 as shown with the p-values in parentheses. The results are roughly the same for both institutions measures, and whether or not the additional covariates are included.

To assess conditional effects, Figure 3 summarizes the results of eight regressions for separatist civil wars that are identical to those from Table 3 except they add an interaction term between oil and inter-ethnic institutions.<sup>22</sup> For all entries, the gray dot presents the point estimate for the effect of increasing local oil wealth from 0 to 1 on the percentage increase in separatist civil war onset probability when institutions are strong, and the black dot when institutions are weak. The lines capture the corresponding 95% confidence intervals.

<sup>22</sup>Because the main effect of interest includes an interaction term, it is clearer to summarize the regressions in a figure than in a regression table because calculating the 95% confidence interval for the marginal effects incorporates an off-diagonal variance term that is not reported in standard regression tables.

**Figure 3. Conditional Results for Separatist Civil Wars**



The results consistently support H2. Not only are the conflict-inducing effects of oil wealth stronger for groups with weak inter-ethnic institutional ties to the center, the effect for weakly institutionalized groups is statistically distinguishable from 0 in all but one of the regressions whereas the effect of oil for better institutionalized groups is never statistically distinguishable from 0. Also as anticipated, the results are stronger for the specifications that only include small ethnic groups. The results are roughly the same for both institutions measures, and whether or not the additional covariates are included.

Assessing the unconditional effects for center-seeking civil wars, Table 4 presents results from similar specifications as Table 3. The two differences are that center-seeking rather than separatist civil war onset is the dependent variable, and Columns 1, 2, 5, and 6 include only groups *larger* than 20% of the population. Supporting H3, the coefficient estimates are considerably smaller than those in Table 3 and none are statistically distinguishable from 0.

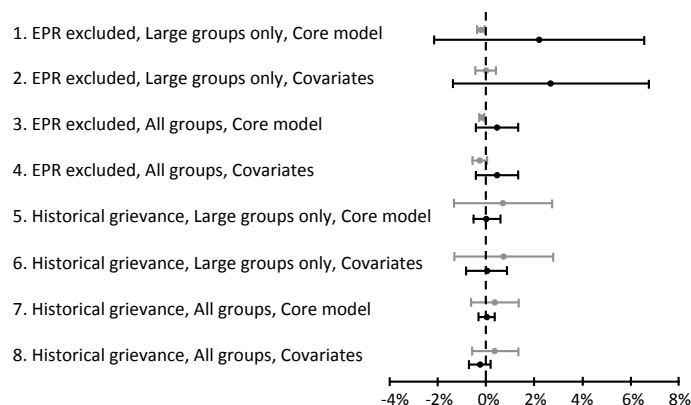
**Table 4. Unconditional Results for Center-Seeking Civil Wars**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent Variable: ACD2EPR Center-Seeking Civil War Onset							
Giant oil field	0.003 (0.554)	0.006 (0.274)	0.002 (0.460)	0.001 (0.604)	0.003 (0.490)	0.003 (0.520)	0.002 (0.441)	0.000 (0.968)
EPR excluded	0.013 (0.002)	0.014 (0.001)	0.003 (0.000)	0.007 (0.000)				
Historical grievances					-0.002 (0.331)	-0.001 (0.831)	-0.001 (0.532)	0.002 (0.145)
Observations	4,547	4,370	16,552	14,321	7,206	4,535	21,612	16,401
	Peace years and cubic splines?							
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Sample							
	Large groups	Large groups	All groups	All groups	Large groups	Large groups	All groups	All groups
	Core model or full model with covariates?							
	Core	Full	Core	Full	Core	Full	Core	Full

*Notes:* Table 4 summarizes a series of OLS regressions by presenting the coefficient estimate for the effect of having a giant oil field located in the ethnic group’s home territory, for the EPR exclusion institutions measure, for the historical grievances institutions measure, and the p-value in parentheses. Other coefficient estimates are suppressed for expositional clarity.

Assessing conditional effects, Figure 4 presents the same specifications as Figure 3 for center-seeking civil wars. Because the formal model does not provide clear expectations for this relationship, these results are mainly suggestive for future research. There are no clear trends in any of the specifications. One potentially important finding is that the confidence intervals are much wider for models 1 and 2 than for 3 and 4, which should be expected given the trend shown above that very few large oil-rich groups have ever been excluded from power. However, if anything this relationship reverses when using the historical grievances institution measure. Given the large number of confounding factors discussed above, it is difficult to discern which if any of these drive the null results.

**Figure 4. Conditional Results for Center-Seeking Civil Wars**



## 2.8 Conclusion

This paper presented a formal model to explain the empirical relationship between local oil wealth and separatist civil wars by ethnic minority groups. It focused on two key properties of oil production that cause violence. Because the government can extract oil revenues with minimal local participation, it can enact high tax rates on oil production. This creates grievances. Furthermore, the government chooses not to lower tax rates to alleviate grievances when oil revenues are large relative to other revenue sources, because the lost consumption from fighting is lower than the opportunity costs of lowering taxes on the “prize.” Combining these conflict-inducing effects with the mitigating effects of inter-ethnic institutions, and considering differential effects for center-seeking

civil wars, yielded a conditional resource curse hypothesis: local oil wealth should only raise separatist civil war propensity for groups with weak historical ties to the center, but the conflict-inducing parameter range is not empirically relevant for center-seeking civil wars. Statistical evidence supported these implications.

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## Chapter 3

# Pre-Colonial Kingdoms and the Coups-Civil War Nexus in Sub-Saharan Africa

### Abstract

Recent research on how horizontal ethnic inequalities affect civil war propensity has demonstrated ethnic groups systematically excluded from power at the center rebel at higher rates. This paper builds on this important finding by addressing two questions. (1) Why would a ruler strategically *choose* to undermine inter-ethnic relationships? (2) What historical factors explain *variance* in ethnopolitical exclusion in Sub-Saharan Africa? A formal model addresses question #1 by allowing a government to politically include or exclude a challenger. It shows that because the prospect of military coups creates an internal security dilemma, weak inter-ethnic commitment ability causes a coup-civil war nexus and induces strategic rulers to pursue ethnic exclusion. To address question #2, I argue ethnic groups in Sub-Saharan Africa that were organized as kingdoms prior to colonization undermined possibilities for developing strong inter-ethnic relationships through reinforcing pre-colonial and colonial epochs. This diminished government commitment ability after independence. Statistical evidence at the ethnic group level, alongside case evidence, shows pre-colonial kingdom groups are an important explanation for ethnic exclusion, coups, and civil wars in Sub-Saharan Africa during the Cold War era.



### 3.1 Introduction

What causes civil wars? Whereas early statistical research on civil wars focused mainly on economic factors (Collier and Hoeffler 2004) and opportunities for insurgencies (Fearon and Laitin 2003), a prominent and burgeoning literature has convincingly demonstrated that ethnopolitical competition over the state affects prospects for violence (e.g., Cederman, Wimmer, and Min 2010; Cederman, Gleditsch, and Buhaug 2013). One of the most important findings from this recent “horizontal inequalities” research agenda is that ethnic groups systematically excluded from power at the center initiate civil wars more frequently than groups with access to central power.<sup>1</sup> This paper aims to build on these contributions by examining two critical factors that have received relatively little attention: strategic and historical causes of variation in ethnic exclusion and political violence.

Regarding strategy, this core empirical finding about excluded ethnic groups and violence sits uneasily with a different strand of the civil war literature. It is nearly a truism that weak institutions create ripe conditions for civil war. One prominent mechanism from existing research that connects weak institutions to fighting focuses on low commitment ability: if future promises are perceived as incredible, actors expecting a weakened future bargaining position may choose to exercise force in the present.<sup>2</sup> Juxtaposing commitment problem theories and horizontal inequalities arguments raises a puzzle that provides the first main inquiry of this paper:

- (1) Why do political leaders frequently *choose* to lower their commitment ability by systematically excluding other ethnic groups from government power—thereby raising civil war risk?

This question is particularly pertinent for Sub-Saharan Africa (SSA). Because few ethnic groups comprise a majority of their national population, we may expect rulers to build inclusive inter-ethnic coalitions to stabilize their regime. In contrast, intriguingly, rulers in this region have frequently pursued ethnic exclusion.

It is also vital to scrutinize the considerable *variation* in ethnic representation choices across and within countries. Because differences in ethnopolitical composition had already emerged by independence in many SSA countries, it appears necessary to examine variance in historical legacies. Furthermore, it may be fruitful to complement the horizontal inequalities literature—and civil war research more broadly—with insights from the active research agenda on historical causes of institutional weakness in SSA, most of which focuses on economic development.<sup>3</sup> This yields a second key question:

- (2) What historical factors explain why SSA rulers exclude some ethnic groups but not

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<sup>1</sup>Horizontal inequalities are “inequalities in economic, social or political dimensions or cultural status between culturally defined groups” (Stewart 2008, 3; quoted in Cederman, Gleditsch, and Buhaug 2013, 31).

<sup>2</sup>Fearon (1995) and Powell (2004, 2006) explain the general logic. Walter (2009, 251) and Blattman and Miguel (2010, 13) discuss its application to civil wars. Throughout this paper, “commitment ability” refers to the government’s ability to commit to delivering promised future payments to a challenger, independent of the challenger’s contemporaneous coercive capacity. A government that can credibly promise a large payment to a group that is militarily weak (either temporarily or permanently) has high commitment ability.

<sup>3</sup>Contributions include Gennaioli and Rainer (2007), Nunn (2008), Nunn and Wantchekon (2011), Michalopoulos and Papaioannou (2013), and Akyeampong et al. (2014). Englebert et al. (2002), Besley and Reynal-Querol (2014), and Dincecco et al. (2014) focus on civil wars.

others?

This paper provides two main contributions. First, it presents a formal model that bridges two prominent but previously disparate strands of the civil war literature by incorporating horizontal ethnic inequalities into a commitment problem framework. The model addresses the first question by analyzing how internal security constraints provide incentives for ethnic exclusion. It focuses attention on what types of ethnic groups pose severe internal threats to the ruler. Second, the paper empirically examines the long-term effects of pre-colonial kingdoms (PCKs) in SSA, which I argue exacerbated ethnically rooted commitment problems and triggered a tradeoff between military coups and civil wars.

Section 2 extends formal commitment problem models to allow a government to choose whether to include or exclude a rival ethnic group—i.e., a challenger—in the ruling coalition. Providing the key tension in the model, although by assumption political inclusion increases the government’s ability to commit to future payments to the challenger, inclusion also enhances the challenger’s ability to *launch a military coup*. Thus, an internal security dilemma may cause the ruler to practice ethnic exclusion and risk civil wars, which formalizes an argument from Roessler (2011). Rather than focusing on a generic weakly institutionalized environment that induces fear of all ethnic “others,” however, the analysis focuses on the *differential* ability of ethnic groups to commit to future promises to each other. It demonstrates why a coup-civil war nexus may arise when inter-ethnic commitment ability is low, whereas political coalitions will be stable when commitment ability is higher.

The remainder of the paper provides evidence that variability in pre-colonial political organization can help explain why we observe ethnic exclusion and a coup-civil war nexus in some SSA countries but not others. Section 3 provides qualitative historical evidence to substantively ground the argument that PCK groups created considerable obstacles to fostering productive inter-ethnic relationships prior to independence, through their alternative vision of statehood and history of animosity toward neighboring groups. After independence, the pressing commitment problems faced by governments in political coalitions that included a PCK group created frequent crises—which resulted in coups that aimed to exclude other ethnic groups and, subsequently, civil wars.

Statistical evidence shows PCKs can explain variance in patterns of military coups, civil wars, and ethnic representation in SSA. Section 4 describes the process for coding PCKs and presents the research design by examining why kingdoms arose in certain parts of pre-colonial Africa but not others. Section 5 provides ethnic group-level statistical evidence and qualitative evidence that PCK groups caused coups, civil wars, and ethnic exclusion. Section 6 summarizes the findings and discusses broader implications.

### 3.2 Modeling the Tradeoff Between Ethnic Inclusion and Exclusion

The formal model achieves two main goals. First, it bridges two influential strands of the civil war literature. Horizontal inequalities research focuses almost exclusively on cultural arguments related to modernization and nationalist mobilization to explain why governments exclude ethnic groups (e.g., Cederman, Gleditsch, and Buhaug 2013, 30-53). Despite the usefulness of these considerations, it is striking that excepting Roessler (2011) there have been few attempts to understand the *strategic*

calculations that undergird ethnic representation decisions. Furthermore, existing theories have difficulty explaining *variance* in ethnic exclusion choices because they focus on generic factors to explain nationalist tensions or fears of ethnic outsiders. Incorporating strategic choices over ethnic representation into a formal commitment problem model addresses these considerations.

Second, the model elucidates the mechanism argued below to link PCKs to political violence. Although it is perhaps not surprising that peaceful bargaining ensues when the government has high commitment ability, the model provides novel theoretical grounding for why *coup-civil war spirals*—as opposed to other patterns of violence—may arise when inter-ethnic commitment ability is weak.

### 3.2.1 Setup

Two ethnic groups—one controlling the government ( $G$ ) and one that can challenge for government control ( $C$ )—bargain over the distribution of state revenues in an infinite time horizon game. With regard to PCK groups in SSA, the model provides insight into strategic bargaining after independence, whereas the historical discussion in the next section explains how pre-colonial interactions affected the credible commitment parameter in this post-colonial bargaining game.

The sequence of moves within each period unfolds as follows. Nature moves first and decides whether  $C$  is strong (probability  $\sigma$ ) or weak (probability  $1 - \sigma$ ) in the period, terms that will be defined below.  $G$  then makes a patronage offer to  $C$ , and  $C$  responds by either accepting or fighting.<sup>4</sup> Although bargaining is a key feature in rationalist theories of conflict (Fearon 1995), the idea that actors can bargain to reduce latent grievances and therefore avoid costly fighting is largely absent in the horizontal inequalities literature. For example, Cederman, Gleditsch, and Buhaug (2013, 49) argue that authoritarian states “generally refuse to accept even the most modest proposals for political change while exposing peaceful protestors to the full force of their repressive capabilities.” Rather than *assume* that bargaining will fail, integrating ideas about horizontal inequalities into a bargaining framework facilitates analyzing *why* bargaining may fail when actors seemingly could peacefully resolve their grievances.

If  $C$  accepts the patronage offer, each side consumes its share of the agreed division and the game moves to the next period. If  $C$  rejects  $G$ ’s offer by fighting, no consumption occurs in the current period, which captures the surplus destroyed by fighting. The winner gains (or remains in) power and the loser becomes (or remains) the challenger. Therefore,  $G$  and  $C$  refer to an actor’s position in a particular period. Finally, if a fight has occurred, as the last move in the period the winner decides whether to “include” or “exclude” the loser in the ruling coalition for their interaction starting in the next period. That is,  $G$  only can make an inclusion/exclusion choice if fighting has occurred earlier in the period. Future consumption is discounted exponentially by  $\delta \in (0, 1)$ .

Existing horizontal inequalities theories trace the emergence of political inequalities to nationalist ideologies spreading to the colonial world (Cederman, Gleditsch, and Buhaug 2013, 33-35). This model, by contrast, allows actors to strategically choose inclusionary or exclusionary ruling coalitions. History certainly impacts equilibrium outcomes—below I explain how PCK groups affected

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<sup>4</sup>Prevalent forms of patronage in post-colonial SSA have included positions in the government bureaucracy, cabinet positions (Arriola 2009), and state-sanctioned racketeering (Englebert 2009).

the credible commitment parameter—but history shapes the *incentive structure* for ethnopolitical exclusion rather than *pre-determines* whether a group is included or excluded.

In the model, inclusionary and exclusionary ruling coalitions are distinguished by (1)  $C$ 's probability of winning a fight and (2)  $G$ 's ability to commit to future payments for  $C$ . On the one hand, exclusion *benefits*  $G$  because  $C$  is less likely to win a fight when excluded. Specifically, in periods  $C$  is strong, if  $C$  is included it wins a coup attempt with probability  $p$  and loses with complementary probability. If  $C$  is excluded, it wins a civil war—or rebellion—with probability  $\alpha p$  in a period it is strong, for  $\alpha \in [0, 1]$ .<sup>5</sup> Substantively, coup attempts pose a more direct threat to the ruler than rebellions by causing government turnover with higher probability. If instead  $C$  is weak in a period, it wins with probability 0 regardless of whether it is included or excluded from power.<sup>6</sup>

On the other hand, exclusion *inhibits* the government by decreasing its ability to credibly commit to higher patronage offers, which the following assumptions capture. If  $C$  is excluded,  $G$  has no ability to commit to future promises. Formally, from a budget normalized to size 1,  $G$  chooses an offer  $x_t \in [0, 1]$  in all periods  $t$ . Therefore, any “promises”  $G$  has made in the past do not constrain its current-period choice. The analysis shows that when  $C$  is excluded,  $C$ 's consumption in each period is determined entirely by its ability to coerce  $G$  at that time.

Including  $C$  increases  $G$ 's commitment ability. The commitment parameter  $\theta$  affects the magnitude of this increase by capturing  $G$ 's ability to credibly promise to make offers independent of  $C$ 's contemporaneous expected utility to fighting. Specifically, the first time an included  $C$  accepts an offer  $x_t$  in a strong period  $t$ , there is a  $\theta \in (0, 1]$  percent chance  $G$  will be bound to make the same offer  $x_t$  in all future periods.<sup>7</sup> In other words, whenever  $G$  makes an offer in a strong period it “promises” to make the same offer in all future periods, and with probability  $\theta$  that promise will be credible. Denote  $G$ 's offer as  $x_t = x_I$  (“ $I$ ” stands for Inclusion) and the equilibrium offer as  $x_I^*$ . With complementary  $1 - \theta$  probability, bargaining continues with  $C$  included in the ruling coalition and  $G$  not bound to offer  $x_I$  in future periods—but the next time  $C$  accepts an offer in a strong period, there is again a  $\theta$  percent chance that  $G$  will be bound to make the same offer in all future periods.<sup>8</sup>

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<sup>5</sup>Of course, empirically, it is *possible* for an excluded group to stage a coup or for an included group to launch a civil war. This setup instead implicitly assumes that coups are the optimal fighting technology for included groups and rebellions for excluded groups, implying that providing a richer set of fighting options would not affect equilibrium actions.

<sup>6</sup>One microfoundation for assuming  $C$ 's probability of winning fluctuates over time is 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). The next section provides examples of power shifting in PCK countries. Furthermore, because the goal of this model is to integrate horizontal inequality hypotheses into a formal commitment problem framework, it is useful to build on existing prominent formal bargaining theories of civil wars that also model stochastic shifts in the distribution of power (Fearon 2004; Powell 2012).

<sup>7</sup>Formally,  $G$ 's action space becomes degenerate because it must make the same offer in all future periods.

<sup>8</sup>Formally, a state variable  $S_t \in \{0, 1\}$  tracks whether or not  $G$  is bound to make a particular offer to an included challenger.  $S_t = 1$  means  $G$  is bound and  $S_t = 0$  means  $G$  is not. Entering any period  $t$ ,  $G$  inherits the value of the state variable from the previous period,  $S_{t-1}$ . If  $S_{t-1} = 1$  and there is no fight in the current period, then  $S_t = 1$ . If a fight occurs when  $S_{t-1} = 1$ , and the winner of the fight chooses to include  $C$ , then  $S_t = 0$ . That is, fighting is sufficient to destroy the promise that earlier had been locked in, although does not eliminate the  $\theta$  possibility of  $G$  being able to commit in the future. Additionally, if the winner of the fight excludes the loser, then  $S_t = 0$  because  $S_t$  is undefined in exclusionary subgames. If  $S_{t-1} = 0$ , there is a  $\theta$  percent chance the state variable changes to  $S_t = 1$  if  $C$  is strong in period  $t$  and  $C$  accepts  $G$ 's offer. This corresponds to the scenario described in the main text that introduced  $\theta$ . Conversely, if  $S_{t-1} = 0$ ,  $S_t$  cannot change to 1 if either  $C$  is weak or there is a fight at time  $t$ . Assuming that  $S_{t-1} = 0$  cannot transform into  $S_t = 1$  if  $C$  is weak at time  $t$  ensures  $G$  cannot lock in a low offer

Substantively,  $\theta$  captures how the two ethnic groups' history of interaction prior to the start of the post-independence bargaining game has affected perceptions about commitment ability. Formal institutions partially determine the magnitude of  $\theta$ . Below I argue PCK groups hindered prospects for creating inter-ethnic political parties during the decolonization era. Drawing on existing research arguing that parties facilitate commitment to lucrative future payments for party members (Magaloni 2008; Svolik 2012), failing to create inter-ethnic political parties undermined an opportunity to enhance the credibility of the government's promised future payments. Informal historical interactions also impact  $\theta$ . I additionally argue below that PCK groups' frequent involvement in pre-colonial warfare and slave raiding engendered acrimonious relations with neighbors. Furthermore, patterns of indirect colonial rule reinforced a pre-colonial history of hierarchical political organization to create an alternative vision for statehood. In countries with a PCK group, these factors cause  $C$  to believe  $G$ 's future promises are not credible—hence lowering  $\theta$ —whether a PCK group is the government or the challenger.<sup>9</sup>

Finally, the model assumes Nature chooses at the outset of the game which group becomes government and whether the challenger is included or excluded, although the exact probabilities do not affect the analysis below. Substantively, this assumption corresponds with colonial influence on the initial post-independence ruling coalition, as described in more detail below. This Nature move makes observable behavior that would be off-the-equilibrium path if instead  $G$  strategically chose the coalition at the outset. For example, even if the winner of a fight always prefers exclusion in equilibrium,  $G$  may inherit an inclusive coalition at the outset of the game.

The solution concept is Markov Perfect Equilibrium, which requires actors to make optimal choices based only on the contemporaneous state of the world and on previous moves within the current period. Figure 1 presents trees for the stage games.

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that a vulnerable  $C$  accepted. Finally, as shown in Figure 1, whether or not the state variable changes is the last move in the stage game.

<sup>9</sup>To my knowledge, no existing formal models of ethnic violence parameterize inter-ethnic commitment ability and derive its implications for fighting. Fearon (1998) provides perhaps the most closely related model. Also considering an interaction between two ethnic groups, he assumes the ruling group has *no* commitment ability—in the sense of being able to promise payments above the reservation value of the out-of-power group—and shows ethnic civil wars will occur if shifting demographic trends are sufficiently large. Furthermore, in his model the government cannot choose to include the out-of-power group.

Figure 1. Trees for the Stage Games

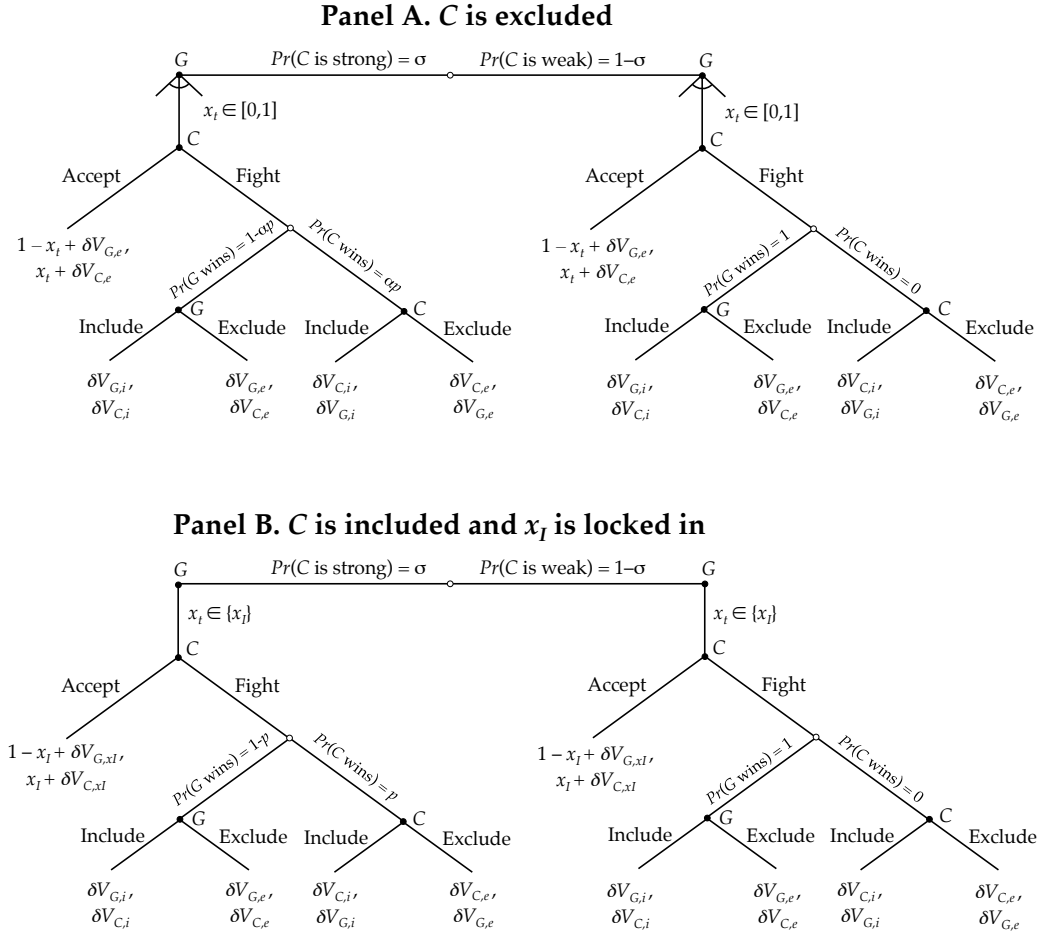


Figure 1 consists of two extensive form games. Both games start with a chance node  $G$  choosing  $x_t \in [0,1]$ . Player  $C$  then chooses between **Accept** and **Fight**.

**Left Game (Strong C):** If  $C$  chooses **Accept**, the game ends at node  $G$  with payoffs  $1 - x_t + \delta V_{G,xl}$  and  $x_t + \delta V_{C,xl}$ . If  $C$  chooses **Fight**, the game continues to a node where  $C$ 's beliefs are  $Pr(C \text{ wins}) = 1-p$  and  $Pr(C \text{ wins}) = p$ . If  $C$  chooses **Include**, the game ends at node  $G$  with payoffs  $\delta V_{G,i}$  and  $\delta V_{C,i}$ . If  $C$  chooses **Exclude**, the game ends at node  $C$  with payoffs  $\delta V_{G,e}$  and  $\delta V_{C,e}$ .

**Right Game (Weak C):** If  $C$  chooses **Accept**, the game ends at node  $G$  with payoffs  $1 - x_t + \delta V_{G,i}$  and  $x_t + \delta V_{C,i}$ . If  $C$  chooses **Fight**, the game continues to a node where  $C$ 's beliefs are  $Pr(G \text{ wins}) = 1$  and  $Pr(C \text{ wins}) = 0$ . If  $C$  chooses **Include**, the game ends at node  $G$  with payoffs  $\delta V_{G,i}$  and  $\delta V_{C,i}$ . If  $C$  chooses **Exclude**, the game ends at node  $C$  with payoffs  $\delta V_{G,e}$  and  $\delta V_{C,e}$ .

### 3.2.2 Model Analysis

The possibility that fighting will occur in equilibrium arises because  $C$ 's ability to threaten  $G$  fluctuates over time and  $G$  either has no or limited ability to commit to future payments. The analysis begins with the subgame in which  $C$  is excluded from power, implying  $G$  has no commitment ability.  $C$  will only consume a positive amount in strong periods. Because a weak challenger does not pose a credible threat,  $G$  has no incentive to make a spoils offer. The less frequently  $C$  is strong, the lower is  $C$ 's stream of expected future benefits to remaining as challenger. Consequently, when the probability of being strong ( $\sigma$ ) is low enough,  $C$  may demand an offer in a strong period that exceeds  $G$ 's per-period revenue stream. Because  $G$  has no commitment ability, it cannot alleviate  $C$ 's concern that it will frequently be weak in the future by promising to offer positive payments when  $C$  is weak. Therefore, when  $\sigma$  is low enough, an excluded  $C$  will launch a civil war in response to any offer in a strong period. This explanation for commitment inability-induced fighting closely resembles a more general logic in bargaining models of conflict (Powell 2004).

<sup>10</sup>Appendix A presents a more detailed formal analysis of the model and proves all results from the text.

The following analyzes the  $\sigma < \underline{\sigma}$  case. Focusing on a parameter range in which rebels seize temporary windows of opportunity to violently engage exclusionary states corresponds with prominent theories of political violence. As Goodwin and Skocpol (1989, 497) argue, “From the viewpoint of would-be revolutionaries, the ideal situation is to face an exclusionary and repressive authoritarian regime that lacks strong control of its entire territory or borders (or else suddenly loses such control).” Furthermore, a history of statehood and strong ethnic identity should increase PCK groups’ ability to organize a rebellion, resulting in higher  $p$ . The  $\underline{\sigma}$  threshold is an increasing function of  $p$ , implying that larger  $p$  raises the probability an excluded group will rebel by widening the range of  $\sigma$  values small enough to trigger fighting.<sup>11</sup>

**Assumption 1.**  $\sigma < \underline{\sigma}$ .

The second key question is whether  $C$  will launch coup attempts when included in power.  $C$ ’s generic dilemma is the same as in the exclusion case: when  $\sigma$  is low,  $C$  will only infrequently be able to coerce  $G$  into high payments. However, a key trait distinguishing inclusionary and exclusionary subgames is that when  $C$  is included, after  $C$  accepts an offer in a strong period there is a  $\theta$  percent chance  $G$  will be bound to make that same offer in *all* future periods—as opposed to the exclusion subgame in which  $C$  will consume 0 in weak periods.

The core determinant of whether coups will occur under inclusion is whether  $\theta$  is high enough to compensate for low  $\sigma$ . When  $\theta$  is low, the same tension that causes civil wars when  $C$  is excluded will also trigger coups when  $C$  is included: in a period  $C$  is temporarily strong,  $G$  cannot make a large enough patronage offer to prevent  $C$  from fighting.<sup>12</sup> In contrast, when  $\theta$  is high enough,  $G$  will be able to buy  $C$  off in an inclusionary subgame. The higher  $\theta$  is, the less (in expectation)  $C$  loses from being weak in future periods because there is a higher probability it will receive a positive patronage offer in all periods.

**Lemma 2.** When there is a high probability that  $G$  can commit to future promises (i.e., if  $\theta > \bar{\theta}$  for  $\bar{\theta}$  defined below), then  $G$  will be able to make a high enough offer in strong periods to ensure an included  $C$  never initiates a coup.

As Appendix A discusses, because there are multiple equilibria in certain parameter ranges, there are different  $\theta$  thresholds depending on whether the winner of a fight includes ( $\underline{\theta}_i$ ) or excludes ( $\underline{\theta}_e$ ) the loser. Define  $\bar{\theta} \equiv \max\{\underline{\theta}_i, \underline{\theta}_e\}$ .

The final question concerns whether the winner of a fight will choose inclusion or exclusion. Figure 2 summarizes this decision. If Assumption 1 is true and if  $\theta < \underline{\theta} \equiv \min\{\underline{\theta}_i, \underline{\theta}_e\}$ ,  $G$ ’s inclusion/exclusion decision determines whether it will face coup attempts or civil wars—demonstrating how weak

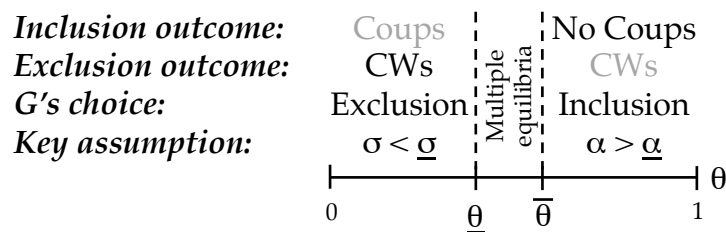
<sup>11</sup> $G$ ’s tradeoff between inclusion and exclusion is trivial when  $\sigma > \underline{\sigma}$ . Because  $G$  is able to make high enough patronage offers in strong periods to prevent fighting regardless of whether  $C$  is included or excluded,  $G$  strictly prefers exclusion. Choosing exclusion reduces  $C$ ’s probability of winning a fight and therefore decreases the equilibrium patronage offer. In future research it may be useful to scrutinize factors that explain variance in which groups rebel when excluded. This could provide insight into why governments exclude some groups because they *do* create an *internal* security dilemma, and exclude other groups because they *do not* cause an *external* security dilemma.

<sup>12</sup>If Assumption 1 holds—implying  $\sigma$  is low enough that an excluded  $C$  will fight in a strong period—and if  $\theta = 0$ , then an included  $C$  will certainly fight in a strong period because coup attempts are assumed to succeed with higher probability than rebellions.



commitment ability causes a coup-civil war nexus. As shown in Figure 2,  $G$  chooses exclusion. Because  $C$  has a higher chance of prevailing in a coup attempt than a civil war,  $G$  prefers to exclude and face rebellions rather than include and face a higher chance of being overthrown via a coup.<sup>13</sup>

**Figure 2. How  $\theta$  Affects Equilibrium Outcomes**



*Notes:* For different ranges of  $\theta$ , Figure 2 lists the equilibrium fighting outcomes that would occur under either inclusion or exclusion, and  $G$ 's optimal inclusion/exclusion choice. Black text represents the on-the-equilibrium path observed outcome, whereas gray represents the counterfactual off-the-equilibrium path fighting outcome that would be observed if  $G$  deviates from its optimal ethnic representation choice. The figure assumes both Assumption 1 (see above) and Assumption 2 (see below) are true.

If instead  $\theta > \bar{\theta}$ ,  $G$  faces a different tradeoff.<sup>14</sup> On the one hand, in this parameter range inclusion prevents fighting, i.e., civil wars will occur if  $G$  chooses exclusion but coups will not occur if  $G$  chooses inclusion. On the other hand, because coups are assumed to succeed at higher rates than civil wars,  $G$  increases  $C$ 's coercive capacity by choosing inclusion. Greater bargaining leverage enables an included  $C$  to command higher offers in strong periods. As summarized in Figure 2,  $G$  resolves this tradeoff by including  $C$  when  $\alpha$  is high (i.e., when the differential probability of winning a rebellion or coup is small).

**Lemma 3.** *Part a.*  $G$  chooses exclusion if  $\theta < \underline{\theta}$ . *Part b.* If Assumption 1 holds and  $\alpha$  is high (i.e., if  $\alpha > \underline{\alpha}$  for  $\underline{\alpha}$  defined in Appendix A), then  $G$  chooses inclusion if  $\theta > \bar{\theta}$ .

The parameter range  $\alpha > \underline{\alpha}$  is empirically plausible for SSA. Excluded elites in SSA have often served previously in the government or security forces and therefore possess valuable information about the government's anti-insurgency strategies. Furthermore, governments face impediments to collecting local intelligence when former regime brokers from that area join an insurgency.<sup>15</sup> Thus, even nascent insurgencies with few soldiers have frequently posed containment challenges

<sup>13</sup>The setup specifically models center-seeking civil wars in which a rebel group fights to overthrow the government in the capital, rather than separatist civil wars in which a rebel group fights to create an autonomous region or its own state. However, introducing separatist civil wars into the model would not alter the implication that  $G$  prefers to face civil wars than coup attempts. Separatist civil wars do not pose a direct threat for the current government to lose power.

<sup>14</sup>Appendix A discusses the multiple equilibria that may arise when  $\theta \in [\min\{\underline{\theta}_i, \underline{\theta}_e\}, \max\{\underline{\theta}_i, \underline{\theta}_e\}]$ .

<sup>15</sup>Roessler (2011, 315-6) provides empirical examples and additional citations.

to African militaries (Herbst 2004). Rebel groups can pose an especially strong threat when they establish sanctuaries in neighboring countries or receive foreign support. These considerations suggest excluded groups can strongly challenge African states, thereby creating incentives for  $G$  to promote ethnic inclusion if inclusion does not trigger coups.<sup>16</sup>

**Assumption 2.**  $\alpha > \underline{\alpha}$ .

Contrasting equilibrium actions and outcomes for different ranges of  $\theta$  ( $\theta < \underline{\theta}$  versus  $\theta > \bar{\theta}$ ), the key implication is that stronger commitment ability can prevent a coup-civil war nexus. Even though Assumption 1 implies civil wars will occur when  $C$  is excluded regardless of  $\theta$ , when  $\theta$  is high enough coup attempts will not occur under inclusion. This provides incentives for  $G$  to choose inclusion and prevent fighting from destroying surplus. Thus,  $G$ 's commitment ability carries stark implications for where horizontal inequalities should emerge and for where political violence should occur.

Carefully observing Figure 2 shows that if governments can *always* choose ethnic representation, coups will never occur along the equilibrium path of play. However, empirically, governments often inherit coalitions they would not have selected given the choice. For the particular substantive setting in this paper, legacies from decolonization elections decisively shaped ruling coalitions at independence—which corresponds with the initial Nature move in the model. Europeans heavily influenced early constitutions and elections. For example, Britain often promoted federal constitutions that generated inclusive power-sharing arrangements at independence, as shown with the Uganda and Nigeria examples in the next section.<sup>17</sup>

Table 1 summarizes the equilibrium strategy profile for  $\theta \in [0, \underline{\theta}] \cup [\bar{\theta}, 1]$  when Assumptions 1 and 2 hold.

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<sup>16</sup>Adding additional assumptions to the model to enhance  $G$ 's fear of civil wars—such as civil wars causing more destruction than coup attempts—would further support this argument.

<sup>17</sup>It would be possible to introduce additional assumptions in the model to constrain the ruler's ethnic representation choice at later points in the game, or assume coups in one period raise coup risk in future periods even when the government practices exclusion. The model does not address these possibilities—which would not qualitatively alter the key results—to focus on the core tradeoffs of interest, rather than because they are unimportant.

**Table 1. Equilibrium Strategy Profile**

Action	Government's action	Challenger's action
Inclusion/exclusion choice after a fight	Chooses exclusion when $\theta < \underline{\theta}$ and inclusion when $\theta > \bar{\theta}$	n.a.
$C$ is included and $\theta > \bar{\theta}$ : <ul style="list-style-type: none"> <li>• If <math>S_{t-1} = 0</math> and <math>C</math> is weak</li> <li>• If <math>S_{t-1} = 0</math> and <math>C</math> is strong</li> <li>• If <math>S_{t-1} = 1</math> and <math>C</math> is weak<sup>†</sup></li> <li>• If <math>S_{t-1} = 1</math> and <math>C</math> is strong<sup>†</sup></li> </ul>	Offers $x_t = 0$ Offers $x_t = x_I^*$ (by optimal choice) Offers $x_t = x_I^*$ (by assumption) Offers $x_t = x_I^*$ (by assumption)	Accepts any offer Accepts $x_t \geq x_I^*$ Accepts $x_I^*$ <sup>††</sup> Accepts $x_I^*$ <sup>††</sup>
$C$ is included and $\theta < \underline{\theta}$ : <ul style="list-style-type: none"> <li>• If <math>S_{t-1} = 0</math> and <math>C</math> is weak</li> <li>• If <math>S_{t-1} = 0</math> and <math>C</math> is strong</li> <li>• If <math>S_{t-1} = 1</math> and <math>C</math> is weak<sup>†</sup></li> <li>• If <math>S_{t-1} = 1</math> and <math>C</math> is strong<sup>†</sup></li> </ul>	Offers $x_t = 0$ Offers any $x_t \in [0, 1]$ n.a. n.a.	Accepts any offer Fights against any offer n.a. n.a.
$C$ is excluded: <ul style="list-style-type: none"> <li>• If <math>C</math> is weak</li> <li>• If <math>C</math> is strong</li> </ul>	Offers $x_t = 0$ Offers any $x_t \in [0, 1]$	Accepts any offer Fights against any offer

<sup>†</sup> For rows with  $S_{t-1} = 1$ , Table 1 only contains equilibrium responses to the  $x_I$  choice that occurs along the equilibrium path, which is  $x_I^*$ . Appendix A additionally describes optimal actions if  $G$  makes an off-the-equilibrium path patronage offer that  $C$  accepts, and  $G$  subsequently is bound to make that offer in future periods.

<sup>††</sup> Because  $G$  is bound to offer  $x_t = x_I^*$ ,  $C$ 's information set is a singleton in which  $G$  has offered  $x_I^*$ . Therefore,  $C$ 's only choices are {accept  $x_I^*$ , reject  $x_I^*$ }, which obviates specifying an acceptance rule for a continuum of possible offers.

### 3.3 Applying the Formal Model: Pre-Colonial Kingdoms and the Coup-Civil War Nexus in SSA

The formal model explains how low inter-ethnic commitment ability causes horizontal inequalities to arise, and how these inequalities contribute to a coup-civil war nexus. This section applies the theory to generate hypotheses about PCK groups and political violence in SSA that will be empirically assessed below. Specifically, I provide qualitative historical evidence to explain how PCK groups' alternative visions of statehood and history of animosity toward neighboring groups caused regional schisms and undermined creating inter-ethnic institutional ties prior to independence—resulting in low  $\theta$ . Uganda and Nigeria provide examples of how, after independence, an inability to solve commitment problems engendered crises that resulted in coups aiming to exclude other ethnic groups and, subsequently, civil wars.

### 3.3.1 Defining Kingdoms

Vansina (1962, 325) defines an African kingdom as a “sovereign political group, headed by a single leader who delegates authority to representatives in charge of the territorial units into which the country is divided.” The existence of state infrastructure distinguished kingdoms from less centralized polities in which kinship ties composed the basic principle underlying authority delegation (324). Unless one embraces primordialist views of ethnic salience, at a basic level political centralization enhanced recognition of a common identity. In contrast, many non-centralized groups in pre-colonial Africa “recognized no common name and had no feeling that they belonged to a common polity,” such as the Tonga in Zambia (Colson 1969, 29; quoted in Posner 2005, 28). Below I additionally argue that hierarchical political organization heavily influenced pre-colonial inter-ethnic relationships and patterns of colonial rule.

### 3.3.2 How PCK Groups Undermined Inter-Ethnic Commitment Ability Prior to Independence

Distinguishing four pre-independence periods explains how PCK groups’ alternative visions of statehood and history of animosity toward neighboring groups—which stemmed from political centralization—resulted in low  $\theta$  at independence. These periods include pre-colonial, onset of colonial rule, pre-1945 colonial, and post-1945 decolonization. The analysis treats effects from these epochs as reinforcing, rather than trying to isolate the effect of each distinct period. In this sense, focusing on a pre-colonial legacy does not obviate the importance of the colonial period, which is instead theorized to be a crucial mediating factor. To avoid confusion, all countries are referred to by their contemporary name rather than colonial or other historical names.

#### Hostile Pre-Colonial Relations

SSA exhibits considerable variance with regard to the extent and type of pre-colonial relationships among different ethnic groups later placed into the same colony. Whereas many closely located groups interacted seldomly prior to colonization,<sup>18</sup> PCK groups frequently experienced acrimonious relations with their neighbors. Reid (2012) argues Africa experienced a military revolution during the 19<sup>th</sup> century that enlarged the scale and vision of political violence in many parts of the continent (109). Centralized states were well-positioned to create the war economies needed to profit from European guns and slave trading. Some cases featured warfare between competing kingdoms. In Uganda, Buganda and Bunyoro fought continuously throughout the 19<sup>th</sup> century (Tripp 2009, 44), a product of heightened competition between two states that continually adapted new military technologies (Reid 2012, 116). In Benin, Dahomey—one of “the most dramatic manifestations of the highly competitive war economies” (Reid 2012, 114)—fought continually with the neighboring Porto Novo kingdom until France invaded in 1892 (Decalo 1990, 91).

Many PCK groups also participated in the continent’s widespread slave trade, one of the most consequential and destructive activities in Africa’s pre-colonial history (Nunn 2008). Examples of organized groups raiding less developed groups for slaves include Muslim slave raids of southern

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<sup>18</sup>Decalo (1998, 177) discusses Kenya.

animists in Chad (Decalo, 1980, 483) and Sudan that created “a deep hatred for northerners” (Ofcansky 1992), Merina raids of coastal peoples in Madagascar (Minorities at Risk “Merina” 2006), and Bambara raids of Berbers and Arabs in Mali (Krings 1995, 58).

### **Violent Colonization Hardens Ethnic Identity**

Between the Berlin Conference of 1884-5 and the turn of the century, European colonizers conquered most of the African continent. This process frequently resulted in violence—especially when Europeans faced a centralized state that could defend itself. Whereas 46% of PCK groups fought at least one war to resist colonization, less than 2% of non-PCK groups did. Hargreaves’ (1969) argument about West African states highlights how these wars contributed to heightened ethnic identity and an alternative vision of statehood. Although every centralized state attempted to bargain with Europeans, all possessed interests similar to a “rudimentary ‘national cause’” (206) they would defend by revolting. Resisting imperialism strengthened this (sub)national vision and facilitated stronger ethnic identities that survived colonial rule (216).

### **Indirect Colonial Rule Through PCK Groups**

Colonial rule perpetuated pre-colonial differences in statehood. Colonizers often ruled indirectly through PCK groups—in some cases as a de facto autonomous colony—which further differentiated them from other groups. This either created or reinforced the regional schisms that impacted decolonization party formation.

Across the region, minimal European presence in most colonies necessitated heavy reliance on Africans to administer local affairs (Kirk-Greene 1980; Berry 1992). Indirect rule required local hierarchies able to collect taxes, regulate land, and enforce laws. Considerable scholarship characterizes European colonial rule mainly in terms of how Europeans frequently “invented tradition” by promoting chiefs in previously acephalous communities and granting them widespread despotic powers (Ranger 1983; Mamdani 1996).

Although informative, however, general arguments about inventing tradition tend not to consider the vast heterogeneity in pre-colonial polities (Gordon 2005). Groups organized as pre-colonial kingdoms required considerably less European intervention to regulate their own affairs, creating continuity between pre-colonial and colonial political authority. Consequently, the privileged status of hierarchically organized groups hardened ethnic differences. For example, “the special status of the Buganda in Uganda was the most important legacy of the colonial era.” Their founding treaty with Britain in 1900 “appeared to the Baganda as in some sense at least an agreement between equals” (Rothchild and Rogin 1966, 341). Therefore, Buganda’s “integration within the rest of Uganda posed serious problems first to colonial officials and subsequently to nationally-oriented African politicians [because] Buganda could not be dethroned from its dominant position without seriously compromising the viability of Uganda as a whole” (Doornbos 1977, 241).

The trend of ruling indirectly through pre-colonial kingdoms is most pronounced in British colonies.<sup>19</sup>

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<sup>19</sup>Although it may seem surprising that colonizers tended to rely on groups they fought while establishing colonial rule, Europeans often effectively enforced compliance—backed by the threat of force—by replacing intransigent rulers with more pliable ones, as with the Ashanti in Ghana (Hargreaves 1969, 212). Furthermore, Europeans often *provoked*

Prominent examples range from Ashanti in Ghana (Boone 2003, 144-77), Buganda in Uganda (Rothchild and Rogin 1966, 341-51), Hausa and Fulani in Nigeria (Sklar and Whitaker 1966, 19), Lozi in Zambia (Caplan 1970), riverine Arabs in Sudan (Sharkey 2008, 28-33), and Sotho in Lesotho (Weisfelder 1977). And although France attempted to flatten the Muslim empires that confronted them at the onset of colonization (Hargreaves 1969, 200-1), they too realized the necessity of collaboration (Mamdani 1996, 83). France ruled indirectly through PCK groups in colonies such as Benin (Thompson 1963, 169), Burkina Faso (Hargreaves 1969, 204), and Chad (Nolutshungu 1996, 28-9). Belgian indirect rule through PCK groups hardened distinctions between the ruling class Tutsi and majority Hutu in Rwanda and Burundi by mandating ethnic designation in the census and requiring identity cards for all subjects (Young 2006, 309). Ethiopia avoided colonization except for a brief period of Italian rule, which placed its monarch at the center of politics.

### **PCK Groups Undermine Inter-Ethnic Party Creation**

Although the “imperial peace” imposed by Europeans (e.g., Bates 2014) mitigated inter-ethnic violence during colonial rule, latent differences between PCK and non-PCK groups—including distinct visions of statehood and a pre-colonial history of ethnic antagonism—caused institutional divergence during the post-1945 decolonization era. Electoral reforms after World War II provided the first major spark for creating inter-ethnic institutions in SSA. However, PCK groups frequently organized regionally oriented parties rather than mass nationalist parties. In addition to legacies from pre-colonial political centralization, the royal line itself often provided an important organizing device.

In stark cases, a PCK group attempted to achieve a separate independence from the remainder of its colony. The Baganda in Uganda cited their distinct status in the Uganda Agreement of 1900 when trying to gain their own state, stemming from a desire to “safeguard the traditions, Kabakaship [kingship], and the customs of Buganda in an independent Uganda” (Kyeyune and Nsibambi 1962). As a result, “the power of traditional groups . . . precluded the success of a centralized, ideological mass party” (Rothchild and Rogin 1966, 389). Instead, supporters of Buganda’s king created the Kabaka Yekka (KY; meaning “king only”) party after the king led a highly successful boycott of the 1961 Legislative Council elections in which less than 2% of eligible Baganda voted. KY provided “a practical avenue through which Buganda could enter national politics and yet preserve its own autonomy and unity” (358). The ethnically rooted party received 38% of total votes in the final pre-independence parliamentary elections (Schmidt 1999), enabling the Kabaka to become Uganda’s first post-independence president.

Even for PCK groups that did not attempt to gain their own state, regional schisms that had emerged during the pre-colonial or early colonial eras often produced locally oriented parties. The Northern People’s Congress (NPC) in Nigeria was led by an aspiring sultan of Sokoto, and the party’s platform emphasized “the integrity of the north [and] its traditions” whereas “support for broad Nigerian concerns occupied a clear second place” (Lovejoy 1992). Benin’s three hegemonic regional parties split among the former Dahomey kingdom—whose leader descended from the former royal house (Hargreaves 1969, 216)—Porto Novo kingdom, and north (Decalo 1973). A north/south

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small wars to prove their military might prior to installing indirect rule. One historian has argued that Britain’s conflict with northern Nigerian emirs in 1903 “was due less to intransigent resistance by Sultan Attahiru than to Lugard’s determination that, before the British could utilize the Fulani as a ‘ruling caste,’ the military basis of British suzerainty should be asserted by conquest” (Hargreaves 1969, 211).

divide also pervaded politics in Chad (Nolutshungu 1996) and Sudan (Ofcansky 1992). In Madagascar, “Since the 1950s political development has been influenced by conflict structures [between Merina and coastal groups] that trace back to the 19<sup>th</sup> century but were reinforced by colonial politics of ‘divide and rule.’” (Thibaut 1999).

### 3.3.3 How Weak Inter-Ethnic Commitment Ability Caused Political Violence After Independence

The formal model implies that if the challenger’s contemporaneous coercive strength heavily impacts the patronage offers it will receive, portended future power shifts will cause political violence. When political bargaining occurred after independence in SSA, weak inter-ethnic commitment ability caused by PCKs transformed normal political events such as referenda or census counts—which shifted the distribution of power—into political crises because the government had low ability to commit to future promises. Examples from Uganda and Nigeria illustrate how low  $\theta$  can undermine peaceful bargaining.

Uganda exhibited weak inter-ethnic commitment ability at independence. As described above, through reinforcing historical epochs that included Baganda unwillingness to join a nationally oriented party, due to British intervention at independence in 1963 an “alliance of complete opposites” (Decalo 1990, 152) between Buganda’s KY and Milton Obote’s (a Langi, non-PCK group) UPC party governed the country. “It is hard to determine at what stage Prime Minister Obote made up his mind to confront the Kabaka and the Kingdom of Buganda . . . but it is tempting, from the small amount of evidence available and his careful preparing of the ground, to think that he had intended it all along” (Dinwiddy 1981, 514). These are the type of machinations we would expect in a country with low  $\theta$  but in which the ruler, because of externally imposed circumstances, inherits an ethnically inclusionary ruling coalition.

Three key events occurred in 1964 that—at least temporarily—shifted power in favor of Obote (Young 1977, 226).<sup>20</sup> First, UPC gained an absolute majority in parliament. Second, a short-lived military mutiny that Britain helped to quell enabled Obote to strengthen his control over the security forces. The third event related to historical inter-kingdom disputes. To provide background, in 1900 Buganda became the first group in contemporary Uganda to sign a treaty with Britain. This treaty awarded territory to Buganda that a British-Baganda alliance had recently captured from rival kingdom Bunyoro (also incorporated into Uganda). Britain’s contentious decision to strip Bunyoro of its culturally and historically significant “Lost Counties” provided an opportunity for Obote (*G*) to undermine Buganda (*C*) by allowing a referendum to occur. Residents of the Lost Counties voted to join Bunyoro. This vote portended a shift in the distribution of power—similar to any election or referendum—but the depth of weak inter-ethnic commitment ability raised the stakes. “As *President*, the Kabaka should have ratified the transfer; as *Kabaka* [i.e., king], such an act was an impossibility” [emphasis in original] (Dinwiddy 1981, 514) because the transfer would erode the king’s support from his main constituency. The Lost Counties referendum soon “shifted

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<sup>20</sup>The model assumes shifts in the distribution of power are exogenous. When examining empirical cases, however, very few events that shift the distribution of power contain *no* element of choice. Instead, it may be useful to think about *opportunities* to shift power as arising exogenously, followed by an actor’s choice regarding whether to seize the opportunity to shift power in their favor. Based on the analysis above, we would expect actors to seize these opportunities when commitment ability is low—because payments will be more closely tied to each actors’ share of power.

the balance of power back from Buganda to the central government” (155). Capitalizing on his improved bargaining position, Obote arrested key Baganda ministers before they could appeal for British military assistance. The crisis culminated in 1966 when Obote militarily suppressed a Baganda secession attempt, staged a coup to become the undisputed head of state, and unilaterally terminated the Baganda monarchy (Tripp 2009, 45). After continued turmoil at the center including Idi Amin’s kleptocratic reign in the 1970s, Baganda participated in civil wars that removed Amin and later that removed Obote after he had become president for a second time.

Nigeria also inherited an ethnically inclusive coalition at independence despite weak inter-ethnic commitment ability and also experienced volatility.<sup>21</sup> Nigeria’s federal formula—a legacy of Frederick Lugard’s invention of the Native Authority System for the Sokoto Caliphate in the north—dictated that each of the country’s three regions would be apportioned seats in the national legislature based on population share. As a result, the constitutionally mandated decennial census in 1962 carried huge consequences for the distribution of power.<sup>22</sup> Despite conducting the census twice, experts estimated the total count was wildly inflated and Igbo (non-PCK group, *C*) leaders publicly charged the northern government (*G*) with fraud. Consistent with actions to prevent adverse power shifts in weak commitment environments, Igbo officers reacted to these events by leading a successful coup attempt in 1966. Despite stating they aimed to create a unitary government without ethnopolitical bias, deep-seated regional cleavages caused northern leaders to perceive the coup “not so much as an effort to impose a unitary government as a plot by the Igbo to dominate Nigeria.” This led to a northern-dominated countercoup in 1966, followed by political exclusion of Igbo and an Igbo secession attempt in 1967.

### 3.3.4 Hypotheses

The analysis below distinguishes among three types of groups: (1) PCK groups, (2) non-PCK groups in a country that has at least one PCK group (i.e., non-PCK groups in a PCK country), and (3) groups in non-PCK countries. *Ceteris paribus*, the model implies PCK groups and non-PCK groups in PCK countries should have higher rates of coups and civil wars, and lower rates of political inclusion, than groups in non-PCK countries. It is crucial to distinguish between two categories of non-PCK groups because the model implies there are within-country spillover effects from PCK groups to non-PCK groups within their country. For example, non-PCK Langi in Uganda should be more likely to participate in political violence than non-PCK Kikuyu in Kenya because Uganda contains PCK groups whereas Kenya does not.

Several caveats to the *ceteris paribus* condition must be considered before stating the core hypotheses. There is state dependence in the model conditional on which group inherits control of the government at the outset of the game via the Nature move. For groups in PCK countries, the magnitude of the effects should be conditioned by whether PCK groups or non-PCK groups tended to be more successful at gaining control of the state at independence, about which the model is agnostic. If the higher organizational capacities of PCK groups enabled them to capture the state more often, then PCK groups’ inclusion rates should be higher than those of non-PCK

<sup>21</sup>The references in this paragraph come from Lovejoy (1992).

<sup>22</sup>Supporting this claim, “The Northern Region’s political strength, marshaled by the NPC, had arisen in large measure from the results of the 1952-53 census, which had identified 54 percent of the country’s population in that area.”



groups within their country—and, consequently, PCK groups’ coup rates should also be higher whereas civil war propensity should be lower than those of non-PCK groups within their country. In contrast, the opposite would be true if non-PCK groups in PCK countries tended to build broad coalitions during the decolonization period to neutralize PCK groups. Still, *ceteris paribus*, the model implies the following hypotheses.

**H1.** PCK groups and non-PCK groups in PCK countries should be included in the ruling coalition less frequently than groups in non-PCK countries.

**H2.** PCK groups and non-PCK groups in PCK countries should participate in military coups more frequently than groups in non-PCK countries.

**H3.** PCK groups and non-PCK groups in PCK countries should participate in new civil wars more frequently than groups in non-PCK countries.

## 3.4 Data and Research Design

The remainder of the paper empirically assesses these hypotheses. This section presents the sample and data, followed by results in the next section.

### 3.4.1 Unit of Analysis and Time Period

The unit of analysis is ethnic group-years, with ethnic groups coded by the Ethnic Power Relations (EPR) database (Cederman, Wimmer, and Min 2010). This dataset codes politically relevant ethnic groups in all country-years since either 1945 or their country’s year of independence. The main advantage of this dataset over others that provide ethnic group-level data, such as Minorities at Risk, is that EPR provides data points for *all* politically relevant ethnic groups, not just discriminated minorities. A potential drawback is that EPR does not provide data for countries in which ethnicity is judged politically irrelevant. This excludes from the analysis countries such as Lesotho and Swaziland that have only one effective ethnic group—but did have a pre-colonial kingdom.<sup>23</sup> As discussed in Appendix B, however, the available sample does match a key implied scope condition of the model: *multi-ethnic* political competition.

Outcomes are measured for each ethnic group from independence until 1989. Most SSA countries experienced independence for about three decades prior to the end of the Cold War. Pre-colonial legacies should exert their strongest effects during this initial post-independence period because of tighter temporal proximity to the hypothesized cause and because political dynamics changed considerably in SSA after 1989 in at least two important ways. First, Western governments gained increased leverage over governments heavily dependent on their foreign aid after the Cold War ended (Levitsky and Way 2010). Among other effects, Western governments have undermined incentives

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<sup>23</sup>More generally, the sample here excludes all ethnic group-years coded by EPR as “politically irrelevant.”

to stage coups by heavily discouraging military rule.<sup>24</sup> Second, Benin’s national conference in 1990 initiated a regional trend of elections that are at least semi-competitive. Although this pattern resembles SSA’s immediate post-independence political situation, the important difference is that PCK groups heavily influenced electoral cleavages during the decolonization era whereas three decades of independence—often accompanied by predatory and authoritarian rule and economic mismanagement in both PCK and non-PCK countries—engendered new cleavages during SSA’s post-Cold War wave of liberalization.

### 3.4.2 Main Explanatory Variable: Pre-Colonial Kingdoms

The theory posits PCK groups created political tensions after independence by causing violent pre-colonial interactions and by influencing the calculus of colonial officials. Unfortunately, sparse data poses considerable difficulties for measuring this concept directly, and reading individual country histories reveals a myriad of pre-colonial political organizations that historians have labeled as “kingdoms” or related terms.<sup>25</sup>

To address these issues I constructed a new dataset of pre-colonial kingdoms in SSA. I followed a two-step procedure that involved (1) compiling a list of candidate states and (2) coding which of these polities were indeed organized as hierarchical kingdoms alongside matching the kingdoms with EPR ethnic groups. First, to identify possible kingdoms I consulted African historical atlases and survey history books. Specifically, I analyzed continent-wide maps of states in Africa on either the eve of the European Scramble for Africa (roughly, 1880s) or the entire 19<sup>th</sup> century.<sup>26</sup> Although none of the sources stated explicit coding rules for how they selected which African states to include in their map, I consulted 11 different sources to minimize the likelihood of omitting any important kingdoms. Second, for all 82 states identified in step 1, I consulted *Encyclopaedia Britannica* (EB) entries and additional secondary sources for evidence of political centralization. Step 2 yielded 27 EPR groups belonging to pre-colonial kingdoms.

Table 2 lists all the PCK groups and their countries. Countries that contain at least one PCK group will be referred to as “PCK countries.”

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<sup>24</sup>Marinov and Goemans (2013) report that 72% of successful coups since 1991 have been followed by elections within the next five years, compared to 27% prior to 1991. Thus, in the post-Cold War era, juntas have faced considerable obstacles to remaining in power even after succeeding in a coup attempt.

<sup>25</sup>Warner (2001, 70) elaborates upon the confusing and inconsistent nomenclature that scholars have used to describe pre-colonial African states.

<sup>26</sup>Appendix C discusses the coding rules and sources in more detail.

**Table 2. List of PCK Groups**

<b>Country</b>	<b>EPR Ethnic Group</b>	<b>Historical Kingdom</b>
Angola	Mbundu-Mestico	Imbangala/Kasanje
Benin	South/Central (Fon)	Dahomey
Benin	Southeastern (Yoruba/Nagot and Goun)	Porto Novo
Burundi	Tutsi	Burundi
Chad	Arabs	Wadai
Chad	Muslim Sahel groups	Wadai
Congo, Rep.	Batéké	Teke
DR Congo	Luba Kasai	Luba
DR Congo	Luba Shaba	Luba
DR Congo	Lunda-Yeke	Lunda/Katanga
Ethiopia	Amhara	Ethiopia
Ghana	Asante (Akan)	Ashanti
Ghana	Other Akans	Fante
Guinea	Peul	Futa Jalon
Madagascar	Highlanders	Merina
Mali	Blacks (Mande, Peul, Voltaic etc.)	Tukulor
Nigeria	Hausa-Fulani and Muslim Middle Belt	Kanem-Bornu, Sokoto
Nigeria	Yoruba	Ibadan, Yoruba states
Rwanda	Tutsi	Rwanda
Senegal	Pulaar (Peul, Toucouleur)	Futa Toro
Sudan	Fur	Darfur
Sudan	Shaygiyya, Ja'aliyyin and Dana	Sennar, Mahdist
Uganda	South-Westerners (Ankole, Banyoro, Toro)	Ankole, Bunyoro, Toro
Uganda	Baganda	Buganda
Zambia	Lozi (Barotse)	Lozi
Zambia	Lunda (NW Province)	Kazembe
Zimbabwe	Ndebele-Kalanga-(Tonga)	Ndebele

### 3.4.3 Dependent Variables

Ethnic group-level civil war onsets and successful coup attempts are coded from Roessler's (2011) appendix, who also uses EPR ethnic groups as the unit of analysis. I focus on successful coups because measuring failed coups poses severe difficulties (Kebschull 1994). Furthermore, Roessler's appendix has full data coverage for the ethnicity of groups in successful coups but exhibits considerable missing data for failed coups, which is presumably why he also only examines successful coup attempts.<sup>27</sup> The EPR database provides ethnic representation data. A group-year is coded as 1 on the political inclusion variable if it scores any of the following on EPR's political status variable: "monopoly," "dominant," "senior partner," "junior partner"; and 0 otherwise.

<sup>27</sup>The failed coups measure involves two strong sources of selection bias: which failed coups produced sufficient evidence to (1) code it as a coup attempt and (2) code the ethnicity of the main participants.

### 3.4.4 Research Design and Control Variables

Although the statistical results are not based on natural experimental variation, I examine the PCK “treatment” assignment process to identify the most likely confounding effects. Furthermore, many prominent explanations of political violence can be eliminated because they are potentially endogenous to PCK. Furthermore, a coherent alternative explanation would need to explain away the correlation between PCK and all three outcomes.

#### Examining the Treatment Assignment Process

Existing statistical and qualitative studies on Africa provide insight into why some but not other ethnic groups developed kingdoms prior to colonization, i.e., why the “treatment” was assigned to some ethnic groups but not others. Alsan (2015, 395) shows groups residing in territory with greater tsetse fly prevalence (*tsetse*) tended to have lower levels of political centralization, perhaps by causing low population density (*popdens*; see Herbst 2000) and by eliminating the possibility of using horses and camels to move armies and conduct large-scale trade (Colson 1969, 35; Reid 2012, 2). Related, Putterman (2008) shows in a global sample that territories experiencing earlier transitions to agricultural production (*agtransition*) tended to experience higher levels of statehood in the second millennium. Fenske (2014) provides evidence that states were more likely to arise in areas with higher ecological diversity (*ecodiv*) because they could more easily trade across ecological regions.

Violence also affected state formation. Although slave wars destroyed historical states such as the Kongo kingdom (Nunn 2008, 143) and could have also adversely affected state formation through increasing ethnic diversity (Whatley and Gillezeau 2011), states able to monopolize trade routes benefited greatly (Lloyd 1965, 70; Reid 2014, 398) and kingdoms such as the Ashanti went into decline after West African slave exports decreased (Hopkins 2000, 314-318). Slave exports also yielded European firearms, which facilitated violent expansion in the “long” 19<sup>th</sup> century (Reid 2012, 107-146). Therefore, it is important to account for a group’s distance from major ports in the Atlantic or Indian Ocean slave trade (*min\_slavedistance*), which affected its propensity for slave trading. Finally, Besley and Reynal-Querol (2014) and Dincecco et al. (2014) demonstrate a strong positive relationship between historical and modern wars in Africa. Applying Eurocentric theories on wars and state formation suggests *histwar* may also be important in Africa.<sup>28</sup>

PCK may also be correlated with colonial-era factors by affecting colonial border formation, which in turn impacted treatment assignment by categorizing ethnic groups into different national units. Although qualitative evidence suggests no clear relationship between PCK and identity of the colonizer, this is important to control for because different strategies of colonial rule, stances toward decolonization, and willingness to prop up friendly post-colonial regimes affected all three dependent variables (Fearon and Laitin 2003, 86; Blanton, Mason, and Athow 2001; Wucherpfennig, Hunziker, and Cederman 2012). Pre-colonial political centralization also likely affected a group’s share of the national population (*groupsize*) and its distance from the capital (*dist\_capital*), which have been studied as causes of civil war.

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<sup>28</sup>Regarding research design, it is unfortunate that none of these factors come close to meeting the main instrumental variables criterion of being independent from the outcome except by affecting the treatment.

## Eliminating Implausible Alternative Explanations

Most of the voluminous literature on causes of civil wars and coups focuses on post-colonial determinants. Thus, in addition to controlling for factors related to the treatment assignment process, a crucial feature of the research design that may permit causal inferences is that PCKs antedate many compelling alternative theories of political violence.

As examples, every regressor from a recent statistical paper on coups can be ruled out on these grounds: expenditures per soldier, the number of military personnel, the number of effective state coercive organizations, the ratio of paramilitary personnel to regular army personnel, (post-independence) GDP per capita, non-coup measures of instability, years since the last coup attempt, and a dummy for each of military regimes, full democracies, and fully non-democratic regimes (J. Powell 2013). Londregan and Poole (1990) focus on income, world region, and previous coups. Many regressors from Fearon and Laitin’s (2003) civil war analysis, which have been widely used in the literature, can also be eliminated: prior civil war (but post-1945), post-independence per capita income, new state, political instability, democracy, and anocracy.

## 3.5 Empirical Evidence

Statistical and qualitative evidence supports the importance of pre-colonial kingdoms for explaining political violence in post-colonial SSA. To preview the multiple regression findings in a transparent manner, Table 3 presents cross-tabular data that summarizes trends for ethnic group-years. As noted, the *ceteris paribus* assumption that generated Hypotheses H1 through H3 requires careful interpretation because PCK groups and non-PCK groups in PCK countries may not have been equally likely to inherit control of the post-colonial state—and if so, these groups should experience differential rates of coups and civil wars. Comparing Column 1 of Table 3 with Columns 2 and 3 shows that although the frequency of political inclusion is lower for both types of groups in PCK countries than for groups in non-PCK countries (Row a), this trend is considerably stronger for non-PCK groups in PCK countries (65.2% versus 40.0%). Therefore, within PCK countries, the coup results should be stronger for PCK groups whereas the civil war results should be stronger for non-PCK groups.

**Table 3. PCK and Violence: Cross-Tabular Evidence**

Outcome	1. Group in non-PCK country	2. PCK group	3. Non-PCK group in PCK country
a. Politically included	$\frac{1059}{1448} = 73.1\%$	$\frac{487}{747} = 65.2\%$	$\frac{762}{1921} = 40.0\%$
b. Coup	$\frac{14}{1448} = 1.0\%$	$\frac{24}{747} = 3.2\%$	$\frac{17}{1921} = 0.9\%$
c. Civil war	$\frac{3}{1448} = 0.2\%$	$\frac{8}{747} = 1.1\%$	$\frac{25}{1921} = 1.3\%$

*Notes:* Each cell of Table 3 reports the total number of the events in which a group with the specified value on the PCK variable participated, divided by the total number of group-years with that PCK value; and the corresponding percentage.

The tabular data support these implications. Although PCK groups are more than three times more likely than groups in non-PCK countries to participate in successful coups, both types of non-PCK groups participate in successful coups at roughly an equal rate. Civil war propensity is higher for both types of groups in PCK countries than groups in non-PCK countries, although the frequency is higher for non-PCK groups in PCK countries. Strikingly, in the time period considered, 33 group-level civil war onsets occurred in PCK countries compared to only 3 in non-PCK countries.

Table 4 provides multiple regression estimates. Column 1 includes separate fixed effects for PCK groups and non-PCK groups in PCK countries—leaving groups in non-PCK countries as the omitted comparison category—and includes temporal dependence controls. Column 2 additionally controls for three pre-colonial variables that are exogenous to PCK: tsetse fly prevalence, timing of agricultural transition, and distance from a major slave trade. Column 3 adds to Column 2 three pre-colonial variables whose inclusion hopefully alleviates omitted variable bias but may induce some post-treatment bias: population density, ecological diversity, and historical wars. Column 4 adds to Column 3 the colonial-era covariates, which exhibit the same concern about an omitted variable bias/post-treatment bias tradeoff: fixed effects for British, French, and Portuguese colonization, the group’s share of the national population, and distance from the capital. The dependent variables in Panels A through C, respectively, are ethnopolitical inclusion, successful coup attempts, and civil war onsets. Panel A features standard logit models whereas Panels B and C use logit models developed by King and Zeng (2001) for rare events dependent variable data. All regressions cluster standard errors by ethnic group.<sup>29</sup>

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<sup>29</sup>Importantly, the models do not control for country fixed effects. Because the model predicts within-country spillover effects of PCK groups on non-PCK groups within their country, within-country comparisons would not provide a valid test of the formal model’s hypotheses.

**Table 4. PCK and Violence: Regression Evidence**

	(1)	(2)	(3)	(4)
<u>Panel A. DV: Political inclusion</u>				
PCK Group	-0.433 (0.365)	-0.357 (0.497)	-0.529 (0.307)	-0.425 (0.371)
Non-PCK Group in PCK Country	-0.786 (0.020)	-0.851 (0.011)	-0.756 (0.045)	-0.679 (0.060)
Observations	4116	4116	4116	4116
<u>Panel B. DV: Successful coup</u>				
PCK Group	1.118 (0.008)	1.169 (0.005)	1.299 (0.005)	1.415 (0.001)
Non-PCK Group in PCK Country	0.002 (0.997)	0.048 (0.916)	0.330 (0.477)	0.470 (0.327)
Observations	4116	4116	4116	4116
<u>Panel C. DV: Civil war onset</u>				
PCK Group	1.514 (0.022)	1.496 (0.021)	1.409 (0.035)	1.503 (0.042)
Non-PCK Group in PCK Country	1.672 (0.006)	1.537 (0.011)	1.485 (0.015)	1.440 (0.037)
Observations	4116	4116	4116	4116
<u>Temporal dependence controls?</u>				
	Yes	Yes	Yes	Yes
<u>Additional control variables:</u>				
Exogenous precolonial?	No	Yes	Yes	Yes
Endogenous precolonial?	No	No	Yes	Yes
Colonial?	No	No	No	Yes

*Notes:* Table 4 reports the coefficient estimate, and p-values calculated by clustering standard errors at the group level in parentheses, for a series of logit regressions. Panels B and C use the rare events logit estimator developed by King and Zeng (2001). For expositional clarity, coefficient estimates are suppressed for all regressors except PCK group and non-PCK group in a PCK country.

Table 4 shows the cross-tabular patterns are robust to considering these alternative explanations. As evidenced by the p-values in parentheses, non-PCK groups in PCK countries are significantly less likely to be politically included, PCK groups are significantly more likely to participate in successful coups, and both groups in PCK countries are significantly more likely to participate in civil wars. Interpreting the substantive magnitude of the estimated effects in the Column 1 regressions, non-PCK groups in PCK countries' predicted probability of inclusion is 55% lower, and of civil wars 527% higher, than the basis category of groups in non-PCK countries; and PCK groups' predicted probability of successful coups is 300% higher, and of civil wars 450% higher, than the basis category.

Analyzing PCK countries individually provides another way to demonstrate that PCK groups played a central role in causing political violence. Table 5 organizes the cases into three modal

patterns of political inclusion/exclusion and violence: (1) one ethnic group ruled to the exclusion of all others at independence, (2) the country gained independence with an ethnically inclusive ruling coalition but transitioned to ethnic exclusion, and (3) the country permanently maintained political inclusion. Every PCK group has an asterisk next to its name the first time it appears in the table.

**Table 5. Modal Paths of Political Violence in PCK Countries**

Country	Year(s)	Description
<i>Ethnic exclusion at independence</i>		
Angola	1975	Mbundu* gain power after a long decolonization struggle that fractured along ethnic lines; systematically excluded Ovimbundu and Bakongo fight against government
Chad	1965	Systematically excluded Muslim Sahel* and Arab* groups fight to overthrow the southern-dominated government
Congo, DR	1960	Lunda-Yeke* and Luba Kasai* proclaim separatist states within days of independence
Ethiopia	Ancient 1962 1974 1976	Head of state is Amhara* monarch Secession attempt by Eritreans Successful coup terminates monarchy Civil war widens to include additional ethnic groups; Amhara dominance ended when Tigray rebels capture the capital in 1991
Madagascar	1960 1972	Merina* excluded from political offices but influential in military Successful coup led by Merina
Mali	1968 1989	Military overthrows civilian government, Bambara* remain in power Tuaregs and Arabs, excluded from power since independence, revolt
Rwanda	1959 1962	Hutu rebellion destabilizes historical Tutsi* monarchy Monarchy terminated by popular referendum, Tutsi are systematically excluded from power and fight Hutu government
Sudan	1955 1958 1963 1983	Mutiny by southern officers during integration into riverine Arab*-dominated army First of four successful coups; although the coups rotate power among riverine Arabs, latter three stemmed from the civil war against the south First civil war by southerners begins Second civil war by southerners begins



**Table 5, cont.**

Country	Year(s)	Description
<i>Ethnic inclusion followed by exclusion</i>		
Burundi	1962	Tutsi* monarch is head of state at independence, shares power with Hutu
	1965	Failed coup attempt by Hutu
	1966	Tutsi officers overthrow the monarchy, repress Hutu
	1972	Violence against Hutu
	1988	Violence against Hutu
Congo, Rep.		Two successful coups in 1960s and brief period of ethnocracy in 1970s appear unrelated to PCK
Nigeria	1960	Head of state is Hausa-Fulani*
	1966	Successful coup led by Igbo, countercoup led by Hausa-Fulani
	1967	Secession attempt by Igbo
Uganda	1963	King of Buganda* is President
	1966	Successful coup engenders systematic exclusion of Baganda and terminates Buganda monarchy
	1978	Baganda participate in anti-Idi Amin civil war
	1981	Baganda participate in anti-Milton Obote civil war
Zimbabwe	1980	Shona-dominated ZANU control the presidency but share power with Ndebele*-dominated ZAPU
	1982	Failed coup attempt led by Ndebele leads to their exclusion and discrimination
	1983	Civil war initiated by Ndebele
<i>Permanent inclusion</i>		
Benin	1960-1972	Fon*, Yoruba*, and northern groups rotate in power, period includes six successful coup attempts
Ghana	1957-1981	Five successful coups, Ashanti* participate in several coups
Guinea	1960-1983	Stable authoritarian rule
	1984	Successful coup that includes Fulani* participation
Senegal	1960-1989	Stable authoritarian rule
	1989	Diola launch separatist war
Zambia	1964-1989	Stable authoritarian rule

Fourteen of the 18 countries highlight a clear destabilizing role for PCK groups. In seven cases, one ethnic group had monopolized power by independence. Six out of the seven cases experienced at least one civil war by an excluded group. In the seventh, Madagascar, the politically excluded Merina (as coded by EPR) maintained a key presence in the military (Schraeder 1995), which may explain why Merina generals staged coups rather than initiated a civil war. Importantly, the PCK group was a central actor in the violence in all these cases. Conflicts in Ethiopia and Rwanda revolved around the monarchy specifically. In an eighth case, DR Congo, two separatist attempts by PCK groups launched within days of independence occurred before any clear patterns of ethnic rule emerged.

In another four cases, ethnic tensions within an ethnically inclusionary coalition bred coup attempts and purges that were followed by systematic ethnic exclusion and civil war. Once again PCK groups

were key actors in the violence, and conflicts in Uganda and Burundi revolved specifically around the monarchy.

Two other countries, Benin and Ghana, exhibit spirals of coups but also raise important questions. The role of PCK groups causing political instability in Benin is quite direct (e.g., Decalo 1973, 1990), and the leader of Ghana's first coup explicitly denounced Nkrumah's attempts to undermine traditional Ashanti organizations (Owusu 1989, 381)—a rivalry that began during the colonial era after Nkrumah attempted to undermine Ashanti planter-chiefs (Boone 2003, 159-63). However, these countries raise the puzzle of why subsequent governments did not attempt systematic political exclusion.

Four countries, however, do not provide clear support for the theory. Although the Republic of Congo experienced two successful coups in the 1960s and a brief period of ethnocratic rule in the 1970s, the role of PCK groups is unclear. Three cases—Guinea, Senegal, and Zambia—defy the general pattern by exhibiting stable authoritarian rule, although in the 1980s a successful coup occurred in Guinea and a civil war began in Senegal.

### 3.6 Conclusion

This paper aimed to develop stronger historical and strategic foundations for the expanding literature on horizontal ethnic inequalities and civil war. It developed a game theoretic model of ethnopolitical inclusion/exclusion and derived implications for coups and civil wars. It then presented historical and statistical evidence that ethnic groups in Sub-Saharan Africa organized as pre-colonial kingdoms (PCKs) undermined inter-ethnic commitment ability and caused higher rates of civil wars and coups alongside low levels of ethnopolitical inclusion after independence.

The findings from this paper carry implications for at least two other important literatures. First, a large economics literature studies historical causes of modern development. Existing evidence shows historical states caused *higher* levels of economic development in Africa (Gennaioli and Rainer 2007; Michalopoulos and Papaiannou 2013). It will be intriguing in future work to explore whether and how historical statehood can be consistent with both higher levels of development *and* higher levels of violence. Building on several recent studies, this paper also demonstrates the importance of historical factors for understanding modern conflict (Besley and Reynal-Querol 2014; Fearon and Laitin 2014; Dincecco et al. 2014). Second, this paper applies a bargaining model of war to study the causes and consequences of ethnopolitical exclusion—a previously unexplored application. This will hopefully provide a constructive step for integrating previously disparate strands of the civil war literature.

### 3.7 References

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Appendix to accompany  
*Pre-Colonial Kingdoms and the Coup-Civil War Nexus*  
*in Sub-Saharan Africa*

## A. Formal Model Analysis

Appendix A presents a more detailed formal analysis of the model and proves all the results from the text. After summarizing the actions in a strategy profile and providing notation, I solve for equilibrium actions in strategy profiles in which the winner of a fight chooses inclusion followed by strategy profiles in which the winner chooses exclusion. Next, I prove the results from the text and state the equilibrium strategy profiles.

### A.1. Actions in a Strategy Profile

A strategy profile contains 13 elements. First, the winner's inclusion/exclusion decision following a fight. The other 12 are:

$\{G\text{'s offer, } C\text{'s acceptance/fighting function}\} \times \{C \text{ is strong, } C \text{ is weak}\} \times$   
 $\{C \text{ is included and } S_{t-1} = 0, C \text{ is included and } S_{t-1} = 1, C \text{ is excluded}\}.$

### A.2. Notation

The following notation will be used below.



**Table A1. Notation for Future Continuation Values**

Player	Type of subgame in the next period	Challenger's strength in the next period	Continuation value
Government	Inclusionary without promise locked in	Strong	$V_{G,i}^s$
Government	Inclusionary without promise locked in	Weak	$V_{G,i}^w$
Government	Inclusionary with $x_I$ locked in	Strong	$V_{G,x_I}^s$
Government	Inclusionary with $x_I$ locked in	Weak	$V_{G,x_I}^w$
Government	Exclusionary	Strong	$V_{G,e}^s$
Government	Exclusionary	Weak	$V_{G,e}^w$
Challenger	Inclusionary without promise locked in	Strong	$V_{C,i}^s$
Challenger	Inclusionary without promise locked in	Weak	$V_{C,i}^w$
Challenger	Inclusionary with $x_I$ locked in	Strong	$V_{C,x_I}^s$
Challenger	Inclusionary with $x_I$ locked in	Weak	$V_{C,x_I}^w$
Challenger	Exclusionary	Strong	$V_{C,e}^s$
Challenger	Exclusionary	Weak	$V_{C,e}^w$

Additionally:

$$V_{G,i} \equiv \sigma V_{G,i}^s + (1 - \sigma) V_{G,i}^w$$

$$V_{G,x_I} \equiv \sigma V_{G,x_I}^s + (1 - \sigma) V_{G,x_I}^w$$

$$V_{G,e} \equiv \sigma V_{G,e}^s + (1 - \sigma) V_{G,e}^w$$

$$V_{C,i} \equiv \sigma V_{C,i}^s + (1 - \sigma) V_{C,i}^w$$

$$V_{C,x_I} \equiv \sigma V_{C,x_I}^s + (1 - \sigma) V_{C,x_I}^w$$

$$V_{C,e} \equiv \sigma V_{C,e}^s + (1 - \sigma) V_{C,e}^w$$

With some repetition of notation, I use the same continuation value terms when the winner optimally includes the loser and when the winner optimally excludes the winner.

**Table A2. Notation for Equilibrium Offers**

Winner's optimal choice	Type of subgame in the current period	Equilibrium Offer
Inclusionary	Inclusionary	$x_{i,i}^*$
Inclusionary	Exclusionary	$x_{i,e}^*$
Exclusionary	Inclusionary	$x_{e,i}^*$
Exclusionary	Exclusionary	$x_{e,e}^*$

Using notation from the text,  $x_I^* = x_{i,i}^*$  if the winner optimally includes and  $x_I^* = x_{e,i}^*$  if the winner optimally excludes.

### A.3. Winner chooses inclusion

#### Conditions under which the inclusive subgame will be peaceful

The following five recursive equations characterize payoffs and the patronage offer in an inclusive subgame when  $S_{t-1} = 0$  if the equilibrium is peaceful. If  $C$  accepts the offer in a strong period, it consumes  $x_t$  in the current period. With probability  $\theta$ ,  $G$ 's implicit promise binds and  $C$  will receive  $x_t$  in all future periods. With probability  $1 - \theta$  the promise does not bind and  $C$  receives the future continuation value associated with being the challenger in either a strong period (probability  $\sigma$ ) or in a weak period (probability  $1 - \sigma$ ):

$$V_{C,i}^s = x_t + \delta \left\{ \theta \frac{x_t}{1 - \delta} + (1 - \theta) [\sigma V_{C,i}^s + (1 - \sigma) V_{C,i}^w] \right\}. \quad (\text{A1})$$

$C$  will only accept  $x_t$  if this action provides utility at least as large as the expected utility of fighting. No consumption occurs in the period of a fight, if  $C$  wins (probability  $p$ ) it receives the future continuation value of the government in an inclusive subgame (by the assumption the winner includes), and if  $C$  loses (probability  $1 - p$ ) it receives the future continuation value of the challenger in an inclusive subgame:

$$V_{C,i}^s \geq \delta [p V_{G,i} + (1 - p) V_{C,i}]. \quad (\text{A2})$$

In a peaceful equilibrium,  $G$  needs to set  $x_t$  large enough that  $C$  prefers to accept rather than to reject. Conditional on inducing acceptance,  $G$ 's utility is a strictly decreasing function of the patronage offer. Therefore,  $G$  sets  $x_t$  to make  $C$  exactly indifferent between accepting and fighting—implying in equilibrium Equation A2 holds with equality.

In a weak period,  $C$  wins with probability 0. Therefore, it receives a patronage offer of 0 and remains as challenger in the next period:

$$V_{C,i}^w = \delta [\sigma V_{C,i}^s + (1 - \sigma) V_{C,i}^w]. \quad (\text{A3})$$

In a strong period,  $G$  consumes the entire per-period revenue stream minus the patronage offer. With probability  $\theta$  the implicit promise binds and  $G$  will consume  $1 - x_t$  in all future periods. With complementary probability the promise does not bind and  $C$  receives either the future continuation

value associated with being the government in a strong period (probability  $\sigma$ ) or in a weak period (probability  $1 - \sigma$ ):

$$V_{G,i}^s = 1 - x_t + \delta \left\{ \theta \frac{1 - x_t}{1 - \delta} + (1 - \theta) [\sigma V_{G,i}^s + (1 - \sigma) V_{G,i}^w] \right\}. \quad (\text{A4})$$

In a weak period,  $G$  consumes the entire per-period revenue stream and remains as government in the next period:

$$V_{G,i}^s = 1 + \delta [\sigma V_{G,i}^s + (1 - \sigma) V_{G,i}^w]. \quad (\text{A5})$$

Solving A1 through A5 for  $x_{i,i}^*$  yields:

$$x_{i,i}^* = \frac{\delta p [1 - \delta(1 - \sigma\theta)]}{[1 - \delta(1 - 2\sigma p)][1 - \delta(1 - \theta)]}. \quad (\text{A6})$$

$G$  is able to make a high enough patronage offer to buy off  $C$  if  $x_{i,i}^* \leq 1$ . Setting  $x_{i,i}^* = 1$  and solving for  $\theta$  provides the threshold value of  $\theta$  such that  $G$  can buy off  $C$  and the inclusionary subgame will be peaceful if  $\theta \geq \underline{\theta}_i$ :

$$\underline{\theta}_i = \frac{(1 - \delta) \{ \delta [1 + p(1 - 2\sigma)] - 1 \}}{\delta [1 - \delta(1 - \sigma p)]}. \quad (\text{A7})$$

### Conditions under which $C$ accepts the permanent offer

Once  $G$ 's promise gets locked in,  $G$ 's action space becomes degenerate.  $C$  will always accept the equilibrium offer. However, there is an off-the-equilibrium-path possibility that a patronage offer lower than the equilibrium one gets locked in. Therefore, we must specify locked in offers  $C$  will accept. If the offer is  $x_I$ , then  $C$ 's utility to accepting is:

$$V_{C,x_I}^s = \frac{x_I}{1 - \delta}. \quad (\text{A8})$$

Based on  $C$ 's expected utility to fighting, it must receive at least

$$V_{C,x_I}^s \geq \delta [p V_{G,i} + (1 - p) V_{C,i}]. \quad (\text{A9})$$

Substituting in information from A1 through A5 and simplifying yields:

$$\underline{x}_{I,i} = \frac{\delta p [1 - \delta(1 - \sigma)]}{1 - \delta(1 - 2\sigma p)}. \quad (\text{A10})$$

### Contradict existence of a peaceful exclusive subgame

The following five recursive equations characterize payoffs and the patronage offer in an exclusive subgame if the equilibrium is peaceful. I will solve for a  $\sigma$  threshold that contradicts the existence of a peaceful exclusionary subgame. If  $C$  accepts an offer in a strong period, it consumes  $x_t$  in the current period, and in the next period  $C$  receives either the future continuation value associated with

being the challenger in a strong period (probability  $\sigma$ ) or in a weak period (probability  $1 - \sigma$ ):

$$V_{C,e}^w = x_t + \delta[\sigma V_{C,i}^s + (1 - \sigma)V_{C,i}^w]. \quad (\text{A11})$$

$C$  will only accept  $x_t$  if this action provides utility at least as large as the expected utility of fighting. No consumption occurs in the period of a fight, if  $C$  wins (probability  $\alpha p$ ) it receives the future continuation value of the government conditional on the winner choosing inclusion, and if  $C$  loses (probability  $1 - \alpha p$ ) it receives the future continuation value of the challenger conditional on the winner choosing inclusion. These future continuation values presume the inclusionary subgame is peaceful. As shown below, the winner will only ever choose inclusion (the presumption undergirding this subsection) if the inclusive subgame is peaceful. These considerations yield:

$$V_{C,e}^s \geq \delta[\alpha p V_{G,i} + (1 - \alpha p)V_{C,i}]. \quad (\text{A12})$$

In a peaceful equilibrium,  $G$  needs to set  $x_t$  large enough that  $C$  prefers to accept rather than to reject. Conditional on inducing acceptance,  $G$ 's utility is a strictly decreasing function of the patronage offer. Therefore,  $G$  sets  $x_t$  to make  $C$  exactly indifferent between accepting and fighting—implying in equilibrium Equation A12 holds with equality.

In a weak period,  $C$  does not consume in the current period and remains as challenger in the next period:

$$V_{C,e}^w = \delta[\sigma V_{C,i}^s + (1 - \sigma)V_{C,i}^w]. \quad (\text{A13})$$

In a strong period,  $G$  consumes the entire per-period revenue stream minus the patronage offer, and in the next period  $C$  receives either the future continuation value associated with being the government in a strong period (probability  $\sigma$ ) or in a weak period (probability  $1 - \sigma$ ):

$$V_{G,e}^s = 1 - x_t + \delta[\sigma V_{G,e}^s + (1 - \sigma)V_{G,e}^w]. \quad (\text{A14})$$

In a weak period,  $G$  consumes the entire per-period revenue stream and remains as government in the next period:

$$V_{G,e}^w = 1 + \delta[\sigma V_{G,e}^s + (1 - \sigma)V_{G,e}^w]. \quad (\text{A15})$$

Solving A11 through A15 for  $x_{i,e}^*$  yields:

$$x_{i,e}^* = \frac{\delta p[(1 - \delta)\alpha + \delta\sigma]}{[1 - \delta(1 - \sigma)][1 - \delta(1 - 2\sigma p)]}. \quad (\text{A16})$$

$G$  cannot make a high enough patronage offer to buy off  $C$  if  $x_{i,e}^* > 1$ . Setting  $x_{i,e}^* = 1$  and solving for  $\sigma$  provides the threshold value of  $\sigma$  such that  $G$  cannot buy off  $C$  and the exclusionary subgame will be conflictual if  $\sigma < \underline{\sigma}_i$ :

$$\underline{\sigma}_i = \frac{-\delta + \delta^2 - 2\delta p + 3\delta^2 p + \sqrt{\delta^2[(-1 + \delta - 2p + 3\delta p)^2 - 8(1 - \delta)p(1 - \delta(1 + \alpha p))]}{4\delta^2 p}. \quad (\text{A17})$$

### Will the winner deviate from inclusion?

If  $\theta < \underline{\theta}_i$ , the winner can profitably deviate to exclusion. By assumptions  $\sigma < \underline{\sigma}$  and  $\theta < \underline{\theta}_i$ , fighting occurs in both the inclusionary and exclusionary subgames.  $G$  will receive per-period utility of 1 in all periods before the first strong period in either type of subgame, and utility of 0 in the period of the fight in either type of subgame. Therefore, the only difference in utility occurs after the fight.  $G$ 's expected lifetime utility starting in the period after the fight in an exclusionary subgame is  $(1 - \alpha p)V_{G,i} + \alpha pV_{C,i}$ , and in an inclusionary subgame is  $(1 - p) \cdot V_{G,i} + pV_{C,i}$ . Because  $\alpha < 1$ , the winner strictly prefers to deviate to exclusion.

If  $\theta > \underline{\theta}_i$ , the winner cannot profitably deviate to exclusion. If  $G$  deviates to exclusion, it will receive the same payoff of 1 in every period before the first strong period as in an inclusionary regime. However, in the first strong period,  $G$  will not consume in the exclusionary equilibrium but will consume in the inclusionary equilibrium, and there is a chance  $G$  will not remain as government after the fight in the exclusionary subgame. Therefore, deviating strictly decreases  $G$ 's utility.

## A.4. Winner chooses exclusion

### Contradict existence of a peaceful exclusive subgame

The following five recursive equations characterize payoffs and the patronage offer in an exclusive subgame if the equilibrium is peaceful. I will solve for a  $\sigma$  threshold that contradicts the existence of a peaceful exclusionary subgame. If  $C$  accepts an offer in a strong period, it consumes  $x_t$  in the current period, and in the next period  $C$  receives the future continuation value associated with being either the challenger in a strong period (probability  $\sigma$ ) or in a weak period (probability  $1 - \sigma$ ):

$$V_{C,e}^w = x_t + \delta[\sigma V_{C,i}^s + (1 - \sigma)V_{C,i}^w]. \quad (\text{A18})$$

$C$  will only accept  $x_t$  if this action provides utility at least as large as the expected utility of fighting. No consumption occurs in the period of a fight, if  $C$  wins (probability  $\alpha p$ ) it receives the future continuation value of the government in an exclusive subgame (by the assumption the winner excludes), and if  $C$  loses (probability  $1 - \alpha p$ ) it receives the future continuation value of the challenger in an exclusive subgame:

$$V_{C,e}^s \geq \delta[\alpha p V_{G,e} + (1 - \alpha p)V_{C,e}]. \quad (\text{A19})$$

In a peaceful equilibrium,  $G$  needs to set  $x_t$  large enough that  $C$  prefers to accept rather than to reject. Conditional on inducing acceptance,  $G$ 's utility is a strictly decreasing function of the patronage offer. Therefore,  $G$  sets  $x_t$  to make  $C$  exactly indifferent between accepting and fighting—implying in equilibrium Equation A19 holds with equality.

In a weak period,  $C$  does not consume in the current period and remains as challenger in the next period:

$$V_{C,e}^w = \delta[\sigma V_{C,i}^s + (1 - \sigma)V_{C,i}^w]. \quad (\text{A20})$$

In a strong period,  $G$  consumes the entire per-period revenue stream minus the patronage offer, and in the next period  $C$  receives either the future continuation value associated with being the

government in a strong period (probability  $\sigma$ ) or in a weak period (probability  $1 - \sigma$ ):

$$V_{G,e}^s = 1 - x_t + \delta[\sigma V_{G,e}^s + (1 - \sigma)V_{G,e}^w]. \quad (\text{A21})$$

In a weak period,  $G$  consumes the entire per-period revenue stream and remains as government in the next period:

$$V_{G,e}^s = 1 + \delta[\sigma V_{G,e}^s + (1 - \sigma)V_{G,e}^w]. \quad (\text{A22})$$

Solving A18 through A22 for  $x_{e,e}^*$  yields:

$$x_{e,e}^* = \frac{\delta\alpha p}{1 - \delta(1 - 2\sigma\alpha p)}. \quad (\text{A23})$$

$G$  cannot make a high enough patronage offer to buy off  $C$  if  $x_{e,e}^* > 1$ . Setting  $x_{e,e}^* = 1$  and solving for  $\sigma$  provides the threshold value of  $\sigma$  such that  $G$  cannot buy off  $C$  and the exclusionary subgame will be conflictual if  $\sigma < \underline{\sigma}_e$ :

$$\underline{\sigma}_e = \frac{\delta(1 + \alpha p) - 1}{2\delta\alpha p}. \quad (\text{A24})$$

### Calculate continuation values in a conflictual exclusionary subgame

In order to calculate  $x_{e,i}^*$ , it is necessary to calculate the continuation values in a conflictual exclusionary subgame. At the outset of every period in the exclusionary subgame, there is a  $1 - \sigma$  percent chance  $C$  will be weak, meaning  $G$  consumes 1 in that period and remains as government in the next period. With complementary probability  $\sigma$ ,  $C$  is strong and a fight occurs. With probability  $1 - \alpha p$ ,  $G$  wins the fight and receives future continuation value  $V_{G,e}$ , and with probability  $\alpha p$ ,  $G$  loses and receives future continuation value  $V_{C,e}$ :

$$V_{G,e} = (1 - \sigma)(1 + \delta V_{G,e}) + \sigma\delta[\alpha p V_{C,e} + (1 - \alpha p)V_{G,e}]. \quad (\text{A25})$$

For the challenger, at the outset of every period there is a  $1 - \sigma$  percent chance it will be weak, consume nothing in the current period, and remain as challenger in the next period. With probability  $\sigma$  it will be strong and a fight will occur. With probability  $\alpha p$ ,  $C$  wins the fight and receives future continuation value  $V_{G,e}$ , and with probability  $1 - \alpha p$ ,  $C$  loses and receives future continuation value  $V_{C,e}$ :

$$V_{C,e} = (1 - \sigma)\delta V_{C,e} + \sigma\delta[\alpha p V_{G,e} + (1 - \alpha p)V_{C,e}]. \quad (\text{A26})$$

Solving Equations A25 and A26 yields:

$$V_{G,e} = \frac{(1 - \sigma)[1 - \delta(1 - \sigma\alpha p)]}{(1 - \delta)[1 - \delta(1 - 2\sigma\alpha p)]} \quad (\text{A27})$$

and

$$V_{C,e} = \frac{\delta\alpha p\sigma(1 - \sigma)}{(1 - \delta)[1 - \delta(1 - 2\sigma\alpha p)]}. \quad (\text{A28})$$

### Conditions under which the inclusive subgame will be peaceful

The following five recursive equations characterize payoffs and the patronage offer in an inclusive subgame when  $S_{t-1} = 0$  if the equilibrium is peaceful. If  $C$  accepts an offer in a strong period, it consumes  $x_t$  in the current period. With probability  $\theta$ ,  $G$ 's implicit promise binds and  $C$  will receive  $x_t$  in all future periods. With probability  $1 - \theta$  the promise does not bind and  $C$  receives either the future continuation value associated with being the challenger in a strong period (probability  $\sigma$ ) or in a weak period (probability  $1 - \sigma$ ):

$$V_{C,i}^s = x_t + \delta \left\{ \theta \frac{x_t}{1 - \delta} + (1 - \theta) [\sigma V_{C,i}^s + (1 - \sigma) V_{C,i}^w] \right\}. \quad (\text{A29})$$

$C$  will only accept  $x_t$  if this action provides utility at least as large as the expected utility of fighting. No consumption occurs in the period of a fight, if  $C$  wins (probability  $p$ ) it receives the future continuation value of the government in an exclusionary subgame (because the strategy profile instructs the winner to exclude), and if  $C$  loses (probability  $1 - p$ ) it receives the future continuation value of the challenger in an exclusive subgame (probability  $1 - p$ ):

$$V_{C,i}^s \geq \delta [p V_{G,e} + (1 - p) V_{C,e}]. \quad (\text{A30})$$

In a peaceful equilibrium,  $G$  needs to set  $x_t$  large enough that  $C$  prefers to accept rather than to reject. Conditional on inducing acceptance,  $G$ 's utility is a strictly decreasing function of the patronage offer. Therefore,  $G$  sets  $x_t$  to make  $C$  exactly indifferent between accepting and fighting—implying in equilibrium Equation A30 holds with equality.

In a weak period,  $C$  does not consume in the current period and remains as challenger in the next period. Therefore:

$$V_{C,i}^w = \delta [\sigma V_{C,i}^s + (1 - \sigma) V_{C,i}^w]. \quad (\text{A31})$$

In a strong period,  $G$  consumes the entire per-period revenue stream minus the patronage offer. With probability  $\theta$  the implicit promise binds and  $G$  will consume  $1 - x_t$  in all future periods. With complementary probability the promise does not bind and  $C$  receives either the future continuation value associated with being the government in a strong period (probability  $\sigma$ ) or in a weak period (probability  $1 - \sigma$ ):

$$V_{G,i}^s = 1 - x_t + \delta \left\{ \theta \frac{1 - x_t}{1 - \delta} + (1 - \theta) [\sigma V_{G,i}^s + (1 - \sigma) V_{G,i}^w] \right\}. \quad (\text{A32})$$

In a weak period,  $G$  consumes the entire per-period revenue stream and remains as government in the next period:

$$V_{G,i}^w = 1 + \delta [\sigma V_{G,i}^s + (1 - \sigma) V_{G,i}^w]. \quad (\text{A33})$$

Solving A29 through A33 yields:

$$x_{e,i}^* = \frac{\delta(1 - \sigma)(p + \sigma)[1 - \delta(1 - \sigma\theta)]}{[1 - \delta(1 - \sigma)](1 + 2\sigma)[1 - \delta(1 - \theta)]}. \quad (\text{A34})$$

$G$  is able to make a high enough patronage offer to buy off  $C$  if  $x_{e,i}^* \leq 1$ . Setting  $x_{e,i}^* = 1$  and solving for  $\theta$  provides the threshold value of  $\theta$  such that  $G$  can buy off  $C$  and the inclusionary

subgame will be peaceful if  $\theta \geq \underline{\theta}_e$ :

$$\underline{\theta}_e \equiv \frac{(1-\delta)[\delta(1-\sigma)(1+p+3\sigma) - (1+2\sigma)]}{\delta\{1+2\sigma - \delta(1-\sigma)[1+(2+p)\sigma + \sigma^2]\}}. \quad (\text{A35})$$

Finally, we can state  $V_{G,i}$  as a function of  $V_{G,e}$  and  $V_{C,e}$ :

$$V_{G,i} = \frac{1 - \delta(1-\sigma) - \delta(1-\delta)\sigma[pV_{G,e} + (1-p)V_{C,e}]}{(1-\delta)[1 - \delta(1-\sigma)]}. \quad (\text{A36})$$

### Conditions under which $C$ accepts the permanent offer

Once  $G$ 's promise gets locked in,  $G$ 's action space becomes degenerate.  $C$  will always accept the equilibrium offer. However, there is an off-the-equilibrium-path possibility that a patronage offer lower than the equilibrium one gets locked in. Therefore, we must specify locked in offers  $C$  will accept. If the offer is  $x_I$ , then  $C$ 's utility to accepting is:

$$V_{C,x_I}^s = \frac{x_I}{1-\delta}. \quad (\text{A37})$$

Based on  $C$ 's expected utility to fighting, it must receive at least

$$V_{C,x_I}^s \geq \delta[pV_{G,e} + (1-p)V_{C,e}]. \quad (\text{A38})$$

Substituting in A27 and A28 and simplifying yields:

$$\underline{x}_{I,e} = \frac{\delta(p+\sigma)}{1+2\sigma}. \quad (\text{A39})$$

### Will the winner deviate from exclusion?

If  $\theta < \underline{\theta}_e$ , there is no profitable deviation. The logic is identical to why the winner has a profitable deviation from including if  $\theta < \underline{\theta}_i$ .

If  $\theta > \underline{\theta}_e$ , whether or not there is a profitable deviation depends on the value of  $\alpha$ . The winner can profitably deviate if:

$$G(\alpha) \equiv V_{G,i} - V_{G,e} > 0. \quad (\text{A40})$$

Applying the intermediate value theorem proves the existence of  $\underline{\alpha}$  such that  $G$  will deviate from excluding if  $\alpha > \underline{\alpha}$  but will not deviate if  $\alpha < \underline{\alpha}$ ; however,  $\underline{\alpha}$  may be negative, in which case  $G$  will deviate for all  $\alpha \in [0, 1)$ .

- $G(1) > 0$ . In general,  $V_{G,i} = \frac{1}{1-\delta} - V_{C,i}$  and  $V_{G,e} = \frac{1-\sigma}{1-\delta} - V_{C,e}$ . Total surplus is larger in the inclusive subgame because fighting does not occur. When  $\alpha = 1$ ,  $V_{C,i} = V_{C,e}$  because  $C$  wins with the same probability in each subgame. Therefore,  $V_{G,i} > V_{G,e}$  when  $\alpha = 1$ .
- Assumption 1 holds as long as  $\sigma < \underline{\sigma}_e$ , from A24. This is only possible if  $\underline{\sigma}_e > 0$ , which solves to  $\alpha > \hat{\alpha} \equiv \frac{1-\delta}{\delta p}$ . Therefore,  $\hat{\alpha}$  is the relevant lower bound for  $\alpha$ . Substitute  $\alpha = \hat{\alpha}$ , A27, A28,



and A36 into A40 and simplify to get  $G(\hat{\alpha}) = \frac{\sigma[2+\sigma-\delta(1-\sigma)(2(1+\sigma)+p)]}{(1-\delta)[1-\delta(1-\sigma)](1+2\sigma)}$ . This term is strictly positive if  $p > \frac{2+\sigma}{\delta(1-\sigma)} - 2(1+\sigma)$ . Intuitively, the larger is  $p$ , the bigger is the power shift when  $\alpha = \hat{\alpha}$ , which increases the winner's incentives to exclude.

- The derivative of  $G(\alpha)$  with respect to  $\alpha$  is  $-\frac{\delta\sigma}{1-\delta(1-\sigma)} \left[ p \frac{d}{d\alpha} V_{G,e} + (1-p) \frac{d}{d\alpha} V_{C,e} \right] - \frac{d}{d\alpha} V_{G,e}$ . Using Equations A27 and A28 to calculate  $\frac{d}{d\alpha} V_{G,e}$  and  $\frac{d}{d\alpha} V_{C,e}$ , substituting, and simplifying yields the strictly positive term  $\frac{\delta p(1-\sigma)\sigma[1-\delta(1-2p\sigma)]}{[1-\delta(1-\sigma)][1-\delta(1-2\alpha p\sigma)]^2}$ .

## A.5. Proving results from the text

*Proof of Lemma 1.*  $C$  will reject any offer in a strong period in an exclusionary subgame if:

$$\sigma < \underline{\sigma} \equiv \min\{\underline{\sigma}_i, \underline{\sigma}_e\},$$

for  $\underline{\sigma}_i$  defined in A17 and  $\underline{\sigma}_e$  defined in A24. ■

*Proof of Lemma 2.*  $G$  will be able to make high enough offer to buy off  $C$  in a strong period in an inclusionary subgame if:

$$\theta > \underline{\theta} \equiv \max\{\underline{\theta}_i, \underline{\theta}_e\},$$

for  $\underline{\theta}_i$  defined in A7 and  $\underline{\theta}_e$  defined in A35. ■

*Proof of Lemma 3.* See Sections A.3.4 and A.4.5. ■

## A.6. Stating the equilibria

If either (1)  $\theta < \underline{\theta} \equiv \min\{\underline{\theta}_i, \underline{\theta}_e\}$  or (2)  $\theta < \underline{\theta}_i$ ,  $\theta > \underline{\theta}_e$ , and  $\alpha < \underline{\alpha}$ , then any equilibrium features the winner choosing exclusion. The following strategies define a set of payoff-equivalent equilibria:

1. If  $C$  is excluded:
  - (a) If  $C$  is weak,  $G$  offers  $x_t = 0$  and  $C$  accepts any offer  $x_t \geq 0$ .
  - (b) If  $C$  is strong,  $G$  offers  $x_t \in [0, 1]$  and  $C$  rejects any offer  $x_t \geq 0$ .
2. If  $C$  is included and  $S_{t-1} = 0$ :
  - (a) If  $C$  is weak,  $G$  offers  $x_t = 0$  and  $C$  accepts any offer  $x_t \geq 0$ .
  - (b) If  $C$  is strong,  $G$  offers  $x_t = x_{e,i}^*$  and  $C$  accepts any offer  $x_t \geq x_{e,i}^*$ .
3. If  $C$  is included and  $S_{t-1} = 1$ :
  - (a) If  $C$  is weak,  $G$  offers  $x_t = x_I$  and  $C$  accepts  $x_I \geq \underline{x}_{I,e}$ .
  - (b) If  $C$  is strong,  $G$  offers  $x_t = x_I$  and  $C$  accepts  $x_I \geq \underline{x}_{I,e}$ .

If  $\theta > \bar{\theta}$  and  $\alpha > \underline{\alpha}$ , any equilibrium features the winner choosing inclusion. The following strategies define the set of payoff-equivalent equilibria:

- If  $C$  is excluded:
  - If  $C$  is weak,  $G$  offers  $x_t = 0$  and  $C$  accepts any offer  $x_t \geq 0$ .
  - If  $C$  is strong,  $G$  offers  $x_t \in [0, 1]$  and  $C$  rejects any offer  $x_t \geq 0$ .
- If  $C$  is included and  $S_{t-1} = 0$ :
  - If  $C$  is weak,  $G$  offers  $x_t = 0$  and  $C$  accepts any offer  $x_t \geq 0$ .
  - If  $C$  is strong,  $G$  offers  $x_t = x_{i,i}^*$  and  $C$  accepts any offer  $x_t \geq x_{i,i}^*$ .
- If  $C$  is included and  $S_{t-1} = 1$ :
  - If  $C$  is weak,  $G$  offers  $x_t = x_I$  and  $C$  accepts  $x_I \geq \underline{x}_{I,i}$ .
  - If  $C$  is strong,  $G$  offers  $x_t = x_I$  and  $C$  accepts  $x_I \geq \underline{x}_{I,i}$ .

If either (1)  $\underline{\theta}_i > \underline{\theta}_e$ ,  $\theta \in [\underline{\theta}_e, \underline{\theta}_i]$ , and  $\alpha > \underline{\alpha}$  or (2)  $\underline{\theta}_i < \underline{\theta}_e$  and  $\theta \in [\underline{\theta}_i, \underline{\theta}_e]$ , then there exist equilibria with inclusion and with exclusion. The strategy profiles above characterize the equilibrium actions.

## B. Sample for the Statistical Analysis

The sample contains almost all ethnic group-years from the EPR dataset for each Sub-Saharan African country from their year of independence until 1989 (which eliminates Namibia, Eritrea, and South Sudan from the sample). The current version of EPR (2014 Update 2) does not provide data for Burkina Faso, Cape Verde, Comoros, Equatorial Guinea, Lesotho, Sao Tome and Principe, Seychelles, Somalia, or Swaziland. Older versions of EPR did not include data for Botswana, Mauritius, or Tanzania, and these countries are not included in Roessler’s (2011) coup and civil war data. Besides Burkina Faso, Equatorial Guinea, and Tanzania, it is preferred that these countries are not included because they fail to meet an important scope condition implicit in the model. Many of the islands lacked an indigenous population prior to colonization, eliminating the possibility of pre-colonial kingdoms. The rest only have one effective ethnic group, obviating the theory’s focus on *inter*-ethnic political interactions. Finally, because the statistical results focus on post-colonial political interactions, the sample excludes foreign settler-dominated South Africa, Liberia before 1980, and Zimbabwe before 1980—therefore only focusing on years in which indigenous Africans held power.

## C. Coding PCK Groups/Countries

Appendix C provides additional details on the coding procedure for pre-colonial kingdoms. Table C1 summarizes the 11 sources used.

**Table C1. Sources for PCK Coding**

Source	Notes
Ajayi and Crowder (1985; Section 55)	Includes all states from the map “European Colonies and African States on the Eve of the 1884-1885 Berlin Conference.”
Atmore (1985; 12, 63)	Includes all states from his maps “Northern Africa on the eve of partition” and “Southern Africa on the eve of partition.”
Barracrough and Parker (1993; 235)	Includes all states and other selectively labeled empires from the map “Africa before the partition by European powers 1800 to 1880.”
Gailey (1971)	Includes all indigenous states in the map “European Territory - 1884.”
Griffiths (1995, 39)	Includes all states from his map “19th Century AD.”
Johnston (xvi-1)	Includes all states in the map.
Kasule (1998; 83, 85)	Includes all states from his map in either 1880 or 1885.
McEvedy (1996; 107, 111, 113, 115)	Includes all states identified in at least one of his maps from 1878, 1885, 1890, or 1900.
Oliver and Atmore (2005; 124-5)	Includes all states from the map “Africa on the eve of partition: African states and European settlements.”
Pakenham (1991; 19, 280)	Includes all states from the maps “Africa before the scramble: indigenous and alien powers in 1876” and “Africa in 1886: the scramble half complete.”
Reid (2012; xix)	Includes all states with demarcated territories in the map “Nineteenth-century military revolution.”

After compiling a list of potential kingdoms, I used *Encyclopaedia Britannica* (*EB*) and other secondary sources to examine evidence of political centralization and to code the years of the kingdom’s existence. A candidate state was coded as a pre-colonial kingdom if (a) there was evidence of centralization around a political kingdom, (b) the state still existed when the territory was colonized, and (c) whether at least one leadership turnover occurred. Coding criterion a depended heavily on descriptions from the secondary sources. For example, *EB*’s Buganda page states, “By the 19<sup>th</sup> century Buganda had become the largest and most powerful kingdom in the region. The local chiefs of conquered areas ruled as personal appointees of the kabaka, who had a sizable army at his disposal.” In contrast, *EB*’s Yao page states, “The Yao were never united but lived as small groups ruled by chiefs who were predominantly military and commercial leaders.” Baganda is coded as a PCK group, whereas Yao is not. Criterion b guards against including historical states that appear on a 19<sup>th</sup> century map, but were in fact defunct by the time colonial rule began. In most cases this required the kingdom to be intact in the 1880s, although for early-colonized territories such as Senegal (Futa Toro) and Sudan (Sennar; destroyed by Egypt), older kingdoms are coded as PCK. Criterion c excludes personal fiefdoms that emerged mainly in East Africa in the mid-19<sup>th</sup>, such as Tippu Tip’s or Mirambo’s trading and slaving empires, and Samori’s empire in West Africa. The theory posits that established centralized structures composed an important pathway through which pre-colonial kingdoms affected post-colonial outcomes. Eliminating ephemeral states therefore achieves the same purpose as criterion a.

## References for coding kingdoms

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## Conclusion to the Dissertation

This dissertation has presented three new game theoretic models to provide insight into how authoritarian survival strategies affect prospects for civil wars, focusing in particular on applications to debates about a conflict resource curse and about ethnicity and political violence. Two key broader implications emerge for studying comparative politics. The first is that two subject areas typically studied in isolation from each other—authoritarian regime survival and civil war—can be productively integrated to expand upon and to challenge conventional wisdom about each topic. The conflict resource curse literature resembles much of the broader civil war literature because most contributions focus mainly on rebels' incentives without closely scrutinizing government strategy. The horizontal inequalities and conflict literature provides a partial exception by analyzing incorporation into the ruling coalition, but also tends not to carefully consider the government's strategic incentives with regard to ethnopolitical inclusion. A game theoretic framework forces the analyst to focus on both government and rebel strategy, and incorporating insights from the authoritarian politics literature provides guidance regarding which aspects of government strategy are more relevant than others.

Second, important insights arise when combining distinct paradigmatic categories of causes for civil wars into a unified analysis. Perhaps the three most important paradigms in the current literature are greed (rebels fight for economic aims), grievance (rebels fight when governments enact unjust policies), and opportunities (rebels fight when the state is weak). Rather than attempt to isolate which of these effects is most important, the game theoretic models presented here demonstrate the necessity of considering these factors in tandem. For example, the oil and center-seeking essay shows how combining the greed and opportunities paradigms overturns conventional wisdom about the conflict resource curse. The oil and separatist essay shows how combining the greed and grievance paradigms highlights new strategic foundations for an important empirical finding as well as produces a new empirical implication about oil wealth affects different types of civil war. The second and third essays also demonstrate how grievances can emerge as a consequence of government strategy.

Overall, this focus on strategic interactions between governments and rebels, and on combining disparate paradigmatic approaches to studying civil wars, should help to perpetuate progress in the influential political science research agenda on causes of civil war.