Beyond Divide and Rule: Weak Dictators, Natural Resources and Civil Conflict*

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Abstract

We propose a model in which an autocrat, who rules over an ethnically divided society, selects the tax rate over domestic production and the nation's natural resources to maximize his rents under the threat of a regime-switching revolution. We show that a weak ruler may let the country plunge in civil war to increase his personal rents. Indeed inter-group fighting weakens potential opposition to the ruler, thereby allowing him to increase fiscal pressure. We show that the presence of natural resources exacerbates the incentives of the ruler to promote civil conflict for his own profit, especially if the resources are unequally distributed across ethnic groups. We validate the main predictions of the model using cross-country data over the period 1960-2007, and show that our empirical results are not likely to be driven by omitted observable determinants of civil war incidence or by unobservable country-specific heterogeneity.

Keywords: Dictatorship; Civil War; Natural Resources; Ethnic Groups; Inequality
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"While Two Dispute, the Third Enjoys". Popular Italian proverb.

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1 Introduction

In many countries around the world, autocrats impose highly rapacious policies on their population and yet manage to remain in power for long periods of time. Surprisingly, such practices have also been observed in countries plagued by internal civil strife in spite of the potential threat these conflicts constitute to the government's stability (Reno 1998). The weakly institutionalized environment characterizing these societies implies that democratic instruments available to balance the power of the ruling elites are limited and highly dysfunctional: legislators and interest groups are typically co-opted by the elite and, as a consequence, elections fall short of disciplining ill-performing leaders (Gandhi and Przeworski 2006). Such *de facto* dictatorships have been studied by scholars who emphasize the web of personal ties and targeted transfers which guarantee the stability of the elites (Bates 1981 and Jackson and Rosberg 1984).[1]

Acemoglu et al. (2004) explore a strategy - which they call *Divide-and-Rule* - adopted by rulers who seek to implement more profitable kleptocratic policies by weakening the opposition. They propose a model whereby the ruler can be overthrown only if a sufficiently large opposition is mobilized. The ruler prevents this collective action by providing selective incentives, thereby making it impossible for a successful challenging coalition to emerge.

Padro i Miquel (2007) considers an alternative strategy of regime survival implemented by rent-extracting autocrats in ethnically divided societies. The proposed mechanism rests on what the author terms *The Politics of Fear*. "[T]he fear to fall under an equally inefficient and venal ruler that favors another group is sufficient to discipline supporters" (Padro i Miquel 2007: 1260). In other words, by dampening the livelihood of the other ethnic groups, the ruler obtains support from his own group and still manages to extract rents from them. The co-ethnics' obedience is rooted in the fear of receiving a worse treatment under the potential rule of a non co-ethnic leader.

A distinct, more extreme mechanism of regime survival, not yet highlighted in the political economy literature, arises if, more than implementing a divide-and-rule strategy, rulers opt for

[1]See also the subsequent work on co-optation and patronage, including Acemoglu et al. (2008), Debs (2008), Egorov and Sonin (2011) and Sekeris (2011).

promoting civil conflict among ethnically divided groups in their country, in other to weaken their opposition and extract more from them. Following this basic idea, in this paper we propose a model whereby an autocrat rules over an ethnically divided society. The ruler selects the tax rates on income and on natural resources that maximize his private rents under the threat of rebellion: While the ruler is not accountable to the people through elections, his power can be challenged through popular uprising. If the rebellion is successful, the ruler loses the capacity to levy taxes. We characterize the equilibrium conditions under which it is in the interest of the ruler to let a conflict escalate among ethnic groups within the boundaries of his country. Inter-group violence weakens the citizens' potential to revolt against the ruler, hence allowing the latter to increase the fiscal pressure without putting his power at risk.

Our simple model delivers three novel predictions. First, we show that weaker rulers profit more from the emergence of civil strife. Second, we show that the ruler's gains from internal conflict are larger the greater is the country's endowment of natural resources. Indeed, when the ruler's income is mainly derived from taxing natural resources, the costs of inter-ethnic violence are lower since violence affects especially labor production. In turn, the potential gains from conflict are large because in the face of weakened ethnic groups the ruler can capture a larger share of the natural resource rents without triggering a revolution.[2] Third, the ruler's gains from internal conflict are larger if resources are distributed unequally among ethnic groups.

The salience of ethnic divisions in triggering civil conflicts has received mixed support by empirical studies (Fearon and Laitin 2003, Collier and Hoeffler 2004, Montalvo and Reynal-Querol 2005, Esteban et al. 2012 a,b), and ethnic violence has been widely studied theoretically. Yet, most contributions explain ethnic conflicts by exploring only the incentives of the parties directly involved in the dispute (Caselli and Coleman II 2006, Esteban and Ray 2008, 2011, Esteban et al. 2010, Besley and Persson 2010). Instead, we emphasize a mechanism that highlights the incentives of an individual ruler *above and beyond* his ethnic identity. Indeed, the private interests of a rent

[2]Note that this constitutes a different mechanism than those proposed by the literature for the positive association between natural resources and conflict. This association has been highlighted, among others, by Collier and Hoeffler (1998) and (2004), Fearon and Laitin (2003), Reynal-Querol (2002), Ross (2004), Hodler (2006), and Olsson (2007).

seeking autocrat are not necessarily aligned with those of his ethnic base. Considering the ruler as a separate agent is an abstraction that helps us explore the proposed mechanism theoretically.

The incentives for a ruler to stress the ethnic divide have already been addressed in the literature (e.g. Fearon and Laitin 2000, Esteban et al. 2010). According to Snyder and Ballentine (1996) and Snyder (2000), political elites exploit the nationalistic argument in newly democratizing countries as a way to preserve their dominant position. Similarly, Glaeser (2005) proposes a theory in which political leaders dig existing societal cleavages by conveying messages that exacerbate hatred between groups with the ultimate goal of fostering electoral support for particular policies. We push this argument one step further and argue that a ruler might consciously let inter-ethnic violence degenerate into a destructive conflict in order to maximize his personal rents.[3]

We illustrate our formal argument with case studies from the recent history of Africa. Most importantly, however, we provide robust cross-country empirical evidence which is consistent with our main theoretical predictions. In particular, using a dataset on conflict incidence as well as novel data on presence of oil and diamonds fields over the period 1960-2007, we show that the likelihood of autocratic and ethnically-polarized countries experiencing civil war is higher when weak rulers govern states endowed with natural resources. We also show that this incentive is exacerbated when resources are distributed unequally. This finding is robust to controlling for the variables identified by the recent literature on civil war as the most robust correlates of conflict (Collier and Hoeffler 2004; Fearon and Laitin 2003), as well as to the inclusion of regional dummies. In addition the results survive the inclusion of country and time fixed effects. This suggest both that our theory can also account for the within-country variation over time in the exploitation of natural resources - the autocracy level and the relative weakness of the ruler - and that the results are not driven by year specific shocks common across countries.

The rest of the paper is organized as follows. Section 2 discusses anecdotal evidence from

[3]While Rocco and Ballo (2008) also show that an autocrat may find it profitable to plunge his country into a wasteful civil war, their underlying mechanism is fundamentally different. In their theory the ruler uses the government's army against the opposition's forces when the odds of winning the conflict exceed the chances to remain in power in peaceful times.

recent conflicts among ethnic groups in Nigeria and Kenya, which were arguably exploited by the countries' rulers to pursue their personal interests. We develop the theoretical model in section 3 and present the empirical analysis in section 4. Section 5 concludes.

2 Anecdotal evidence from recent history

2.1 Nigeria

In 1993, in the middle of widespread economic downturn, General Sani Abacha seized political power and became the *de facto* President of Nigeria until 1998. Because of the drop of oil prices, Nigeria was facing balance of payment difficulties, increasing deficits and debt burden, and high inflation rates (Bolanle 1999, Ikelegbe 2001). In addition, old patronage networks were collapsing partly because of the cut in external support after the end of the Cold War (Reno 1998). Due to the diversion of large shares of the oil revenue to the pockets of the political elite, the popularity of the regime was particularly low among the Ogoni, an ethnic group located in the oil-rich southeastern region.

Abacha's government heavily depended on oil revenue and could not afford to give in to the pressing requests of the Ogoni. Instead, the president dealt with the hostility by destabilizing the Ogoni region through the use of state violence in the form of killings, rapes, and looting by the security forces, and with deliberate attempts to foster conflicts between the Ogoni and their neighboring ethnic groups (Reno 1998). The regime constantly tagged as ethnic rivalries attacks that independent observers attributed to the regular army (Ibeanu 2000, Human Right Watch 1995, Reno 1998). For instance, when four traditional chiefs were killed during an Ogoni rally in 1995, Abacha blamed local Ogoni activists for the killings and sentenced them to death (Ifeka 2000, Ikelegbe 2001). The evidence that emerged afterwards, however, suggests that Abacha's regime was behind the murders (Reno 1998).

The strategy proved successful and Ibeanu (2000, p. 26) laconically concludes: "[...] at that point, the implosion of MOSOP [Movement for the Salvation of Ogoni People] was completed and the struggle became Ogoni against Ogoni".

A similar strategy was adopted to instigate violence between Nembe and Kalabari ethnic groups. According to witness reports, regular army soldiers killed fourteen Nembe, whereas officials claimed it was part of a Kalabari plot to appropriate Nembe's land. According to Reno:

> The militarization of local factions is an effective way to ensure that communities in oil-producing areas cannot unify to challenge the regime. This tactic effectively destroys civil society, replacing it with sets of rival ethnic organizations [...] (Reno 1998, p. 206).

This strategy enabled Abacha to contain successfully the outbreak of rebellion. His five-year rule over Nigeria was primarily used for his own benefit and in favor of his associates, despite his relative weakness and the unfavorable economic conditions (Bolanle 1999). After Abacha's death on June 7 1998, his family members were forced to give up thirty-seven residences and $750 million. It has been estimated, however, that before his death Abacha managed to secure about $5-7 billion abroad (Reno 1999).

2.2 Kenya

Kenya has experienced repeated episodes of ethnic violence over the last 20 years. The ethnic legacy, passed from the British colonialists to Jomo Kenyatta in 1964, is one of deep antagonisms, reflecting the divide-and-rule policy pursued during the colonial years. Both Kenyatta, an ethnic Kikuyu, and his successor Daniel arap Moi, an ethnic Kalenjin, implemented redistribution policies favoring their own ethnic group, thus further nourishing the pre-existing ethnic tensions (Burgess et al. 2011). On the eve of the 1991 elections, as well as in the aftermath of both the 1991 and the 2007 elections, the country experienced severe episodes of ethnic strife that led to thousands of killings and hundreds of thousands of internally displaced persons. Most analysts converge on blaming the resource-greedy elites for having engineered these violent events to serve their personal interests (Kahl 2006, Kagwanja 2009, and Rutten and Owuor 2009).

The 1991-1993 events are particularly telling. The intensification of pro-multiparty voices compelled president Moi to repeal in 1991 *Section 2A*, a constitutional amendment that made Kenya a single-party state. The response of the ruling elite was immediate and came in the form of a series of political rallies (known as the *Majimbo* rallies) organized by the Kenya African National Union's (KANU) across the country. The speeches of officials during these meetings conveyed particularly violent messages of hatred and intolerance towards the Kikuyu and Luo ethnic groups. The elites accused them of stealing the ancestral lands of the Kalenjin and the Maasai (Africa Watch 1993, Kahl 2006: 143). KANU officials radicalized local populations by explicitly demanding land evictions by violent means, while emphasizing that the bravery of Kalenjin and Maasai "warriors" would not tolerate the usurpation (Africa Watch 1993: 12-18, Klopp 2001).

As a result of the ethnic confrontation over 1500 were killed and over 300,000 were forcibly displaced over the 1991-1993 period (Africa Watch 1993, Kahl 2006). While the authorities emphasized their inability to cope with the situation because of lack of resources, posterior court testimonies revealed the active role of highly ranked KANU figures in the organization of death squads recruited from the cities' slums (Kagwanja 2009). In addition, many argue that the length of the confrontation and the idleness of security forces reveal the unwillingness of the ruling party to deter the ethnic conflict, irrespective of the ethnicity of the victims (Kahl 2006).

That the conflict appears to have been orchestrated by a weakened central regime that exploited existing enmities, inequalities and grievances between the country's various ethnic groups has been emphasized by various scholars.[4] This strategy was crafted at the end of the Cold War era, when the power of the ruling elite was significantly reduced and political opposition from other parties became a real threat. In this context ethnic clashes eventually allowed the ruling elite to retain power and pursue their extractive policies.

These stories motivate the argument that we now formalize in the next section. Subsequently, however, we show that the scope of our argument goes beyond the case studies emphasized here,

[4]See especially Colin H. Kahl's thesis of the *state exploitation conflicts* (Kahl 2006), and the Africa Watch 1993 report on divide-and-rule politics in Kenya (Africa Watch 1993).

by highlighting robust longitudinal empirical patterns that support the predictions of our theory.

3 The Model

3.1 Set up

We consider a country populated by two equally-sized ethnic groups respectively designated by A and B, and a ruler L. Each group i is composed of n agents who control the natural resources located on their own territory. Thus group i owns a share φ_i of the country's total resources R, with $\varphi_A + \varphi_B = 1$. Each ethnic group decides on the manpower to allocate to productive, w_i, and fighting, f_i, activities. The production technology is assumed to be linear and hence the total income of group i equals $\varphi_i R + w_i$. The ruler can tax all the nation's income by applying group-specific taxes, τ_A and τ_B.[5]

If group i decides to allocate manpower to fighting, $f_i > 0$, this force may serve two purposes: On the one hand it can be used to loot the resources of the other ethnic group, in which case we have a conflict. On the other hand it may serve to mount a rebellion against the ruler so that the group can avoid paying taxes. Throughout the model, we assume that only natural resources can be appropriated with violent means.[6] If a rebellion occurs, the ruler's army fights the rebels and no taxes are collected if the rebellion succeeds. The ruler controls an army of force a, and decides how to divide it between protecting himself from a potential rebellion, a_L, and deterring potential inter-group conflicts from arising, a_D.

Given the above description of the agents' actions, we now turn to the associated payoffs. Denote *civil war* with the superscript C, *rebellion* with the superscript R, and peace *peace* with the superscript P. In the absence of civil war and rebellion (that is when the country is at peace), ethnic group i's payoff is given by its after tax income:

[5]Modifying this assumption and constraining the ruler to impose a unique tax rate in the whole country reduces the ruler's equilibrium utility. All results are however robust to such a change. Similarly, allowing the ruler to impose different tax rates on natural resources and on labor production leaves the results unchanged.

[6]While other goods may also be looted in times of conflict, non-material goals notwithstanding, the control of valuable resources constitutes the prime objective of armed groups.

$$U_i^P = (1 - \tau_i)(\varphi_i R + n - f_i) \tag{1}$$

Meanwhile the tax proceeds are entirely consumed by the ruler whose utility therefore is:

$$U_L^P = \sum_i \tau_i (\varphi_i R + n - f_i) \tag{2}$$

If in the absence of civil conflict group i decides to mount a rebellion (superscript PR for Peace-Rebellion), its payoff equals:

$$U_i^{PR} = \frac{f_i}{a_L + f_i}(\varphi_i R + n - f_i) \tag{3}$$

where $\frac{f_i}{a_L+f_i}$ is a simple *ratio-form* contest success function that constitutes the probability that group i's rebellion is successful, and hence it can stop paying taxes. Similarly, the ruler's utility becomes:

$$U_L^{PR} = \frac{a_L}{a_L + f_i}\Big(\varphi_i R + \tau_{-i}(\varphi_{-i} R + n - f_{-i})\Big) \tag{4}$$

where $\frac{a_L}{a_L+f_i}$ is the probability that the rebellion is unsuccessful in which case the ruler appropriates all the rebelling group's natural resources, and enjoys the revenues from taxing the other group. Equation (4) assumes that only natural resources and not the production of the rebelling ethnic group are appropriated through conflict. In case of defeat, however, an ethnic group is not able to carry on production successfully.

If both groups rebel (superscript Rr, where r signals that group $-i$ joins the rebellion), group i's utility equals:

$$U_i^{PRr} = \frac{f_i}{a_L + f_i + f_{-i}}(R + n - f_i) \tag{5}$$

While the ruler's utility is given by:

$$U_L^{PRr} = \frac{a_L}{a_L + f_i + f_{-i}} R \tag{6}$$

When group i initiates a conflict over the control of group j's natural resources (a civil war), but refrains from rebelling against the ruler, it obtains:[7]

$$U_i^C = (1-\tau_i)\frac{f_i}{a_D + f_i + f_{-i}}(R+n-f_i) \tag{7}$$

where the contest success function features the ruler's effort to deter inter-groups' conflict, a_D, a share of the army which is deployed to help the targeted group. In accordance with Equation (4), only natural resources and not the production of the rival ethnic group are appropriated through conflict.

The attacked group's payoff is then given by:

$$U_{-i}^C = (1-\tau_{-i})\frac{a_D + f_{-i}}{a_D + f_i + f_{-i}}(R+n-f_{-i}) \tag{8}$$

The ruler's payoff takes into account that, absent rebellion, taxes on both groups can still be levied. Hence:

$$U_L^C = \tau_i\frac{f_i}{a_D + f_i + f_{-i}}(R+n-f_i) + \tau_{-i}\frac{f_{-i} + a_D}{a_D + f_i + f_{-i}}(R+n-f_{-i}) \tag{9}$$

Lastly, when there is both civil war and rebellion (superscript CR), the rebelling group's payoff is:

$$U_i^{CR} = \frac{f_i}{a + f_i + f_{-i}}(R+n-f_i) \tag{10}$$

In such event, we assume that the ruler backs the non-rebelling group, which he keeps taxing.[8] The non-rebelling group's and the ruler's utilities therefore respectively read as:

$$U_{-i}^{CR} = (1-\tau_{-i})\frac{a + f_{-i}}{a + f_i + f_{-i}}(R+n-f_i) \tag{11}$$

[7]Even in in reality some share of individuals engaging in inter-group violence are more motivated by ethnic hatred than by a rational economic calculus, the driving reason is often linked with wealth redistribution issues.

[8]To keep the model tractable, we need to assume a single contest under any configuration. Given this assumption, it follows that the optimal strategy of the ruler is to side with the non-rebelling group.

$$U_L^{CR} = \tau_{-i}\frac{a + f_{-i}}{a + f_i + f_{-i}}(R + n - f_i) \tag{12}$$

If both groups simultaneously rebel, however, group i's utility becomes:

$$U_i^{CRr} = \frac{f_i}{a + f_i + f_{-i}}(R + n - f_i) \tag{13}$$

Whereas the ruler's utility equals:

$$U_L i^{CRr} = \frac{a}{a + f_i + f_{-i}}R \tag{14}$$

3.1.1 Timing

The timing of the game is as follows:

1. The ruler decides the pair $\tau = \{\tau_A, \tau_B\}$, and the allocation of the army between protecting himself a_L from rebellion, and deterring civil conflicts a_D.

2. The two ethnic groups simultaneously decide:

   - The manpower to allocate to fighting each other, (f_A, f_B).[9]
   - Whether or not to initiate a conflict, with conflict resulting if either group initiates it.
   - Whether or not to mount a rebellion.

We solve the model backwardly by looking at Subgame Perfect Equilibria in pure strategies.[10]

[9] And thus implicitly their productive effort (w_A, w_B).

[10] We adopt the sequential structure of Grossman and Kim's (1995) that allows peace to be a potential equilibrium of the game. An alternative timing where the ruler would allocate his army *simultaneously* or *after* the civil war and/or rebellion stages would not be suitable for the purpose of this paper since the unique equilibrium would then be the outbreak of civil war (see De Luca and Sekeris (2012) for a formal proof of this claim). Indeed, in these cases the deployment of a deterring force would not dissuade the ethnic groups from arming. Since the diversion of otherwise productive labour to fighting activities constitutes the only cost of conflict for the ruler (due to the reduction of his tax base), deterring the outbreak of an ethnic conflict would bring no benefit to the leader. On the other hand, the deployment of a deterring army ($a_D > 0$) weakens the ruler vis à vis a potential rebellion.

3.2 Analysis

Stage 2:

The six potential outcomes that can arise in this game are the following:

(a) Conflict

(b) Conflict and rebellion by one group

(c) Conflict and rebellion by both groups

(d) Peace

(e) Peace and rebellion by one group

(f) Peace and rebellion by both groups

In what follows, we shall consider the groups' optimal manpower allocation and associated expected utilities for each case. We then identify the equilibria of the subgame played in stage 2 for the entire range of admissible values of $\{\tau_A, \tau_B, a_D\}$.

(a) Conflict

The optimal manpower allocation to fighting is obtained by maximizing equation (7) with respect to f_i. Combining the derived values of $f_i^C(f_{-i})$ and $f_j^C(f_i)$ yields:

$$f_i^{C*} = f_j^{C*} = \frac{n+R}{3} \tag{15}$$

Hence, the associated (expected) utilities are given by:

$$U_i^C(\tau_i) = (1-\tau_i)\frac{n+R}{3} \tag{16}$$

(b) Conflict and rebellion by one group

The optimal manpower allocation to fighting activities for group i is obtained by maximizing equation (10) with respect to f_i, which yields:

$$f_i^{CR}(f_{-i}) = ((a + f_{-i})(a + f_{-i} + n + R))^{1/2} - (a + f_{-i}) \tag{17}$$

Group $-i$ maximizes the following expression with respect to f_{-i}

$$U_{-i}^{CR} = (1 - \tau_{-i}) \frac{a + f_{-i}^{CR}}{a + f_i + f_{-i}^{CR}} \left(R + n - f_{-i}^{CR}\right) \tag{18}$$

which yields the reaction function:

$$f_{-i}^{CR}(f_i) = (f_i (a + f_i + n + R))^{1/2} - (a + f_i) \tag{19}$$

Combining (17) and (19), we obtain the optimal manpower allocations f_A^{CR*} and f_B^{CR*} and the two groups' associated utilities (not reported).

(c) Conflict and rebellion by both groups

If both conflicting groups simultaneously rebel against the leader, they maximize equation (13) with respect to f_i. The optimal manpower allocated to fighting is therefore given by:

$$f_A^{CRr*} = f_B^{CRr*} = \frac{n + R}{3} \tag{20}$$

The associated utilities equal:

$$U_A^{CRr*} = U_B^{CRr*} = \frac{2(n + R)^2}{3\,(3a + 2(n + R))} \tag{21}$$

(d) Peace

Since the allocation of manpower to fighting activities would constitute a pure waste, $f_A^{P*} = f_B^{P*} = 0$. The two groups' utilities are given by :

$$U_i^P(\tau_i) = (1 - \tau_i)(\varphi_i R + n) \tag{22}$$

(e) Peace and rebellion by one group

If group i rebels, the optimal manpower allocation is obtained by maximizing equation (3). This allows us to derive the following expression:

$$f_i^{PR*} = (a_L (a_L + n + \varphi_i R))^{1/2} - a_L \tag{23}$$

Replacing this value in (3) gives:

$$U_i^{PR*} = \left[(a_L + n + \varphi_i R)^{1/2} - a_L^{1/2} \right]^2 \tag{24}$$

Since group B remains in peace we naturally have that $f_{-i}^{PR*} = 0$.

(f) Peace and rebellion by both groups

If both groups rebel simultaneously, group i maximizes (13), and this yields:

$$f_i^{PRr}(f_{-i}) = ((a_L + f_{-i})(a_L + f_{-i} + n + R))^{1/2} - (a_L + f_{-i}) \tag{25}$$

Using $f_{-i}^{PRr}(f_i)$ we deduce that $f_A^{PRr*} = f_B^{PRr*} = \frac{n+R}{3}$. We can then derive the associated utilities:

$$U_A^{PRr*} = U_B^{PRr*} = \frac{2(n + R)^2}{3(3a_L + 2(n + R))} \tag{26}$$

Having exposed the potential equilibrium outcomes of this game, we can now identify which equilibria will emerge under different policy vectors $\{\tau_A, \tau_B, a_D\}$.

Notice first that the tax rates (τ_A, τ_B) do not influence the decision of groups to engage in conflict because taxation reduces by the same proportion the groups' utility under *peace* and under *conflict*. Groups will therefore engage in conflict unless they are successfully deterred by the deployed contingent a_D. For deterrence to be successful, it is necessary that both ethnic groups are unwilling to initiate hostilities given that the other group is unprepared for fighting. Since both groups are endowed with the same fighting technology and face the same opportunity cost of mobilizing fighters, the ethnic group whose resources endowment is the lowest has the highest incentives to start a conflict. Without any loss of generality assume $\varphi_A > 1/2$. If the deterrent force is to be effective, therefore, the following condition should be satisfied: $U_B^C(f_A = 0) \leq U_B^P$. The payoff group B obtains when deviating from *peace* is obtained by maximizing equation (7) when setting $i = B$, and $f_A = 0$. The resulting utility for group B then equals:

$$U_B^C(f_A = 0) = (1 - \tau_B)\left[(a_D + n + R)^{1/2} - a_D^{1/2}\right]^2 \tag{27}$$

Using equations (22) and (27) for group B, we can determine the minimal amount of troops the ruler needs to deploy for the deterrent strategy to be effective, $\bar{a}_D$:

$$\bar{a}_D = \frac{(\varphi_A R)^2}{4\,(n + \varphi_B R)} \tag{28}$$

For any smaller value of a_D, at equilibrium groups will fight each other.

The next condition to inspect regards the decision to rebel. Let's start considering the case of $a_D < \bar{a}_D$, namely when groups are at conflict with each other. Group A unilaterally rebels against the leader if his utility of rebelling, with $f_B = f^{C*}$, exceeds his utility of conflict. Formally, if:

$$U_i^{CR*} = \left[\left(a + f_{-i}^{C*} + n + R\right)^{1/2} - \left(a + f_{-i}^{C*}\right)^{1/2}\right]^2 > (1 - \tau_i)\frac{n + R}{3} = U_i^C(\tau_i) \tag{29}$$

where U_i^{CR*} (the left hand side) is obtained by replacing (17) into (10). Group i therefore rebels at equilibrium if $\tau_i > \tau^{C*}$ where τ^{C*} is implicitly defined by condition (29) imposing equality.

For both groups to simultaneously rebel at equilibrium, it must be profitable for group i to rebel provided group $-i$ is rebelling. In Appendix A.1 we show that both groups rebel if $\tau_i > \tau_i^{C**}$, with $\tau_i^{C**} > \tau_i^{C*}$.

Summarizing the case where $a_D < \bar{a}_D$, conflict between groups occurs for $\tau_i \in [0, \tau_i^{C*}]$, conflict between groups and unilateral rebellion by i occurs for $\tau_i \in [\tau_i^{C*}, 1]$, while conditional on group $-i$

rebelling, both groups fight each other and rebel for $\tau_i \in [\tau_i^{C**}, 1]$.

Consider next the case where $a_D \geq \bar{a}_D$. At equilibrium the two groups refrain from attacking each other. Group i will nevertheless unilaterally rebel if his utility of rebelling when $f_{-i} = 0$ exceeds his utility of peace as given by (1). Formally we obtain:

$$U_i^{PR*} = \left[(a_L + n + \varphi_i R)^{1/2} - a_L^{1/2}\right]^2 > (1 - \tau_i)(\varphi_i R + n) = U_i^P(\tau_i) \tag{30}$$

Group i rebels at equilibrium if $\tau_i > \tau_i^{P*}$, where τ_i^{P*} is such that (30) is satisfied with equality. As for the conflict scenario (i.e. $a_D < \bar{a}_D$), it can be shown that both groups rebel at equilibrium for $\tau_i > \tau_i^{P**}$, with $\tau_i^{P**} > \tau_i^{P*}$.

For $a_D \geq \bar{a}_D$, we therefore obtain that peace occurs for $\tau_i \in [0, \tau_i^{P*}]$, peace and unilateral rebellion of group i occurs for $\tau \in [\tau_i^{P*}, 1]$, while conditional on group $-i$ rebelling, both groups will rebel for $\tau_i \in [\tau_i^{P**}, 1]$.

Figure 1 summarizes the various equilibria of the subgame played in stage 2 for the admissible values of τ_i (x-axis) and a_D (y-axis) while keeping τ_{-i} constant.

FIGURE 1: Equilibrium Outcomes. (ABOUT HERE)

Stage 1:

We have derived the ethnic groups' best responses to the ruler's tax rates and optimal army deployment. We now can solve the game's first stage. In order to reap the maximal wealth from its citizens, the ruler uses two tools: the tax rates and the army deployment.

At equilibrium, the leader always chooses to deter rebellions. Indeed, for any $a_D < \bar{a}_D$, the leader sets $\tau_A = \tau_A^{C*}$ and $\tau_B = \tau_B^{C*}$. Reducing the tax rate below these values on either group represents a loss since it decreases the tax revenue when rebellion is anyway averted. Any tax rates above these thresholds provoke rebellion. When rebelling, however, groups devote some of their manpower to fighting, thereby reducing aggregate production. Since the tax rates τ_A^{C*} and τ_B^{C*} secure to the two groups the same utility under rebellion and under no-rebellion, it follows that the aggregate waste due to rebellion is incurred by the leader.

Applying the same reasoning, for any $a_D \geq \bar{a}_D$ (i.e. peace) the leader deters rebellions by setting $\tau_A = \tau_A^{P*}$ and $\tau_B = \tau_B^{P*}$.

Consider next the optimal choice of a_D. Any $a_D < \bar{a}_D$ as defined in (28) is unable to deter a civil war. Deploying this army across the country instead of using it to protect themselves is suboptimal. Indeed, the lower the protection of the ruler, the easier it is to mount a rebellion, which eventually translates into a lower optimal tax rate. By the same reason, any $a_D > \bar{a}_D$ would unnecessarily reduce the ruler's defense. We thus conclude that $a_D = \{0, \bar{a}_D\}$. In other words, the ruler will either just deter a conflict from occurring or abstain entirely from any deterrent activities.

Referring to Figure 1, the leader chooses between the policy vector $(\tau_A^{P*}, \tau_B^{P*}, \bar{a}_D)$ as described by point S in the diagram, and $(\tau_A^{C*}, \tau_B^{C*}, 0)$ as represented by point T.

The utility of a ruler who chooses to deter civil conflict (point S in Figure 1) is given by (2), which after substituting for the optimal tax rates yields:[11]

$$U_L^P = 2n + R - \sum_{i=A,B} \left[((a - \bar{a}_D) + n + \varphi_i R)^{1/2} - (a - \bar{a}_D)^{1/2} \right]^2 \tag{31}$$

If the ruler, however, does not deploy a deterrent contingent, the ethnic groups always deviate from the peaceful situation. Thus, whenever $a_D = 0$, a civil conflict will occur (point T in Figure 1). The utility of the ruler is then given by equation (9) after replacing f_A^C and f_B^C with their equilibrium value given in (15), and setting the tax rates to their optimal (conflict) value τ_i^C. This yields:

$$U_L^C = \frac{2}{3} \left[n + R - \left[(4\,(n + R) + 3a)^{1/2} - (n + R + 3a)^{1/2} \right]^2 \right] \tag{32}$$

The ruler therefore decides whether or not to deploy the deterrent forces by comparing (31) to (32). On the one hand, averting a civil conflict grants the ruler the largest tax base. Indeed, when the ethnic groups enter into an armed struggle, potentially productive resources are diverted to fighting activities. On the other hand, despite the partial reduction of the ruler's tax base, civil conflict

[11] Notice that U_L^P is not defined for $a < \bar{a}_D$, as the ruler would not have enough power to deter an ethnic conflict.

reduces the contestants' capacity of rebellion and strengthens the defenses of the ruler, thereby increasing the tax rates the ruler can impose. In the context of an on-going conflict between the ethnic groups, the group willing to mount a rebellion will have to fight *both* the other ethnic group and the ruler's army. We now turn to analyze the trade-off between tax-base and tax rate when varying the model's key parameters.

The following proposition describes how the ruler's strength as measured by the size of his army will influence the equilibrium:[12]

Proposition 1. *There exists a unique ruler's strength level above which he preserves peace and below which a civil conflict occurs.*

Proof. A formal proof is provided in Appendix A.2. □

Proposition 1 deserves a brief discussion. It suggests that a country ruled by a weak dictator is expected to experience internal conflicts. Very weak dictators ($a < \bar{a}_D$) do not have the sufficient strength to deter the most motivated group in the society from starting a conflict over natural resources. Indeed, attacking the other group when $a_D < \bar{a}_D$ always yields a larger payoff to A than under peace. Interestingly, countries ruled by relatively weak dictators (who nevertheless control an army $a > \bar{a}_D$) are *also* expected to experience civil conflicts. Unlike in the previous case, this is the result of a rational calculus by the ruler: by concentrating all his forces a to protect himself from a potential rebellion he can impose larger tax rates. Refraining from deploying a peace-keeping force results in a civil war which destroys part of the tax base. The gains from larger tax rates, however, exceed the tax base loss.

Figure 2 plots the outcome of a simulation exercise to help visualize the result of Proposition 1. The horizontal axis represents the strength of the ruler, and the vertical axis measures his utility. A ruler whose army is weaker than $\bar{a}_D$ is unable to deter a civil conflict. As a consequence, for that range of a, only U_L^C (dashed curve) is defined. For intermediate strength values ($a \in [\bar{a}_D, \tilde{a}]$), the burden of preserving peace exceeds the increase in tax base, thus the ruler refrains from preventing

[12]Throughout the paper the results presented in the propositions hold for the entire range of admissible parameters' values. Both interior and corner solutions are formally dealt with in the Appendix.

civil conflict. Interestingly, for $a > \bar{a}_D$, increasing the ruler's strength reduces the gap in the tax rates under peace and conflict, while the gap in tax bases remains constant. Indeed, the tax base loss under conflict is entirely determined by the amount of resources (n and R) at stake, since $a_D = 0$ (see equation 15). The waste of resources under conflict eventually makes the peace-preserving strategy more profitable for sufficiently strong rulers ($a > \tilde{a}$).

FIGURE 2: The effect of the ruler's strength (ABOUT HERE)

A consequence of this finding is that a negative shock on the personal power of a strong autocratic ruler *can be conducive to civil conflict*, either because the ruler is no longer able to support peace (if the shock affects the ruler strength such that his resulting army $a < \bar{a}_D$), or because it is no longer in his interest to do so.

Another parameter of interest in the analysis is R, the amount of natural resources. The next proposition summarizes our findings on the effect of natural resources:

Proposition 2. *There exists a unique stock level of natural resources below which the ruler preserves peace, and above which civil conflict occurs.*

Proof. A formal proof is provided in Appendix A.3. □

Like in Proposition 1, the intuition behind this result lies in the effect of natural resources on the ruler's taxing ability under the two scenarios. Indeed, increasing the amount of natural resources has two effects. On the one hand, under both scenarios a larger stock of natural resources increases the tax base. Interestingly, the tax base increment under peace is larger than under conflict as in the latter scenario more natural resources divert more labor from production to fighting. On the other hand, however, increasing natural resources also inflates the cost for the ruler to preserve peace in terms of soldiers to deploy ($\bar{a}_D$) to deter a civil conflict. As a consequence, larger resource stocks reduce the forces dedicated to directly protecting the central regime from a potential rebellion, thereby pushing downwards the tax rate that can be imposed under the peace scenario. For large resource stocks this last force prevails. Thus, for a sufficiently large amount of natural resources, the ruler should deploy the entire army for deterrence to be successful. This, however, makes the ruler powerless vis-a-vis the potentially rebellious ethnic groups. As a consequence the ruler's payoff is nil. When the presence of abundant resources makes the country very unstable, the ruler finds it more profitable not to avert a civil conflict and to profit from it (by imposing larger tax rates), instead of devoting a large share of his army to maintain peace.

It is worth stressing that the ruler's decision depends on the amount of natural resources *relative* to labor productivity. Throughout this paper we consider a unit marginal productivity of labor. Had we allowed for a more efficient production technology this would have increased the threshold level of natural resources conducive to a conflict equilibrium without, however, qualitatively modifying the findings.

In Figure 3 we present the results of a simulation that helps visualizing Proposition 2. While the horizontal axis represents the level of natural resources in the country, the vertical axis measures the utility of the ruler. The dashed curve describes the utility of the ruler under conflict. Instead, the solid curve represents the utility of the ruler if he decided to maintain peace in the country.

FIGURE 3: The effect of natural resources (ABOUT HERE)

While U_L^C is monotonically increasing in R, U_L^P decreases for large stocks of natural resources. Indeed, for large values of R securing peace leaves the ruler with relatively little forces to face a potential rebellion. As a consequence the effect of additional increments of resources on the tax rates under peace becomes increasingly important and eventually exactly offsets the increase in the tax base. This occurs for the level of resources for which the solid curve reaches its maximum. For any larger stocks of natural resources, the tax base expansion does not compensate for the reduction in the tax rates. The negative slope of U_L^P for large resource stocks in Figure 3 captures these dynamics. Eventually, for $R > \bar{R}$, the ruler is better off under civil conflict.

The last comparative statics exercise highlights the role of inequality, i.e. whether and how the initial distribution of natural resources across the two ethnic groups influences the ruler's policy decisions. The next proposition addresses this issue.

Proposition 3. *Higher inequality in initial resource endowments increases the occurrence of civil conflicts.*

Proof. A formal proof is provided in Appendix A.4. □

The impact of inequality on the emergence of an internal conflict has been widely investigated in the literature.[13] From our model we can show that a more unequal distribution of natural resources across groups in the society makes the deterrence strategy more costly for the ruler because of the higher incentives for the society's poorest group to violently appropriate resources. As a consequence, when governing a society characterized by high inequality in the distribution of resources, a ruler finds it more profitable to have an inefficient conflict over resources, and to exploit his subjects through higher tax rates.

We can now summarize the main findings of the model. We have shown that it may be in the interest of an autocratic ruler to foster an inefficient internal conflict in a divided society by foregoing the peace-keeping role of the army under his control. Such conflicts imply a partial loss of the ruler's tax base since otherwise productive labor gets diverted towards fighting. By protecting himself with his entire army, on the other hand, the ruler can impose higher tax rates which more than compensate the loss in terms of tax base. Our comparative statics predict that internal conflict is more likely to be fostered: (i) by a relatively weak ruler, (ii) in the presence of abundant natural resources, and (iii) in societies where natural resources are distributed less equally.

The next section confronts these predictions to cross-country longitudinal data on civil wars in recent history.

[13] While early studies argue that conflicts are mainly triggered by strong grievances (Gurr 1970, Scott 1976), more recent contributions show mixed results on the role of inequality on conflict (Fearon and Laitin 2003, Collier and Hoeffler 2004, Murshed and Gates 2005, Hidalgo et al. 2010, De Luca and Sekeris 2011).

4 Empirical evidence

We now test the main predictions of the model. Note that, taken together, Propositions 1 and 2 imply that civil conflicts (in ethnically polarized, autocratic societies) occur if two conditions are met: the autocrat must be weak enough, and there should be natural resources. Proposition 3 implies that when resources are unequally distributed the probability of conflict is even larger. We can test this empirically by looking at the effect on the probability of civil war occurrence of the interaction between natural resources and some proxy of the dictator's *weakness* in the subsample of autocratic, ethnically polarized countries (Propositions 1 and 2), and by running the same regression in the subsample of the countries where resources are unequally distributed. Such is the essence of our empirical strategy, which we explain in detail after we describe the data.[14]

4.1 Data and sample

The dependent variable is a dummy that describes whether a civil conflict took place in country *i* in year *t*. The source is the Uppsala/PRIO conflict dataset, available from the Uppsala Conflict Data Program (Gleditsch et al. 2001).

We use the Polity IV dataset (Marshall and Jaggers 2002), which assigns to each country (each year) a score in the autocracy–democracy spectrum. Because our story is one of the incentives of autocratic rulers, we keep only the subsample of countries closer to pure autocracy using as threshold the median of the distribution of country-years in the regime type spectrum. Our results are robust to variations in the arbitrary cutoff.

Similarly, and in line with our model which highlights that the perverse incentives of the autocratic ruler occur in ethnically polarized societies, our sample of country-years gets further re-

[14] It is important to stress two annotations upfront: first, our empirical exercise is guided by the predictions of our model, and that we are not claiming any clean identification or causal interpretation in the empirical exercise, beyond what the theoretical model suggests. Secondly, our empirical strategy is similar to that of Humphreys (2005, Table 3) in the sense that both look at the interaction term of ruler weakness and resource abundance. However there are several differences between the two approaches as we focus on the subsample ethnically polarized autocracies, show that results are stronger in places where resources are more unequally distributed, and investigate the robustness of the main results to the inclusion of fixed effects.

duced when we take the countries above the median of the ethnic polarization index of Montalvo and Reynal-Querol (2005). Again, our results are robust to variations in this cutoff.

When testing Proposition 3 we further reduce the sample to focus on the countries in which natural resources are unequally distributed. To do this we use the data on petroleum by Lujala et al. (2007) which includes geospatial coordinates of each of the oil wells within each country. We then compute the average distance between fields in each country and normalize it by the country's population, hence obtaining an inverse measure of resource inequality.[15] Finally we focus on the countries below the median of such measure (that is above the median inequality) to test the role of resource inequality.

Mainly because of the availability of income data for a large set of countries (source: PWT 6.3, Heston et al. 2009), our sample covers the period 1960–2007.

Table 1 reports the summary statistics of the main set of variables used in the analysis. We report the summary statistics for the entire sample of autocrats, that of ethnically polarized autocracies, and also that of ethnically polarized autocracies that have an unequal distribution of natural resources according to our proxy of resource distribution. In the sample of autocracies (top panel of Table 1) civil war occurs in 14.4% of the country-years. The middle panel of Table 1 shows that the mean incidence of civil war is reduced slightly (13.5%) when looking at the sample of ethnically polarized autocracies. The mean incidence gets further reduced if the sample is restricted to the countries with unequal distribution of resources (6.5%).

Our proxy for the presence of natural resources is a time-varying dummy that equals one if a country produces either oil or diamonds. We compute this using two recent and comprehensive datasets that record longitudinal world-wide production of the two minerals (oil: Lujala et al. 2007; diamonds: Gilmore et al. 2005). Roughly 41-42% of the observations produce either or both minerals and this is true both for the sample of autocracies and for that of ethnically polarized autocracies. The figure drops to 24% in the subsample of countries with unequal resource distribution (Table 1).

[15] We obtain similar results when we normalize by the country's surface.

We control in our regressions for the variables identified by the recent cross-country literature as the most robust correlates of civil war (Collier and Hoeffler 2004 and Fearon and Laitin 2003). These include population, which we also add as a scale control, per capita GDP and its rate of growth, and the proportion of mountainous terrain which controls for the geographic characteristics facilitating the mobilization of rebellious movements. In addition, we control for how open countries are to international markets and add regional dummies.[16] The descriptive statistics of these variables are reported on Table 1.

4.2 Empirical strategy

Propositions 1 and 2 of our model imply that, within the sample of ethnically polarized autocracies, civil conflicts are more likely to occur in places with natural resources (which constitute an incentive to engage in war against other groups) and when the autocrat is weak (which makes him less likely to devote soldiers to prevent inter-group fighting). Furthermore, Proposition 3 suggests that the risk of conflict is higher the worse the distribution of natural resources.

Our main empirical specification looks at these predictions jointly by looking at the effect on the probability that civil war takes place in a given country at a given time, of the interaction between the dummy for resource presence and our proxy for weakness of the dictator.

For the latter we exploit the time variation provided by the end of the Cold War, an event which has been widely identified as a negative shock to regimes that received aid from either the US or the Eastern Bloc. Indeed, Reno (1997, 1998), and Ndulu and O′Connell (1999) document how the end of the Cold War entailed a decline of interest for the African continent. In addition, Boschini and Olofsgard (2007) estimate that the amount of foreign aid from the West was systematically higher in periods of increased security concerns, as measured by estimated military expenditures in the former Eastern Bloc, only during the Cold War era. Similarly, Fleck and Kilby (2010) demonstrate that foreign aid has not targeted the neediest countries during both the Cold War and the War on

[16]Ethnic polarization has also been proposed as a driver of civil unrest. Since our theory focuses on ethnically divided societies we take this aspect into account in all regressions by focusing on the sample of countries above the median of ethnic polarization.

Terror (after 2001). Moreover Berthelémy and Tichit (2004) emphasize that since the beginning of the 1990s, aid was directed according to economic criteria as opposed to global strategic reasons. Table A5.1 in the appendix investigates the effect of the interaction of the post Cold War dummy and the presence of natural resources on the size of the armed forces in ethnically polarized autocracies. The estimated coefficient is negative and significant consistently across specification (where controls are included additively), which supports the assumption that autocracies weakened during the post Cold War era. However, as it will remain clear (see Table 4), our results are robust to using other proxies of weakness of the ruler.

For our main empirical specification, we estimate:

$$Y_{i,t} = \alpha + \beta_1 PostColdWar_t + \beta_2 NatRes_{i,t} + \gamma(PostColdWar \times NatRes)_{i,t} + \delta X_{i,t} + \varepsilon_{i,t} \qquad (33)$$

where $Y_{i,t}$ is a dummy that equals one if a civil war took place in country i in year t, $PostColdWar_t$ is a time dummy that takes value one starting in 1990, $NatRes_{i,t}$ is a dummy that equals one if country i produces either oil or diamonds at time t, $X_{i,t}$ is a vector of time-varying controls, and $\varepsilon_{i,t}$ is the error term.

The coefficient of interest is γ, which captures the effect on the incidence of civil war of the interaction between the presence of natural resources and the weakness of the dictator.

4.3 Main results and robustness

We estimate equation (33) with a linear probability model.[17] Table 2 reports the benchmark results of the test of Propositions 1 and 2.[18] We focus on γ, the coefficient of interest.

The difference between columns 1 and 2 is that, while the former uses the entire sample of autocracies, column 2 is closer to our model in the sense that it looks at the subsample with higher

[17] Angrist and Pischke (2008) argue that OLS consistently estimates the linear conditional expectation function and minimizes mean-squared error and, for binary outcomes, recommend linear probability models over limited dependent variable models like Probit or Logit. However, all our results are robust to fitting a Probit model on (33).

[18] See Table 3 for a test of Proposition 3.

values in the ethnic polarization index. As suggested by our model, the positive effect of the interaction between the post Cold War dummy and the presence of natural resources on the likelihood of civil war incidence is higher in the latter subsample, and we stick to it for the remainder of the empirical analysis. According to the estimated coefficient of column 2, which is significant at the 1% level, the probability that an ethnically polarized autocracy experiences civil war increases by 8.8 percentage points when the autocrat is weak and the country has natural resources.

Columns 3 to 6 illustrate the robustness of our result by additively including various controls. We start with the variables identified by the cross country empirical literature as the most robust correlates of civil war (column 3). These are population size, per capita GDP (both of which we measure in logs) and the rate of growth of the economy.[19] The size of the coefficient is virtually unchanged compared to the regressions without controls. Column 4 adds two additional controls, also frequently significant in the empirical literature, namely the roughness of the terrain (as measured by the proportion of mountainous terrain from Fearon and Laitin (2003)'s dataset) and a measure of economic openness. The coefficient does not lose significance but doubles in magnitude. The interaction of interest increases the probability of civil war in 17 percentage points. This estimate remains very similar (16 percentage points) when introducing regional dummies that capture continent-specific heterogeneity (column 5). The last column of Table 2 shows that clustering the standard errors at the country level reduces the significance but not enough to make the estimated effect undistinguishable from zero.

Two annotations are in order: First, because of data availability, the additive inclusion of controls reduces significantly the sample size and column 6 has 52% of the observations of column (2) (recall that column 1 does not focus on ethnically polarized cases). To show that the robustness of our results to controlling for different sets of covariates is not an artifact of the reduced sample from one column to the other in table A.5.2 of the appendix we run again the benchmark model with the sample balanced at the maximum number of observations that the controls allow us. That

[19]The other variable robustly associated with civil war is the presence of natural resources, especially oil. This specific variable is part of our interaction of interest and we include the non interacted version of it [recall equation (33)].

is, we run all the regressions on the same set of country years regardless of the controls included in each step. Compared to table 2 our results are qualitatively unchanged. Second, we test our theory by looking at the incidence of armed conflict in ethnically polarized societies. We do no think that a more direct test is necessarily to look directly at the incidence of conflicts that are specifically regarded as ethnic. Indeed the ethnic card is often played endogenously by political actors seeking to mobilize the masses for the support of a specific political goal (Eifert et al. 2010). In addition only recently has systematic data on the longitudinal cross country variation of conflicts coded as ethnic been put together. Using a new dataset by Cederman et al. (2009), in the appendix Table A.5.3 we repeat our benchmark specification looking specifically at the incidence of conflicts regarded as ethnic. The main results and robustness checks are virtually unchanged both when looking at the whole sample (Panel A) and when looking at the balanced one (Panel B). Significance is lost when the standard errors are clustered at the country level but only very marginally (p-value 0.101).

Following an analogous procedure we test Proposition 3 in Table 3. In Panel A we add to the interaction of interest the triple interaction between the post Cold War dummy, the indicator on natural resource presence and our inverse proxy of resource inequality. Recall that the latter is the population-normalized average distance among the oil wells within a country. We compute this with standard GIS techniques using the petroleum dataset of Lujala et al. (2007). We estimate:

$$\begin{aligned} Y_{i,t} = {} & \alpha + \beta_1 PostColdWar_t + \beta_2 NatRes_{i,t} + \beta_3 ResEquality_{i,t} + \gamma_1 (PostColdWar \times NatRes)_{i,t} + \\ & + \gamma_2 (PostColdWar \times ResEquality)_{i,t} + \gamma_3 (NatRes \times ResEquality)_{i,t} + \\ & + \phi (PostColdWar \times NatRes \times ResEquality)_{i,t} + \delta X_{i,t} + \mu_{i,t} \end{aligned}$$

Panel A of Table 3 reports the estimated coefficients of interest: that of the interaction between the proxy of weakness and the presence of natural resource ($\gamma 1$), and that of the triple interaction with the inverse proxy of resource inequality (ϕ). The estimate of the first is positive and significant which is consistent with Propositions 1 and 2. In turn, the estimate of the second is negative and significant, which is consistent with Proposition 3 given that the included measure (average distance between oil-wells) is an *inverse* proxy of resource inequality: if resources are more equally (unequally) distributed the probability the the weaken autocrat finds it profitable to promote conflict among ethnic groups is lowered (exacerbated). These results are robust to including all the standard controls (column 2) as well as region fixed effects (column 3). Standard errors are clustered in all columns.

Results in Panel B of Table 3 are equivalent but somewhat easier to interpret. Instead of including the triple interaction with resource inequality we estimate the baseline regression model (equation 33) but we now restrict the sample to the countries below the median of our inverse proxy of resource inequality (hence to the countries above the median of resource inequality). Both panel B of Table 3 and its balanced-sample equivalent (Table A.5.4 in the appendix) suggest that the coefficient on the interaction of interest is not only still positive and significant but also higher in magnitude across columns when compared to Table 2 (or Table A.5.2 in the balance-sample case). Taken together Table 3 constitutes supportive evidence of our claim that resource inequality exacerbates the incentives of weakened dictators in resource-rich, ethnically polarized countries.

4.4 Additional robustness checks

The empirical association reported on Table 2 between the incidence of civil war and the interaction of natural resources with the weakness of the ruler is consistent with our theory. We have shown that this association is robust to controlling for the relevant correlates of civil war identified in the cross-country empirical literature and that it survives the inclusion of continent fixed effects and even a stringent correction of the standard errors (when we cluster them at the country level). We now look at the robustness of this association to additional tests and alternative measures of our independent variables of interest.

Table 4 presents the additional robustness checks. The first two columns include, additively, country and year fixed-effects. By doing this we control for country specific time-invariant heterogeneity, as well as for time shocks that are common across countries. That is, we estimate the following variant of the model described in (33):

$$Y_{i,t} = \alpha_i + \lambda_t + b_2 NatRes_{i,t} + g(PostColdWar \times NatRes)_{i,t} + \delta X_{i,t} + \epsilon_{i,t}$$

where, in addition to the terms already defined, α_i and λ_t are respectively country and year fixed effects.[20]

The coefficient on our interaction of interest (in this case g) remains positive and significant.

Our main proxy for the weakness of the autocrat is a dummy for the post Cold War period. While this is arguably an exogenous shock to the strength of autocratic regimes, one limitation of this variable is that it presents no time variation across units or in terms of intensity. As shown respectively in columns 3-4 and 5-6 of Table 4, our results are robust to interacting with the presence of natural resources two other proxies of weakness, which we borrow from the dataset constructed by Humphreys (2005) and both of which present longitudinal variation: regime *instability* and ruler *strength*. While columns 3 and 5 do no restrict the sample to the observations with high resource inequality, columns 4 and 6 do. Results are consistent with our theoretical predictions: the interaction between natural resources and regime instability is positive and significant and, conversely, that between natural resources and regime strength is negative and significant (but significance is lost in the high inequality sample). While this robustness is reassuring, our preferred proxy is the dummy for the post Cold War period because the Humphreys variables are not available for the whole sample and they may also suffer from endogeneity problems that are less likely to be present when using the Cold War dummy.[21]

Finally, the last four columns disaggregate our benchmark measure of natural resources' presence (a dummy that equals one if a country produces either oil or diamonds in a given year) into two: an indicator of oil production only (columns 7 and 8) and one for the production of diamonds (columns 9 and 10). Columns 8 and 10 restrict the sample to the observations above the median of

[20] Note that the variable *PostColdWar* is not included in its non interacted version. This is because it is a time dummy that gets absorbed by the year fixed-effect.

[21] We acknowledge however that the end of the Cold War may capture other dynamics in addition to the weakening of autocratic rulers, like a change in the international price of commodities. However in Table 3 we have shown that our results are robust to the inclusion of country-specific and especially time fixed effects, which reduce the scope of this potential confounder.

resource inequality. The estimated coefficient is generally positive and significant, which suggests that the results are not driven by the simultaneous presence of the two commodities.[22]

Overall, we find a strong support in the data for our political economy story of the perverse incentives of autocrats to profit from ethnic strife in weakly institutionalized and ethnically polarized societies.

5 Conclusions

The observation that some weak autocrats ruling over ethnically divided societies seem to have avoided intervening to control the escalation of violent conflict in their countries (if not favored such escalation altogether) is puzzling and, to the best of our knowledge, no explanation has been offered in the social science literature. We propose a theoretical framework that, by emphasizing the private incentives of autocrats in natural resource-rich and ethnically divided societies, provides a rational explanation to such behavior. In our model, a rent maximizing dictator sets taxes on production and natural resources and allocates military effort both to protect himself from a potential rebellion and to deter the occurrence of civil conflict among the ethnic groups. The occurrence of civil conflict undermines the tax base by disrupting production but also lowers the probability that a group revolts, hence empowering the ruler to set higher tax rates. We then show that weaker rulers (i.e. with a lower capacity to defend their regime) profit from the incidence of civil strife. When the primary source of revenue comes from taxing natural resources the disruption that conflict provokes on the economy's production is lower. Thus a second prediction of our model is that the autocrat's gains from internal conflict are proportional to the country's endowment of natural resources. Moreover, we also show that the civil war dividend for the ruler is increasing in the inequality of resource ownership across ethnic groups. This is explained by the predatory incentives of the disadvantaged group in appropriating the assets of the other group *vis à vis* engaging in a coup attempt.

[22] The magnitude of the coefficient is about three times larger when using the production of diamonds as the proxy for natural resources as opposed of using the production of oil.

In this paper we complement the theoretical model by backing its predictions with empirical evidence. While the correlation between natural resources and conflict is a well documented phenomenon (Ross 2004), our empirical evidence adds to the stylized facts some important nuance that is in turn consistent with our novel theoretical mechanisms. Indeed, in line with the model's setting, we look at the subsample of ethnically polarized, autocratic countries over the period 1960-2007. Our dependent variable is the incidence of civil war and our coefficient of interest is the interaction between a dummy for the presence of natural resources and a dummy for the post Cold War period. The latter variable is our benchmark proxy for the weakness of the autocrat since it identifies a period when most dictatorial regimes lost both geo-strategic importance and access to financial resources. The coefficient associated with the interaction, which supports our main theoretical predictions, is positive, significant, and robust to a variety of controls and the inclusion of country and time-fixed effects: The incidence of internal strife is higher in ethnically polarized countries ruled by weak dictators and richly endowed in natural resources. We also find suggestive evidence that this effect is bigger in places with more skewed distribution of natural resources.

Our paper contributes to the recent political economy literature on the incentives of autocratic leaders in ethnically polarized and weakly institutionalized societies. By suggesting a driver of civil war that had not previously been emphasized in the literature, we call attention to seemingly unintended consequences of international efforts for weakening the leaders of autocratic regimes. This suggests that embargoes and other measures that aim at weakening local autocrats in the quest for a more democratic world ought to be weighted against alternative policies when rulers have incentives to hold on to power by any means, even at the expense of the life of their people.

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Table 1: Descriptive Statistics

	Obs.	Mean	Std. Dev.	Min.	Max.	Source
Sample of autocracies						
Incidence of civil war	6,472	0.144	0.351	0	1	UCDP
Log Population	6,472	7.926	2.150	2.249	14.095	PWT 6.3
Log Real GDP pc	5,220	8.365	1.180	5.733	11.624	PWT 6.3
GDP growth	5,124	2.269	8.249	-64.360	131.243	PWT 6.3
Log Mountainous terr.	4,696	2.053	1.453	0	4.557	F&L (2003)
Log Openness	5,220	4.222	0.694	0.697	6.434	PWT 6.3
Dummy Prod. Nat. Res	6,472	0.416	0.493	0	1	Lujala et al. (2007)
Sample of ethnically polarized autocracies						
Incidence of civil war	4,312	0.135	0.342	0	1	UCDP
Log Population	4,312	7.815	2.150	2.249	14.095	PWT 6.3
Log Real GDP pc	3,225	8.425	1.161	5.743	11.624	PWT 6.3
GDP growth	3,162	2.356	8.891	-64.360	131.243	PWT 6.3
Log Mountainous terr.	3,064	2.249	1.415	0	4.557	F&L (2003)
Log Openness	3,225	4.221	0.748	0.697	6.434	PWT 6.3
Dummy Prod. Nat. Res	4,312	0.414	0.493	0	1	CSCW/PRIO
Sample of ethnically polarized autocracies with unequal resource dist.						
Incidence of civil war	2,298	0.065	0.246	0	1	UCDP
Log Population	2,298	6.644	1.891	2.249	11.073	PWT 6.3
Log Real GDP pc	1,826	8.396	1.147	5.743	11.388	PWT 6.3
GDP growth	1,789	2.227	8.646	-46.877	118.244	PWT 6.3
Log Mountainous terr.	1,146	1.610	1.399	0	4.557	F&L (2003)
Log Openness	1,826	4.429	0.610	1.773	6.434	PWT 6.3
Dummy Prod. Nat. Res	2,298	0.235	0.424	0	1	CSCW/PRIO

Notes: UCDP is the Uppsala Centre Data Program that maintains the Uppsala/PRIO Armed Conflict Dataset (Gleditsch et al. 2001). PWT is the Penn World Table (Heston et al. 2009). F&L (2003) is Fearon and Laitin (2003).

Table 2: Benchmark results

Linear probability model. Dependent variable: *Civil war incidence*						
	(1)	(2)	(3)	(4)	(5)	(6)
Post Cold War x	0.069***	0.088***	0.082***	0.171***	0.164***	0.164*
Resource presence	(0.019)	(0.023)	(0.026)	(0.034)	(0.033)	(0.086)
Controls						
Population			X	X	X	X
GDP level			X	X	X	X
GDP growth			X	X	X	X
Rough terrain				X	X	X
Openness				X	X	X
Regional fixed effects					X	X
Country cluster						X
Observations	6,472	4,312	3,162	2,240	2,240	2,240
R-squared	0.019	0.019	0.146	0.124	0.160	0.160

Notes: Robust standard errors in parentheses. Post Cold War end is a time-dummy that equals 1 for the post-Cold War period. Resource presence is a dummy that equals 1 for the country-years with positive production of either oil or diamonds, according to the DIADATA and PETRODATA from The CSCW at PRIO. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table 3: Exploring the role of inequality

Linear probability model. Dependent variable: *Civil war incidence*	(1)	(2)	(3)
Panel A: Interaction with proxy of resource equality			
Post Cold War x Resource presence	0.139** (0.063)	0.229** (0.100)	0.265** (0.102)
Post CW x Res. presence x Av. distance of oil wells	-26.58** (12.57)	-22.33** (10.91)	-23.65** (9.598)
Observations	3,682	1,929	1,929
R-squared	0.045	0.113	0.148
Panel B: Sample of resource high inequality			
Post Cold War x Resource presence	0.119 (0.072)	0.198* (0.108)	0.196* (0.110)
Observations	2,298	921	921
R-squared	0.012	0.176	0.236
Controls			
All		X	X
Regional dummies			X
Country cluster	X	X	X

Notes: Robust standard errors, clustered at the country level, in parentheses. Post Cold War end is a time-dummy that equals 1 for the post-Cold War period. Resource presence is a dummy that equals 1 for the country-years with positive production of either oil or diamonds, according to the DIADATA and PETRODATA from The CSCW at PRIO. In Panel A, Average distance of oil wells is the population normalized average distance between the active oil wells within a country at any given year, which we compute using GIS. It is an inverse proxy of resource inequality. In Panel B the sample is restricted to the countries above the median of resource inequality. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table 4: Additional robustness checks

Linear probability model. Dependent variable: *Civil war incidence*										
	Fixed effects		Alt. weakness measures				Split nat. resources			
	Country f.e.	+ Time f.e.	Strength		Instability		Oil		Diamonds	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Post CW x	0.136*	0.152*								
Res. presence	(0.077)	(0.078)								
Instability			0.140*	0.0306						
Res. presence			(0.077)	(0.128)						
Strength x					-0.131**	-0.157*				
Res. presence					(0.060)	(0.091)				
Post CW x							0.0508***	0.0745		
Oil presence							(0.012)	(0.092)		
Post CW x									0.150***	0.123**
Dia. presence									(0.042)	(0.051)
Observations	2,298	2,298	1,499	551	1,519	559	1,783	681	4,099	2,180
R-squared	0.023	0.062	0.043	0.066	0.040	0.073	0.013	0.018	0.006	0.009

Notes: Robust standard errors in parentheses. Post Cold War end is a time-dummy that equals 1 for the post-Cold War period. Resource presence is a dummy that equals 1 for the country-years with positive production of either oil or diamonds. Columns (3)-(4) and (5)-(6) use respectively two different proxies of weakness, both taken from Humphreys (2005): Instability is Fearon and Laitins (2003) measure of political instability and Strength is a combination of Instability and the Anocracy measure of the same authors. In columns (7)-(8) and (9)-(10), Oil presence and Diamonds presence are dummies that equal 1 for the country-years with positive production of oil and diamonds respectively. Columns (1) and (2) show robustness of the main results to countru fixed effects and country and year fixed effects respectively. Columns (3), (5), (7) and (9) use the entire available sample of countries and columns (4), (6), (8) and (10) focus on the sample of unequal resource endowment. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

A Appendix

A.1 Comparison of τ_i^{C*} and τ_i^{C**}

The tax rate τ_i^{C**} above which both groups rebel when $a_D < \bar{a}_D$ is defined by the following condition:

$$U_i^{Cr} = (1-\tau_i^{C**})\frac{f_i^{Cr*}+a}{f_i^{Cr*}+f_{-i}^{Cr*}+a}\left(R+n-f_i^{Cr*}\right) =$$
$$\frac{f_i^{CRr}(f_{-i}^{Cr*})}{f_i^{CRr}(f_{-i}^{Cr*})+f_{-i}^{Cr*}+a}\left(R+n-f_i^{CRr}(f_{-i}^{Cr*})\right) = U_i^{CRr}(f_{-i}^{Cr*}) \tag{34}$$

The tax rate τ_i^{C*} is instead defined as:

$$U_i^{C} = (1-\tau_i^{C*})\frac{f_i^{C*}}{f_i^{C*}+f_{-i}^{C*}}\left(R+n-f_i^{C*}\right) =$$
$$\frac{f_i^{CR}(f_{-i}^{C*})}{f_i^{CR}(f_{-i}^{C*})+f_{-i}^{C*}+a}\left(R+n-f_i^{CR}(f_{-i}^{C*})\right) = U_i^{CR}(f_{-i}^{C*}) \tag{35}$$

It can be shown that the conflict technology we consider implies strategic complementarity between f_i and f_{-i}. Therefore, the RHS of (34) is smaller than the RHS of (35). Similarly the LHS of (34) net of taxes is larger than the LHS of (35) net of taxes. Combining these two observations implies that $\tau_i^{C**} > \tau_i^{C*}$.

A.2 Proof of Proposition 1

We need to prove the existence and uniqueness of an army size $\underline{a}$ such that $U_L^P < U_L^C$, $\forall a < \underline{a}$ and $U_L^P > U_L^C$, $\forall a > \underline{a}$. In order to ease the exposition, it is useful to highlight some features that will be used throughout the proof. Notice that the groups' militia reaction functions, $f_i(.)$, are monotonically increasing in the opponents' strength. As a consequence, there always exists a level of a such that the optimal rebellion army equals n. Define by $\hat{a}$ the ruler's army size such that $f_i^{PR} = n$, when $\varphi_i = 1$ (i.e. in the most unequal case). A second important feature directly linked to the previous point is that the utility of the ruler is the lowest when φ_i takes the extreme values of 0 or 1, thus implying that should our reasoning hold for $\varphi_i = 1$, it can always be reproduced for any φ_i.

Since the utilities U_L^P and U_L^C behave differently for interior and corner solutions, we provide the proof for two subcases:

Case 1: $R < 2n$ which implies that at the conflict equilibrium, $f_i^C < n$

Case 2: $R \geq 2n$ which implies that $f_i^C = n$

Case 1

The sketch of the proof is the following. We show that $\exists a = \bar{a}_D$ below which U_L^P is not defined, and at which $U_L^C(\bar{a}_D) > U_L^P(\bar{a}_D) = 0$. We then show that both U_L^P and U_L^C increase monotonically in a, with U_L^P growing at a faster rate. Finally we show that $\exists a = \hat{a}$ in which $U_L^P(\hat{a}) > U_L^C(\hat{a})$, thus implying that U_L^P and U_L^C cross only one time.

To prove the claim in the proposition it is sufficient to show the following conditions:

1. $\partial U_L^P/\partial a > \partial U_L^C/\partial a > 0$
2. $U_L^C = 0$ for $a = 0$
3. $U_L^P = 0$ for $a = \bar{a}_D$
4. $\lim_{a\to\infty} U_L^C = \frac{2}{3}(n+R)$
5. $U_L^P(\hat{a}) \geq \lim_{a\to\infty} U_L^C$

To verify whether condition 1 is satisfied we compute the two partial derivatives:

$$\frac{\partial U_L^P}{\partial a} = -4 + \left((a - \bar{a}_D + n + \varphi_A R)^{1/2} + (a - \bar{a}_D + n + \varphi_B R)^{1/2}\right)(a - \bar{a}_D)^{-1/2} + \left((a - \bar{a}_D + n + \varphi_A R)^{-1/2} + (a - \bar{a}_D + n + \varphi_B R)^{-1/2}\right)(a - \bar{a}_D)^{1/2} \tag{36}$$

Denote $(a - \bar{a}_D + n + \varphi_A R)$ by $\bar{X}_A$, $(a - \bar{a}_D + n + \varphi_B R)$ by $\bar{X}_B$, and $(a - \bar{a}_D)$ by $\underline{X}$. The last expression becomes:

$$\frac{\partial U_L^P}{\partial a} = -4 + \left(\bar{X}_A^{1/2} + \bar{X}_B^{1/2}\underline{X}\right)^{-1/2} + \left(\bar{X}_A^{-1/2} + \bar{X}_B^{-1/2}\right)\underline{X}^{1/2} \tag{37}$$

The partial derivative on U_L^C is given by:

$$\frac{\partial U_L^C}{\partial a} = -4 + 2\left((n+R+3a)^{1/2}(4(n+R)+3a)^{-1/2}\right) + 2\left((n+R+3a)^{-1/2}(4(n+R)+3a)^{1/2}\right) \tag{38}$$

Denoting $(n + R + 3a)$ by $\underline{Y}$, and $(4(n + R) + 3a)$ by $\bar{Y}$, this expression becomes:

$$\frac{\partial U_L^C}{\partial a} = -4 + 2\left(\underline{Y}^{1/2}\bar{Y}^{-1/2} + \underline{Y}^{-1/2}\bar{Y}^{1/2}\right)$$

Notice that both derivatives contains terms with the same structure, which respect the following condition:

$$\left(\frac{\alpha}{\beta}\right)^{1/2} + \left(\frac{\beta}{\alpha}\right)^{1/2} \geq 1 \qquad \text{where} \quad \alpha, \beta > 0$$

This implies that both derivatives are weakly positive.
For (36) to be larger than (38), the following condition should hold:

$$\left(\bar{X}_A^{1/2} + \bar{X}_B^{1/2}\right)\underline{X}^{-1/2} + \left(\bar{X}_A^{-1/2} + \bar{X}_B^{-1/2}\right)\underline{X}^{1/2} > 2\left(\underline{Y}^{1/2}\bar{Y}^{-1/2} + \underline{Y}^{-1/2}\bar{Y}^{1/2}\right)$$

which is true if the following two inequalities are satisfied:

$$\begin{cases} \bar{X}_A^{1/2}\underline{X}^{-1/2} + \bar{X}_A^{-1/2}\underline{X}^{1/2} > \underline{Y}^{1/2}\bar{Y}^{-1/2} + \underline{Y}^{-1/2}\bar{Y}^{1/2} \\ \bar{X}_B^{1/2}\underline{X}^{-1/2} + \bar{X}_B^{-1/2}\underline{X}^{1/2} > \underline{Y}^{1/2}\bar{Y}^{-1/2} + \underline{Y}^{-1/2}\bar{Y}^{1/2} \end{cases}$$

The first inequality is satisfied if:

$$\left|\bar{X}_A - \underline{X}\right| < \left|\bar{Y} - \underline{Y}\right|$$

Substituting the original values of $\bar{X}_A$, $\underline{X}$, $\bar{Y}$ and $\underline{Y}$, we obtain:

$$n + \varphi_A R < 3(n + R)$$

which is always true. Similarly, the second inequality is satisfied if:

$$n + \varphi_B R < 3(n + R)$$

which is always true. This establishes Condition 1.

Condition 2 is verified by setting $a = 0$ in U_L^C as given by (32). Similarly, condition 3 is verified by substituting $a = \bar{a}_D$ in (31).

Let us consider condition 4. Since $\lim_{a\to\infty} \tau_i^C = 1$, the ruler can appropriate the entire tax base, which in the interior conflict equilibrium equals $\frac{2}{3}(n + R)$.

In order to tackle condition 5, we first compute $\hat{a}$. This value is found by setting the fighters' best response when rebelling equal n. This level of a should then satisfy:

$$(\hat{a} - a_D)^{1/2}(\hat{a} - a_D + n + R)^{1/2} - (\hat{a} - a_D) = n \quad \Leftrightarrow (\hat{a} - a_D)(R - n) = n^2$$

Using a_D as given by (28) with $\varphi_i = 1$ yields:

$$\hat{a} = \frac{n^2}{R - n} + \frac{R^2}{4n}$$

The utility of group i of rebelling under peace when constrained ($a \geq \hat{a}$) is given by:

$$U_i^{PR}|a \geq \hat{a} = \frac{n}{n + a - \bar{a}_D}R \tag{39}$$

Equating this expression to U_i^P yields the 'corner' tax rate from which we can obtain the utility of the ruler in $\hat{a}$:

$$U_L^P(\hat{a}) = n + R - \frac{nR}{n + \frac{n^2}{R-n}} + \tau_{-i}n = (2 + \tau_{-i})\,n$$

Where $\tau_{-i}n$ is the tax revenue collected on the non-rebelling group whose share of natural resources is $\varphi_{-i} = 0$.

It is straightforward to show that condition 5 holds for $R < 2n$, and $\tau_{-i} \geq 0$:

$$U_L^P = (2 + \tau_{-i})\,n \geq \frac{2}{3}(n + R) = \lim_{a\to\infty} U_L^C(a)$$

Case 2

It is useful to sketch the proof of this case as well. We first repeat the steps of the interior Case 1 (steps $1-3$). We then verify that for values of a sufficiently large to induce all individuals in the rebelling group to specialize as fighters, $f_i = n$, the utility of the ruler under peace grows at an even faster rate, thus implying that there is only one crossing between U_L^P and U_L^C for the entire range of admissible values of a (condition 4).

To prove the claim in the proposition it is sufficient to show the following conditions:

1. $\partial U_L^P/\partial a > \partial U_L^C/\partial a$
2. $U_L^C = 0$ for $a = 0$
3. $\lim_{a\to\infty} U_L^C < \lim_{a\to\infty} U_L^P$
4. Denote by $U_L^{\hat{P}}$ the utility of the ruler under peace if the optimal rebellion for the wealthier group implies everybody rebelling. Then, $\partial U_L^{\hat{P}}/\partial a > \partial U_L^P/\partial a$.

Let us start by computing U_L^C and U_L^P for $R > 2n$. Since for $R \geq 2n$ in the conflict scenario all agents are fighters, in case of rebellion and conflict all agents would be fighters as well (because f_i^{CR} is increasing in the opponents' strength). The equilibrium conflict tax rate and U_L^C are thus given by:

$$(1-\tau_i^C)\frac{R}{2} = \frac{n}{2n+a}R \Leftrightarrow \tau_i^C = \frac{a}{2n+a} \text{ and } U_L^C = \frac{a}{2n+a}R \tag{40}$$

Given the construction of the proof, in the peace scenario, we concentrate on the most unequal case, which yields the lowest utility to the ruler. It can be shown that $\bar{a}_D$ as given by (28) would be unnecessarily high for $R > 2n$, as $f_i^C(\bar{a}_D) > n$. The adjusted $\bar{a}_D$ which deters the group with no resources from attacking the other group is instead given by:

$$U_{-i}^P = (1-\tau^P)n = (1-\tau^P)\frac{n}{n+\hat{a}_D}R = U_{-i}^C \Rightarrow \hat{a}_D = R - n$$

For any $a < R - n$, U_L^P is not defined, and conflict is the only equilibrium. Like for Case 1, there exists a value of a that we denote by $\hat{a}$ such that $\forall a \geq \hat{a}$, $f_i^{PR} = n$. If $a < \hat{a}$ then U_L^P is given by (31) with $\hat{a}_D = R - n$.

We can now consider condition 1. Notice that $\partial U_L^P/\partial a$ is given by (36) with $\bar{a}_D = R - n$. We still need to compute $\partial U_L^C/\partial a$:

$$\frac{\partial U_L^C}{\partial a} = \frac{2n}{(2n+a)^2}R$$

Imposing condition 1:

$$\left(\frac{a-R+2n}{a-R+n}\right)^{1/2} + \left(\frac{a+2n}{a-R+n}\right)^{1/2} + \left(\frac{a-R+n}{a-R+2n}\right)^{1/2} +$$
$$\left(\frac{a-R+n}{a+2n}\right)^{1/2} - 4 > \frac{2nR}{(2n+a)^2}$$

Notice first that since $(a + 2n) - (a - R + n) > (a - R + n) - (a - R + n)$, then:

$$\left(\frac{a+2n}{a-R+n}\right)^{1/2} + \left(\frac{a-R+n}{a+2n}\right)^{1/2} > \left(\frac{a-R+2n}{a-R+n}\right)^{1/2} + \left(\frac{a-R+n}{a-R+2n}\right)^{1/2} > 2$$

Therefore, denoting $\lambda = \frac{nR}{(2n+a)^2}$, it is sufficient to show:

$$\left(\frac{a+2n}{a-R+n}\right)^{1/2} + \left(\frac{a-R+n}{a+2n}\right)^{1/2} > 2\,(1+\lambda)$$

$$\Leftrightarrow \frac{a+2n+a-R+n}{2} > (1+\lambda)\,(a+2n)^{1/2}\,(a-R+n)^{1/2}$$

$$\Leftrightarrow \left(a+\frac{3}{2}n-\frac{1}{2}R\right)^2 > (1+\lambda)\,(a+2n)\,(a-R+n)$$

$$\Leftrightarrow a^2+\frac{9}{4}n^2+\frac{1}{4}R^2+3an-aR-\frac{3}{2}Rn > (1+\lambda)\left(a^2-aR+3an-2Rn+2n^2\right)$$

$$\Leftrightarrow \left(\frac{n+R}{2}\right)^2 > \lambda\,(a+2n)\,(a-R+n)$$

Replacing for λ we obtain:

$$(a+2n)\left(\frac{n+R}{2}\right)^2 > nR\,(a-R+n)$$

$$\Leftrightarrow a\,(n-R)^2 + 2n(n^2+3R^2) > 0$$

which is necessarily verified for positive R and n.

Condition 2 can be simply verified by setting $a = 0$ in (40).

It can be shown that $\lim_{a\to\infty} U_L^C = R$ whereas $\lim_{a\to\infty} U_L^P = R + 2n$ as both tax rates tend to unity, which implies that condition 3 is also verified.

To tackle condition 4, observe first that U_L^P can be re-written implicitly under the following form:

$$U_L^P = 2n + R - \sum_i \frac{f_i^{PR}}{f_i^{PR} + a - \bar{a}_D}\left(n - f_i^{PR} + \varphi_i R\right)$$

Taking the derivative with respect to a yields:

$$\partial U_L^P/\partial a = -\sum_i \frac{\partial \frac{f_i^{PR}}{f_i^{PR}+a-\bar{a}_D}\left(n - f_i^{PR} + \varphi_i R\right)}{\partial a}$$

$$\Leftrightarrow \sum_i -\left(\frac{f_i^{PR\prime}\left(f_i^{PR}+a-\bar{a}_D\right) - f_i^{PR}\left(f_i^{PR\prime}+1\right)}{\left(f_i^{PR}+a-\bar{a}_D\right)^2}\left(n - f_i^{PR} + \varphi_i R\right)\right) +$$

$$f_i^{PR\prime}\frac{f_i^{PR}}{f_i^{PR}+a-\bar{a}_D}$$

$$\Leftrightarrow \sum_i f_i^{PR'} \left(-\frac{(a-\bar{a}_D)\left(n - f_i^{PR} + \varphi_i R\right)}{\left(f_i^{PR} + a - \bar{a}_D\right)^2} + \frac{f_i^{PR}}{f_i^{PR} + a - \bar{a}_D} \right) +$$

$$\frac{f_i^{PR}}{\left(f_i^{PR} + a - \bar{a}_D\right)^2} \left(n - f_i^{PR} + \varphi_i R\right)$$

Recall that the FOC for group i, when deciding on f_i^{PR} requires in the interior:

$$\frac{f_i^{PR}}{f_i^{PR} + a - \bar{a}_D} = \frac{(a-\bar{a}_D)\left(n - f_i^{PR} + \varphi_i R\right)}{\left(f_i^{PR} + a - \bar{a}_D\right)^2}$$

If, however, group i is constrained to n when choosing f_i^{PR}, then it would fail to optimally adjust to futher increases in a. This in turn, implies a larger increase of U_L^P for further increases in a.

A.3 Proof of Proposition 2

The variable of interest being R, the utilities are expressed as a function of R. To prove Proposition 2 we sequentially establish the following results:

1. $U_L^P(0) > U_L^C(0)$
2. $\frac{\partial U_L^C(R)}{\partial R} > 0$
3. $\exists \hat{R} > 0$ such that $\partial U_L^C(R)/\partial R$ is constant $\forall R \geq \hat{R}$
4. $U_L^P(0) > U_L^C(\hat{R})$
5. $\frac{\partial^2 U_L^2(R)}{\partial R^2} < 0$
6. $\exists \bar{R}$ such that $U_L^P(\bar{R}) = 0$

Before dealing with each condition in isolation, we briefly explain the intuition of the general proof. By establishing that U_L^P is larger than U_L^C in $R = 0$ (Condition 1), and that the opposite holds true for some $\bar{R}$ (Conditions 2 and 6), we show that there exists at least one switching value of R in the vicinity of which the deterrent strategy is preferable for $R < \bar{R}$ and the conflict strategy is prefered of $R > \bar{R}$. The remaining conditions ensure the unicity of this threshold. Indeed, Conditions 2, 4 and 5 guarantee that if the crossing between U_L^P and U_L^C occurs for $R < \bar{R}$, then $\partial U_L^P/\partial R < 0$, thus necessarily implying that $\partial U_L^C/\partial R > \partial U_L^P/\partial R$ for all $R \geq \bar{R}$ because of conditions 2 and 5. On the other hand, condition 3 ensures us that if the crossing between U_L^P and U_L^C occurs for $R \geq \bar{R}$, then the linearity of U_L^C together with the concavity of U_L^P secures the unicity result.
1. Regarding the first point, notice that if $R = 0$, then $a_D = 0$, as no army is needed to deter a war over resources. Condition 1 is therefore verified if the following inequality holds:

$$U_L^P(0) = 2n - 2\left[((a+n)^{1/2} - (a)^{1/2}\right]^2 > \frac{2}{3}\left[n - \left[(4n+3a)^{1/2} - (n+3a)^{1/2}\right]^2\right] = U_L^C(0)$$

After some algebraic manipulation this expression reduces to:

$$2\left(a^2 + an\right)^{1/2} > a \tag{41}$$

And this is always true.

2. Computing next the partial derivative of Condition 2 gives us:

$$\frac{\partial U_L^C(R)}{\partial R} = \frac{2}{3}\left(4\left(\frac{n+R+3a}{4(n+R)+3a}\right)^{1/2} + \left(\frac{4(n+R)+3a}{n+R+3a}\right)^{1/2} - 1\right)$$

Using the notation $X = \frac{n+R+3a}{4(n+R)+3a}$, this term is positive if:

$$4X^{1/2} + X^{-1/2} > 1$$

Which is necessarily true $\forall X > 0$.

3. The third condition states that for any R larger to some threshold value $\bar{R}$, the ruler's utility under conflict is linear in C. The ruler's utility is linear when all individuals are fighting in the conflict scenario. This situation is therefore realized when $f_i^{C*} = n$ for both groups, which is verified when:

$$f_i^{C*} = \frac{\hat{R}+n}{3} = n \Rightarrow \hat{R} = 2n$$

The utility of the ruler when $R \geq \hat{R}$ equals $\frac{R+n}{3}$ and is therefore linear in R.

4. We now turn to Condition 4 which is verified if:

$$U_L^p(0) = 4a^{1/2}\left((a+n)^{1/2} - a^{1/2}\right) > \frac{2an}{2n+a} = U_L^c(\hat{R})$$

$$2\left((a+n)^{1/2} - a^{1/2}\right)(2n+a) > a^{1/2}n$$

$$\Leftrightarrow 4\left(2a + n - 2(a+n)^{1/2}a^{1/2}\right)(2n+a)^2 > an^2$$

$$\Leftrightarrow 4\,(2a+n)\,(2n+a)^2 - an^2 > 2(a+n)^{1/2}a^{1/2}(2n+a)^2$$

$$\Leftrightarrow 16\,(2a+n)^2\,(2n+a)^4 + a^2n^4 - 8\,(2a+n)\,(2n+a)^2an^2 > 4(a+n)a(2n+a)^4$$

$$\Leftrightarrow 4(2n+a)^4\left(4(2a+n)^2 - (a+n)a\right) + a^2n^4 - 8\,(2a+n)\,(2n+a)^2an^2 > 0$$

This inequality is necessarily verified if we drop the second (positive) term from the LHS, thus implying that unicity is obtained if:

$$(2n+a)^2\left(4(2a+n)^2 - (a+n)a\right) > 4\,(2a+n)\,an^2 > 0$$

$$(2n+a)^2\left(15a^2 + 4n^2 + 15an\right) > 4\,(2a+n)\,an^2 > 0$$

And this last expression can easily be shown to be true.

5. For Condition 3 we need to consider various cases. On the one hand, a_D may be constrained in the sense that the minimal deterrent amount of guns is inferior to $a_D(f_i^{PC})$ (where $\varphi_i \geq 1/2$). On the other hand, $f_i^{PR}(a_D)$ may be constrained by n. We sequentially show that $U_L^P(R)$ is concave in all cases, starting with the fully unconstrained one.

The second order derivative of the unconstrained equilibrium utility function of the ruler under peace, U_L^P (equation 31) is given by:

$$\frac{\partial^2 U_L^P}{\partial R^2} = a_D^{''}(R)\left(\frac{\partial U_L^P/\partial R}{a_D^{'}}\right)$$
$$+\frac{a_D^{'}}{2}\sum_{i=A,B}\left(\frac{\varphi_i(a-a_d)+a_D^{'}(n+\varphi_i R)}{(a-a_D+n+\varphi_i R)^2}\left(\frac{a-a_D+n+\varphi_i R}{a-a_D}\right)^{1/2}\right)$$
$$-\frac{a_D^{'}}{2}\sum_{i=A,B}\left(\frac{\varphi_i(a-a_d)+a_D^{'}(n+\varphi_i R)}{(a-a_D)^2}\left(\frac{a-a_D}{a-a_D+n+\varphi_i R}\right)^{1/2}\right)$$
$$-\frac{a_D^{'}}{2}\sum_{i=A,B}\varphi_i\left(\frac{a-a_D+n+\varphi_i R}{a-a_D}\right)^{1/2}\frac{\varphi_i(a-a_D)+a_D^{'}(n+\varphi_i R)}{(a-a_D+n+\varphi_i)^2}$$

To establish quasi-concavity, it is sufficient to show that if $\frac{\partial U_L^P}{\partial R}=0$, then $\frac{\partial^2 U_L^P}{\partial R^2}<0$. Assume that $\frac{\partial^2 U_L^P}{\partial R^2}=0$. To conclude that $\frac{\partial^2 U_L^P}{\partial R^2}<0$, it is sufficient to show that the next inequality holds true for any i:

$$\frac{a_D^{'}}{2}\left(\frac{\varphi_i(a-a_d)+a_D^{'}(n+\varphi_i R)}{(a-a_D+n+\varphi_i R)^2}\left(\frac{a-a_D+n+\varphi_i R}{a-a_D}\right)^{1/2}\right)<$$
$$\frac{a_D^{'}}{2}\left(\frac{\varphi_i(a-a_d)+a_D^{'}(n+\varphi_i R)}{(a-a_D)^2}\left(\frac{a-a_D}{a-a_D+n+\varphi_i R}\right)^{1/2}\right)$$

Simplifying this expression, we obtain:

$$a_D^{'}(n+\varphi_i R)>0$$

And this last term is necessarily positive.

In the second case, $a_D = \frac{nR}{\varphi_i R+n} - n$, thus implying that $a_D^{'} > 0$, and $a_D^{''} > 0$. By the same reasoning as in case 1, this implies that U_L^P is quasi-concave in R.

Lastly, we ought to consider the case where $f_i^{PR}(a_D) = n$. Assume that only group i is constrained (the reasoning extends straightforwardly to both groups being constrained), then U_L^P becomes:

$$U_L^P = 2n + R - \left((a-a_D+n+\varphi_{-i}R)^{1/2}-(a-a_D)^{1/2}\right)^2 - \frac{n\varphi_i R}{n+a_D}$$

By taking the second order derivative w.r.t. R, applying an analogous reasoning to the one employed in Case 1, we can establish quasi-concavity if the following expression is verified:

$$\frac{\partial^2\left(-\frac{n\varphi_i R}{n+a_D}\right)}{\partial R^2} \leq 0$$

And this can be shown to be true.

6. Condition 6 requires that $U_L^P(\bar{R}) = 0$ for some $\bar{R} > 0$. Fixing $a = a^{'}$, it is therefore sufficient to show that there exists a $\bar{R}$ such that $a_D(\bar{R}) = a^{'}$. Condition 6 is therefore satisfied by the fact that $\partial a_D(R)/\partial R > 0$, whether a_D is constrained ($a_D = R - n$) or not ($a_D = (\varphi R)^2/(4(n + (1-\varphi)R))$).

A.4 Proof of Proposition 3

Notice first that increasing inequality, modeled as an increase of φ_i in the range $[1/2, 1]$, enters the ruler's problem only in U_L^P. As a consequence we only need to check the sign of $\frac{\partial U_L^P}{\partial \varphi_i}$ for $\varphi_i > 1/2$.

$$\frac{\partial U_L^P}{\partial \varphi_i} = -2\left[(a_L + n + \varphi_i R)^{\frac{1}{2}} - a_L^{\frac{1}{2}}\right]\left(\frac{a_L' + R}{2\left(a_L + n + \varphi_i R\right)^{1/2}} - \frac{a_L'}{2a_L^{1/2}}\right)$$

$$-2\left[(a_L + n + (1-\varphi_i) R)^{\frac{1}{2}} - a_L^{\frac{1}{2}}\right]\left(\frac{a_L' - R}{2\left(a_L + n + (1-\varphi_i) R\right)^{1/2}} - \frac{a_L'}{2a_L^{1/2}}\right)$$

where a_L' is a short notation for $\frac{\partial a_L}{\partial \varphi_i}$.

The last expression can be decomposed as:

$$-\left[(a_L + n + \varphi_i R)^{\frac{1}{2}} - a_L^{\frac{1}{2}}\right]\left(\frac{a_L'}{\left(a_L + n + \varphi_i R\right)^{1/2}} - \frac{a_L'}{a_L^{1/2}}\right)$$

$$-\left[(a_L + n + (1-\varphi_i) R)^{\frac{1}{2}} - a_L^{\frac{1}{2}}\right]\left(\frac{a_L'}{\left(a_L + n + (1-\varphi_i) R\right)^{1/2}} - \frac{a_L'}{a_L^{1/2}}\right)$$

$$-\left[R - \frac{R a_L^{1/2}}{\left(a_L + n + \varphi_i R\right)^{1/2}} - R + \frac{R a_L^{1/2}}{\left(a_L + n + (1-\varphi_i) R\right)^{1/2}}\right]$$

which is always negative for $a_L' < 0$.

Notice that since $a_L = a - \bar{a}_D$. This implies:

$$\frac{\partial a_L}{\partial \varphi_i} = -\frac{\partial \bar{a}_D}{\partial \varphi_i} \tag{42}$$

Consider $\bar{a}_D$ as defined by (28). Increasing φ_i increases the numerator and decreases the denominator. We can conclude that $\bar{a}_D' > 0 \Rightarrow a_L' < 0 \Rightarrow \frac{\partial U_L^P}{\partial \varphi_i} < 0$.

Finally, since U_L^C does not depend on φ_i, we can conclude that increasing inequality makes peace less profitable for the ruler.

A.5 Additional tables

Table A5.1: Weak autocrats and the size of the armed forces

Linear probability model. Dependent variable: *Size of armed forces*	(1)	(2)	(3)	(4)	(5)
Post Cold War x	-2.163**	-2.060**	-1.856**	-1.544**	-1.544**
Resource presence	(0.856)	(0.844)	(0.851)	(0.743)	(0.750)
Controls					
Population		X	X	X	X
GDP level		X	X	X	X
GDP growth		X	X	X	X
Rough terrain			X	X	X
Openness			X	X	X
Regional fixed effects				X	X
Country cluster					X
Observations	1,306	1,298	1,086	1,086	1,086
R-squared	0.022	0.038	0.100	0.287	0.287

Notes: Robust standard errors in parentheses. Post Cold War end is a time-dummy that equals 1 for the post-Cold War period. Resource presence is a dummy that equals 1 for the country-years with positive production of either oil or diamonds, according to the DIADATA and PETRODATA from The CSCW at PRIO. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A5.2: Benchmark results with balanced sample

Linear probability model. Dependent variable: *Civil war incidence*	(1)	(2)	(3)	(4)	(5)
Post Cold War x	0.201***	0.179***	0.171***	0.164***	0.164*
Resource presence	(0.035)	(0.034)	(0.034)	(0.033)	(0.086)
Controls					
Population		X	X	X	X
GDP level		X	X	X	X
GDP growth		X	X	X	X
Rough terrain			X	X	X
Openness			X	X	X
Regional dummies				X	X
Country cluster					X
Observations	2,240	2,240	2,240	2,240	2,240
R-squared	0.023	0.093	0.124	0.160	0.160

Notes: Robust standard errors in parentheses. Post Cold War end is a time-dummy that equals 1 for the post-Cold War period. Resource presence is a dummy that equals 1 for the country-years with positive production of either oil or diamonds, according to the DIADATA and PETRODATA from The CSCW at PRIO. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A5.3: Impact of dictator's weakness and resource presence on the incidence of ethnic conflicts

Linear probability model. Dependent variable: *Incidence of ethnic conflicts*					
	(1)	(2)	(3)	(4)	(5)
Panel A: Full sample					
Post Cold War x	0.066***	0.063***	0.105***	0.097***	0.097
Resource presence	(0.019)	(0.022)	(0.028)	(0.028)	(0.058)
Observations	4,312	3,162	2,240	2,240	2,240
R-squared	0.013	0.089	0.065	0.110	0.110
Panel B: Balanced sample					
Post Cold War x	0.125***	0.107***	0.105***	0.097***	0.097
Resource presence	(0.029)	(0.029)	(0.028)	(0.028)	(0.058)
Observations	2,240	2,240	2,240	2,240	2,240
R-squared	0.008	0.061	0.065	0.110	0.110
Controls					
Population		X	X	X	X
GDP level		X	X	X	X
GDP growth		X	X	X	X
Rough terrain			X	X	X
Openness			X	X	X
Regional dummies				X	X
Country cluster					X

Notes: Robust standard errors in parentheses. The source of the data on ethnic wars is Cederman et al. 2008. Post Cold War end is a time-dummy that equals 1 for the post-Cold War period. Resource presence is a dummy that equals 1 for the country-years with positive production of either oil or diamonds, according to the DIADATA and PETRODATA from The CSCW at PRIO. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A5.4: Resource inequality with balanced sample

Linear probability model. Dependent variable: *Civil war incidence*			
	(1)	(2)	(3)
Post Cold War x Resource presence	0.271** (0.123)	0.198* (0.108)	0.196* (0.110)
Controls			
Population		X	X
GDP level		X	X
GDP growth		X	X
Rough terrain		X	X
Openness		X	X
Regional dummies			X
Country cluster	X	X	X
Observations	921	921	921
R-squared	0.043	0.176	0.236

Notes: Robust standard errors in parentheses. Post Cold War end is a time-dummy that equals 1 for the post-Cold War period. Resource presence is a dummy that equals 1 for the country-years with positive production of either oil or diamonds, according to the DIADATA and PETRODATA from The CSCW at PRIO. The sample is restricted to the countries above the median of resource inequality. We measure resource inequality with the population normalized average distance between oil wells within a country, which we compute using GIS. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.