

The Politics of Resource Booms*

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Abstract

This paper develops a simple model to investigate how resource-driven economic booms shape the equilibrium political institutions of resource-rich societies. In our model a strong army favors property-rights protection but also makes the state more powerful and hence may induce autocratic regimes over democracy. We characterize the parameter space of each political outcome in terms of the type of the available natural resources. Economic booms based on resources that are privately exploited tend to ease democratic transitions. Booms based on resources exploited by the state tend to favor more dictatorial regimes. Finally, economic booms based on resources that can be exploited either by the state or by private citizens incite preemptive actions that may ignite civil strife. We discuss the predictions of the model using historical and contemporary examples.

Key Words: Resource Boom, Autocracy, Democracy, Civil War.

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1 Introduction

The classical ‘Resource Curse’ literature highlights the correlation between the presence and dependence of natural resources and bad economic and political outcomes such as economic stagnation (Sachs and Warner, 1997), the consolidation of autocratic regimes (Barro 1999 and Ross 2001), and the incidence and duration of civil war (Fearon and Laitin, 2003; Collier and Hoeffler, 1998 and 2004; Collier et al. 2004). The proposed channels through which natural resource-rent windfalls have a negative effect on economic and political outcomes include the appreciation of the exchange rate that harms traditional exporting sectors (Corden and Neary, 1982), the consolidation of rentier states that feature low fiscal revenues, a weak bureaucracy and high levels of patronage and repression (Robinson, 2006), and the fact that resource rents may fuel rapacious behavior, finance rebellions or empower separatist movements (Le Billon, 2001). More recently, however, scholars have added some nuance to the resource curse hypothesis by recognizing that not all resources are cursed (Fearon, 2005 and Dube and Vargas, 2007), and that even the resources that are more likely to be correlated with stagnation, autocracy and violence –like oil and kimberly diamonds– do not generate such outcomes at the time of their discovery or when they are booming as long as certain institutions is in place (Acemoglu, Johnson and Robinson, 2001 and Mehlum, Moene and Torvik, 2006).¹ For instance, while the discovery of oil reserves in the Middle East in the 1940s changed the political landscape of the region (Chaudhry, 1997), resource windfalls in mineral-rich countries like Botswana and Norway have never been a threat to these countries’ political stability.²

In this paper we propose a different mechanism of why natural resource booms may result in perverse political institutions or even civil war. Thus we emphasize the last two of the aforementioned aspects of the resource curse (while focusing on the onset of civil war and not its intensity) and abstract from the perverse economic outcomes associated with natural-resource dependence. We develop a simple model to study the effect of resource-driven economic booms on the political equilibrium of resource-rich societies. We characterize natural resources in terms of their production ownership and show that unanticipated booms based on commodities that are privately exploited empower the civic society and favor democracy over autocracy. In contrast, booms based on resources exploited by the state empower the rent-extracting elite

¹These institutions include the protection of property rights and the presence of political checks and balances than constrain the executive from expropriating the citizens.

²Ross (2001) shows that oil-impedes-democracy hypothesis holds for most oil-rich states and it is not idiosyncratic to the Middle East region. Moreover he shows that it is in fact not even restricted exclusively to oil-producing nations; it extends to other mineral resources that require extensive public exploitation and thus generates gradual state empowerment.

and hence favor autocratic systems. Finally, when resources can be exploited either privately or by the state, resource booms are likely to produce civil conflict. This is because parties cannot commit *ex ante* to transfer resource rents as the resource boom will change the balance of power *ex post* and hence alter the bargaining incentives. Hence, war can occur because of preemptive strikes from both parties.

Whether resources are exploited by the state or by private citizens depends both on technological constraints as well as on the structure of society. In general resources that require large industrial scale exploitation generate revenue for the government (e.g. oil and kimberly diamonds), while those that require artisan exploitation enhance the pockets of the citizens (e.g. alluvial diamonds, coffee, cacao, etc.). In well developed markets large-scale investments can be carried out privately (e.g. oil in the US). Less developed markets, however, do require the state to take the burden of such investments.

Bates, Greif and Singh (2002) focus on the conditions under which the state can rise endogenously to enforce property rights and promote production and exchange. Aside from the protection of property rights, in their model the monopoly of violence gives the state the means to extract from the productive sectors of society. While we do not model the rise of the state as an equilibrium outcome, we do borrow the idea that state forces can be used either to protect property rights or to extract rents. In our model a strong state favors property-rights protection but the monopoly of violence may also be used to predate. Indeed, we consider two types of state political institutions: *Democracy* and *Autocracy*. While in the former the government retains the monopoly of violence but cannot violate civilian rights, in the latter the government is powerful enough to do so. Resource booms play the role of empowering one or both groups according to their production structure, a process that may either consolidate or threaten the existing regime type. We characterize the parameter space that favors regime consolidation, a democratic (or autocratic) transition, or civil war. We discuss the model predictions using historical and contemporary examples.

Our argument is consistent with (but expands on) previous literature. Snyder (2004) and Snyder and Bhavnani (2005) discuss through case studies how resources are likely to trigger civil war depending on the identity of the extracting party and the relative power of the state. For instance while the presence of alluvial diamonds generated civil strife in Sierra Leone because of their exclusive public exploitation that empowered the state and its predatory capacity, it kept the peaceful status quo in neighboring Guinea where the predominantly private exploitation generated the opposite dynamics. De Luca, Sekeris and Vargas (2011) show that in autocratic regimes a ruler who gets weakened is likely to promote civil war among contesting parties within

his territory especially in the presence of natural resources. According to Dunning (2008) oil booms can also induce to democratic or autocratic political institutions. While the direct effect of an oil boom is to increase the benefit of taking over the political power in order to control of the rents, there is an indirect effect whereby resource rents lower the redistributive costs that the elites face under democracy. Our paper also allows for both democratic and autocratic effects of resource booms but through a different mechanism. Booms on resources privately exploited increase the *de facto* political power of the citizens and thus the elite democratizes not because the boom eased the burden of redistribution under democracy but because the citizens become a credible threat to the autocratic regime.

The remaining of the paper is organized as follows. In the next section, we present the set up of the model by illustrating plausible differences between democratic and autocratic states in terms of the equilibrium tax rate and the size of the army. Section 3 studies the effect of an unexpected resource windfall that accrues mainly to the citizens. Section 4 explores the potential impact of a resource boom that is exploited by the government. In section 5, we show how resource booms can generate civil war. Finally we conclude.

2 The Model

2.1 Set-up

Consider a simple economy with N individuals, who can specialize as labor force, L , or be recruited by the state as soldiers, S . Hence $N = S + L$. The production function of the economy uses only labor and can be written:

$$Y = \alpha(S)L \quad \text{with } \alpha' > 0$$

Labor productivity is then an increasing function of the extent to which property right are protected, which we assume proportional to S . Hence, in contrast to Grossman (1991), here the Pareto Optimal allocation demands certain amount of state involvement. Indeed this allocation is given by:

$$\begin{aligned} \max_{\tau, S} & \quad \alpha(S)(1 - \tau)(N - S) \\ \text{s.t.} & \quad \alpha(S)\tau(N - S) - \alpha(S)(1 - \tau)S \geq 0 \end{aligned}$$

where τ is the tax rate that is collected to pay for the soldiers hired to protect property rights and $N - S = L$. Notice that disposable income is maximized subject to a participation constraint that captures the idea that all the state revenue is used to hire soldiers, who in turn should be rewarded to match labor productivity.

The Pareto Optimal allocation (S_o, τ_o) , however, is never implemented if the army under the control of the government is also used to extract rents from the citizens.

Let the utility of the government, g , be given by the tax revenue net of the cost of the army, and that of the representative citizen, c , be given by their disposable income. We have respectively:

$$U_g = \alpha(S)\tau(N - S) - \alpha(S)(1 - \tau)S$$

$$U_c = \alpha(S)(1 - \tau)$$

Since the state can extract rents it is essential to distinguish between two types of political systems: Democracy, D , in which the policy vector (S, τ) is chosen by the representative citizen, and Autocracy, A , which directly imposes its preferred (S, τ) . While the latter type of government may find it optimal to increase the size of the army above the S_o to maximize its rents, under democracy, and anticipating the risk of rent extraction, the citizens may choose to recruit a number of soldiers lower than S_o .³

We allow for the possibility that regardless of the political system in place either the state or the citizens start a civil war with the aim of changing the political status quo. If a civil war breaks out, W , the utilities of the agents are given by:

$$V_g^W = p(S)V_g^A - \delta \tag{1}$$

$$V_c^W = p(S)V_c^A + [1 - p(S)]V_c^D - \delta \tag{2}$$

where $p(S)$ is the probability that the state wins the war (with $p' > 0$) and $\delta \in (0, 1)$ captures the disutility of conflict. V_j^r is the utility that group j derives from regime r , with $j = \{g, c\}$ and $r = \{A, D, W\}$.

Equations (1) and (2) capture the idea that the party that wins the war puts in place its preferred political system. Notice that we assume that if the (autocratic) government loses the war a democracy is installed and this gives g utility nil. In contrast, the citizens do get some

³Our model does not explain how one political system or the other comes about but rather how resource booms may trigger political transitions. This will become evident when we set up the timing on the game in which ‘nature’ moves first and decides what political regime is in place to start with.

positive utility, V_c^A , if an autocratic government is installed.

The timing of the game, Γ , is as follows:

1. Nature decides the initial political system, $\{A, D\}$.
2. The entitled body chooses (S, τ) .
3. The status quo can be challenged by either player via civil war.

We make the following assumptions:

- A1.** *If civil war breaks out the government cannot hire more soldiers than those employed in the previous period.*
- A2.** *If indifferent, the citizens prefer autocracy over war.*
- A3.** *If indifferent, the government prefers democracy over war.*

Assumption A1 is a simplification that is helpful, but not critical, to obtain the results. The assumption implies that in the presence of war the citizens do not show loyalty to the government by joining the army. In addition the economic disruption associated with war undermines the taxing ability of the government and hence the capacity of hiring soldiers. A2 and A3 are just-tie-breaking rules.

We now solve the model. We do so by backward induction assuming first that the starting political system is autocratic. We repeat the analysis subsequently starting from democracy.

2.1.1 Autocracy

In autocratic regimes the the government gets to decide both the size of the army and the tax rate.

Consider the last stage of the game. For the government in power it is always optimal to avoid a civil war. Indeed if the citizens were to win the contest the payoff for the government would be 0, so in the best case scenario the outcome of the war would get the government a payoff: $p(S)V_g^A - \delta$, which is strictly smaller than their status quo payoff: V_g^A , for any S and τ .

The government's problem is therefore given by:

$$\begin{aligned} \max_{\tau, S} \quad & \alpha(S)\tau(N - S) - \alpha(S)(1 - \tau)S \\ \text{s.t.} \quad & \alpha(S)(1 - \tau) \geq p(S)\alpha(S)(1 - \tau) + [1 - p(S)]V_c^D - \delta \end{aligned} \quad (3)$$

where the constraint ensures that the citizens are better off under the current autocratic regime than by starting a civil war. We denote the optimal policy vector obtained from such problem as: (S^A, τ^A) .

2.1.2 Democracy

In this case the citizens get to choose the size of the army and the tax rate.

Consider the last stage of the game. The citizens are always better off avoiding conflict initiation since their expected payoff from conflict $p(S)V_c^A + [1 - p(S)]V_c^D - \delta$ is strictly smaller than their status quo payoff: V_c^D , for any S and τ .

The problem for the representative citizen is therefore given by:

$$\begin{aligned} \max_{\tau, S} \quad & \alpha(S)(1 - \tau)(N - S) \\ \text{s.t.} \quad & \alpha(S)\tau(N - S) - \alpha(S)(1 - \tau)S \geq p(S)V_g^A - \delta \\ & p(S)V_c^A + [1 - p(S)]V_c^D - \delta > V_c^A \end{aligned} \quad (4)$$

where the first constraint ensures that the government is better off under the current democratic regime than by starting a civil war looking to install an autocracy. The second constraint ensures that the citizens' reaction to a government coup attempt is a credible threat. We denote the optimal policy vector obtained from such problem as: (S^D, τ^D) .

Note that under these circumstances, civil war never breaks out because it is inefficient for both parties and there are bargaining possibilities that make them both better off.

Proposition 1

- i) $V_c^A(S^A) < V_c^D(S^D)$ – The citizens are better off under democracy than under autocracy.*
- ii) $\frac{\partial V_c^W}{\partial S} < 0$ – The citizens are less willing to fight when the government becomes stronger.*
- iii) $S^D < S^A$ – The size of the government's forces is larger under autocracy.*

Proof. See proof in the appendix. ■

The intuition of the first part of the proposition is as follows: On the one hand, under autocracy the government wants to extract rents but also has to ensure that the citizens will not rebel, so they set the policy vector (S^A, τ^A) such that the citizens' payoff is just equal to what they would get if war broke out. On the other hand, under democracy the citizens must credibly signal that they prefer the current political arrangement over war. Hence democracy is always the preferred political arrangement for the citizens.

As for the second part of the proposition, it asserts that the value of civil war to the citizens goes down as the state becomes stronger.

The last part suggests that the government is weaker under democracy than under autocracy. This is linked to the second part in the sense that stronger governments reduce the citizens' value of civil war and hence the threat of rebellion against a strong autocratic government is not credible.

3 Resource Boom

We now modify the model to allow for a resource boom to take place and investigate the effect of booms associated with different types of natural resources. We characterize such differences in terms of the ownership structure of the resource exploitation. Resources like oil and kimberly diamonds, that require large industrial scale investments are usually exploited by the government. In contrast, resources like coffee and wool, that require smaller investments and artisan exploitation are exploited by the private citizens. This distinction is not only about technical and financial constraints but it has to do with the how the society is organized. For instance in well developed markets even large scale resources can be exploited by private citizens. Indeed, we also study the effect of booms associated with resources that can be exploited either by the state or the private citizens.

In order to study the consequences of the resource boom we modify the benchmark game, Γ , adding one stage. We assume that after the policy vector (S, τ) is decided by the entitled body, an *unexpected* boom takes place, changing the balance of power.

The timing of the game, Γ' , is as follows:

1. Nature decides the initial political system, $\{A, D\}$.
2. The entitled body chooses (S, τ) .
3. A resource boom (∇) takes place, shifting the balance of powers.

4. The entitled body is allowed to adjust τ . S does not change.
5. The status quo can be challenged by either player via civil war.

3.1 Privately exploited resource boom

We first consider booms driven by resources that have the private citizens involved in their exploitation. Commodities of this sort include wool, coffee, cacao and alluvial diamonds. We model such boom as an increase in α . This in turn changes the productivity of labor, which becomes: $\bar{\alpha}(S) = \alpha(S) + \nabla > \alpha(S)$, where ∇ is a measure of the magnitude of the resource boom.

Now the empowered citizens have a higher probability of winning (say because they can buy more weapons). Hence $p(\gamma S) < p(S)$, where $\gamma < 1$ measures the new balance of powers, now tilted toward the citizens.

The new values are represented by: \bar{V}_j^r , with $j = \{g, c\}$ and $r = \{A, D, W\}$.

In this case if a civil war breaks out the payoffs of the agents are given by:

$$\bar{V}_c^W(\gamma S) = p(\gamma S)\bar{V}_c^A + [1 - p(\gamma S^-)]\bar{V}_c^D - \delta \quad (5)$$

$$\bar{V}_g^W(\gamma S) = p(\gamma S)\bar{V}_g^A - \delta \quad (6)$$

We make the following assumption:

A4. *If $\bar{\alpha}(S) = \alpha(S) + \nabla > \alpha(S)$, then $\bar{V}_c^W(\gamma S) - \bar{V}_c^A > V_c^W(S) - V_c^A$.*

That is, because the rise in individual productivity leads to more combative ability, predation is less likely to be tolerated.

We now solve the model by backward induction assuming first that the starting political system is autocratic. We repeat the analysis subsequently starting from democracy.

3.1.1 Autocracy

Before the resource boom takes place the autocratic regime sets a policy vector, (S^A, τ^A) to dissuade the citizens from mounting a rebellion.

However after the boom the empowered citizens are more keen to start a civil war for any army size S^A , which by **A1** does not change because no hiring of soldiers can occur during war. The citizens' payoff from civil war after the boom becomes:

$$\bar{V}_c^W(\gamma S^A) = p(\gamma S^A)\bar{V}_c^A + [1 - p(\gamma S^A)]\bar{V}_c^D - \delta. \quad (7)$$

In this case the tax rate $\bar{\tau}^A$ that will ensure the continuity of autocracy (by deterring the citizens from insurrection) is the one that makes the citizens indifferent between war and autocracy, or:

$$\begin{aligned} \bar{V}_c^W(\gamma S^A) &= \bar{V}_c^A \\ p(\gamma S^A)\bar{V}_c^A + [1 - p(\gamma S^A)]\bar{V}_c^D - \delta &= \bar{V}_c^A \\ \bar{V}_c^A - p(\gamma S^A)\bar{V}_c^A + \delta &= [1 - p(\gamma S^A)]\bar{V}_c^D \\ \bar{V}_c^A + \frac{\delta}{1 - p(\gamma S^A)} &= \bar{V}_c^D \\ \alpha(S^A)(1 - \bar{\tau}^A)(N - S^A) + \frac{\delta}{1 - p(\gamma S^A)} &= \bar{V}_c^D \end{aligned}$$

Note that $\bar{\tau}^A < \tau^A$ because after the resource boom the citizens have more combative power and hence their expected payoff from civil war increases. There can be two cases.

First, $\bar{\tau}^A$ can be less than a threshold such that government finds it unprofitable to maintain autocracy given the previously determined S^A since the citizens are stronger after the resource boom. This happens if,

$$\bar{V}_g^A(\gamma S^A) = \alpha(S^A)\bar{\tau}^A(N - S^A) - \alpha(S^A)(1 - \bar{\tau}^A)S^A < 0. \quad (8)$$

and in this case the autocratic government shifts the political power to the citizens and democracy is installed.

Second, when $\bar{V}_g^A(\gamma S^A) \geq 0$ so that the political power is voluntarily transferred, the citizens have become greater threat and their payoff will be:

$$\max \left[\bar{V}_c^A(\gamma \bar{S}^A), \bar{V}_c^W(\gamma S^A) \right].$$

Hence the citizens have to be paid at least $\bar{V}_c^W(\gamma S^A)$ to be dissuaded from starting a civil war, in which case autocracy will remain profitable.

3.1.2 Democracy

Consider the nation has democracy to start with. The rise in α empowers the citizens.

Initially, the citizens allocated resources in a way that the government could not install autocracy. In other words, the citizens had sufficient combative ability to deter the government becoming Frankenstein. Now if a war breaks out, the situation is even more favorable to the citizens. Prior to the resource boom, it was true that:

$$V_c^W(S^D) > V_c^A. \quad (9)$$

After the resource boom, the probability of winning has gone up for the citizens as the government becomes even weaker vis a vis the citizens. Since $\bar{\alpha} > \alpha$, by **A4** we know:

$$\left[\bar{V}_c^W(\gamma S^D) - \bar{V}_c^A \right] > \left[V_c^W(S^D) - V_c^A \right] > 0. \quad (10)$$

As long as $\left[\bar{V}_c^W(\gamma S^D) - \bar{V}_c^A \right] > 0$, the citizens maintain the credible threat of mounting a civil war. Alternatively, the citizens are willing to go for war if the government attempts to install autocracy. If the government can wage a war, the ex ante expected pay-off for the government is:

$$\bar{V}_g^W(\gamma S^D) = P(\gamma S^D) \bar{V}_g^A - \delta. \quad (11)$$

But the citizens can ensure an equivalent payoff (a credible commitment) under democracy or can even better it when $\bar{V}_g^D(\gamma \bar{S}^D) > \bar{V}_g^W(\gamma S^D)$. Therefore, it is not profitable to wage a war from the government's point of view and the nation remains a democracy.

Proposition 2 *Suppose, the citizens are more powerful.*

(a) *If there is an autocratic government to begin with, a democracy will evolve if the government can no longer credibly threaten or $\bar{V}_g^W(\gamma S^D) < 0$. Otherwise, autocracy will persist.*

(b) *If the nation started out as a democracy, it will remain so as long as assumption (d) is valid.*

When resource booms such as surge in price in cash crops occur, the power of the citizens is enhanced. If the country begins with autocracy, given the level of force S^A , the government may find it unprofitable to assuage the newly strengthened citizens. In other words, autocratic arrangement at S^A or $\bar{V}_g^A(S^A)$ yields a negative payoff. In short, the government can no longer credibly threaten and democracy is established.

When the nation starts out as a democracy, the initial power structure allowed the rights of the citizens. If a particular resource boom increases the combative ability of the citizens, the prevailing political structure is likely to continue.

3.1.3 Discussion

Our argument also dictates that rational bureaucratic states are to retain its structure intact even after resource boom of this kind. It is relevant to cite the examples of Australia and California in this context - two settler colonies where the state structure remained unruffled even after several resource booms spanning over a century or so.

Australia and California were settler colonies where colonial masters had interest in creating good institutions that imitated the British system. After a series of resource booms such as wool, wheat, gold, the institutional structure of Australia remained intact. The growth of California or the North West part of USA was also not constrained by her resource booms.

The fact that to begin with, these lands had independent citizens to challenge the authority of the government is one factor that helped them to escape the resource curse. Secondly, the particular types of resource boom periodically led citizens to prosper and become more powerful. This additional factor enhanced the possibility of rational bureaucratic state even more and thereby vindicating our postulation.

As a modern example of contrasting scenarios, Chaudhry (1997) cites the examples of Yemen and Saudi Arabia. In Yemen, labor remittances escaped the formal banking system and hence undermined the authority of the state. While in Saudi Arabia, oil revenue only enhanced the strength of the state. Inevitably, a relatively weak state emerged in Yemen in direct contrast to a stronger one in Saudi Arabia.

3.2 Government exploited resource boom

Consider now the discovery of lumpy kind of resource such as oil, Kimberly diamonds. Usually, the government gets involved in exploration of such types. Thus, with the money obtained, the government obtain more combative ability by buying arms and ammunition. The post-resource boom probability of winning of the government becomes $P\left(\frac{S^-}{\gamma}\right) > P(S^-)$. This is *the authoritarian effect* of this kind of resource boom. The game like Γ' where the resource boom shifts the balance of power towards the government.

Consider, the value of the resource to be R . Under democracy, R will be distributed equally among all the citizens and the government. The problem for the representative citizen is there-

fore given by:

$$\begin{aligned}
\tilde{V}_c^D &= \max_{\tau, S} (1 - \tau) [\alpha(S)(N - S) + R] \\
s.t. \quad &\tau [\alpha(S)(N - S) + R] - (1 - \tau)S \left[\alpha(S) + \frac{R}{N} \right] \geq p \left(\frac{S}{\gamma} \right) \tilde{V}_g^A - \delta; \\
&p \left(\frac{S}{\gamma} \right) \tilde{V}_c^A + \left(1 - p \left(\frac{S}{\gamma} \right) \right) (1 - \tau) \{ \alpha(S)(N - S) + R \} - \delta > \tilde{V}_c^A
\end{aligned} \tag{12}$$

The solution to the above problem \tilde{S}^D is different from S^D since the probabilities of winning has changed for both parties. The value under democracy becomes: $\tilde{V}_c^D \left(\frac{\tilde{S}^D}{\gamma} \right)$.

The value of autocracy also becomes different. The optimization problem of an autocratic government amounts to:

$$\begin{aligned}
\tilde{V}_g^A &= \max_{\tau, S} \tau \alpha(S)(N - S) - (1 - \tau) \alpha(S)S + R \\
s.t. \quad &\lambda \left[\alpha(S)(1 - \tau)(N - S) - \tilde{V}_c^W \left(\frac{S}{\gamma} \right) \right].
\end{aligned}$$

The solution to the above problem \tilde{S}^A is also different from S^A . \tilde{V}_j^i is the value that is determined after the resource boom has taken place where $i = \{A, D, W\}$ and $j = \{g, c\}$.

When a civil war breaks out, the previously determined army either under D or A does not change. There are two changes. First, the payoffs of the civil war has changed for the citizens and the government. For the citizens, the payoff of winning and losing respectively are: \tilde{V}_c^D and \tilde{V}_c^A . These values will be determined after a winner has been chosen. Second, the existing combative abilities have altered. Therefore, the value of civil war becomes different as well:

$$\tilde{V}_c^W \left(\frac{S}{\gamma} \right) = p \left(\frac{S}{\gamma} \right) \tilde{V}_c^A + \left(1 - p \left(\frac{S}{\gamma} \right) \right) \tilde{V}_c^D - \delta. \tag{13}$$

Even though the resource is possessed by the government, redistribution is taking place through low or even negative taxes (subsidies).

The probability of winning the battle has gone down for the citizens for a given S^- . However, \tilde{V}_c^D has gone up since the citizens can gain more under democracy. In short, there are two effects:

- The government is becoming more powerful and it is *the authoritarian effect*.
- The citizens have greater reward in installing democracy. This lures them to rebellion. This is *the liberalizing effect*.

3.2.1 Autocracy

Consider the economy starting with autocracy. After the resource boom, the government is more powerful since it possesses the entire resource. The government decides whether to install autocracy or not. If the government installs autocracy, the citizens can choose to wage a war.

The government is strong even before the possession of the resource. Possession of the resource only empowers the government further. Additionally, as the government has more resources, a rebellion can be prevented by redistributing the resource rent. Hence, the autocracy is likely to prevail.

On the other hand, the citizens may opt for war since the benefit of democracy has increased. Thus for a given S^A , the benefit of war may decline or may increase. After the resource boom, the payoff of the citizens during war is:

$$\tilde{V}_c^W \left(\frac{S^A}{\gamma} \right) = p \left(\frac{S^A}{\gamma} \right) \tilde{V}_c^A + (1 - p \left(\frac{S^A}{\gamma} \right)) \tilde{V}_c^D - \delta. \quad (14)$$

It is ambiguous whether:

$$\tilde{V}_c^W \left(\frac{S^A}{\gamma} \right) - \tilde{V}_c^A \left(\frac{\tilde{S}^A}{\gamma} \right) \begin{matrix} < \\ > \end{matrix} 0. \quad (15)$$

S^A and \tilde{S}^A are two different forces. S^A is the pre-resource boom force that the government needed to restrain the citizens and \tilde{S}^A is the level that is needed after the boom. If $\tilde{V}_c^W \left(\frac{S^A}{\gamma} \right) - \tilde{V}_c^A \left(\frac{\tilde{S}^A}{\gamma} \right) > 0$, the government has to pay at least $\tilde{V}_c^W \left(\frac{S^A}{\gamma} \right)$ to prevent the rebellion.

Prior to the boom, the government was strong enough to deter the citizens to rebel:

$$V_c^W(S^A) - V_c^A(S^A) = 0. \quad (16)$$

There can be two cases for a given S^A :

First, suppose:

$$\tilde{V}_g^A \left(\frac{S^A}{\gamma} \right) > 0. \quad (17)$$

The credible threat of the government is maintained since it still prefers the autocratic arrangement at S^A to relinquishing the power to the citizens. So the state remains autocracy. The payment to the citizens amounts to $\max \left[\tilde{V}_c^W \left(\frac{S^A}{\gamma} \right), \tilde{V}_c^A \left(\frac{\tilde{S}^A}{\gamma} \right) \right]$. The authoritarian effect is predominant in this case.

However, when

$$\tilde{V}_g^A \left(\frac{S^A}{\gamma} \right) \leq 0, \quad (18)$$

the credible threat for the government can no longer be maintained. So democracy emerges. In short, the liberalizing element is so powerful that despite being stronger, the government is unable to withstand the pressure of democratization.

3.2.2 Democracy

Beginning with democracy implies that prior to the resource boom, $V_c^W(S^D) - V_c^A(S^D) > 0$.

The level of government power or S^D was determined before the resource boom took place. So with more resources in hand and a given S^D , the citizens during the war obtain:

$$\tilde{V}_c^W \left(\frac{S^D}{\gamma} \right) = p \left(\frac{S^D}{\gamma} \right) \tilde{V}_c^A + \left(1 - p \left(\frac{S^D}{\gamma} \right) \right) \tilde{V}_c^D - \delta. \quad (19)$$

It can very well be true that the government becomes so powerful that:

$$\tilde{V}_c^W \left(\frac{S^D}{\gamma} \right) < \tilde{V}_c^A. \quad (20)$$

In other words, the citizens can no longer credibly threaten the state and the state becomes autocratic.

If however, the citizens still remain powerful enough to deter the government, we have:

$$\tilde{V}_c^W \left(\frac{S^D}{\gamma} \right) > \tilde{V}_c^A. \quad (21)$$

Thus, the democratic regime prevails. This happens when $\tilde{V}_c^W \left(\frac{S^D}{\gamma} \right)$ increases or when the citizens are more eager to fight lured by the increased prosperity from more resources. In other words, the liberalizing effect is stronger.

The citizens in order to maintain a credible threat need, $\tilde{V}_c^W \left(\frac{S^D}{\gamma} \right) - \tilde{V}_c^p > 0$. The payment to the government again becomes: $\max \left[\tilde{V}_g^W \left(\frac{S^D}{\gamma} \right), \tilde{V}_g^D \right]$.

Proposition 3 *Consider a resource boom that enhances the power of the government.*

(a) *If there is an autocratic regime in the beginning, it will prevail as long as the government can credibly threaten or $\tilde{V}_g^A \left(\frac{S^A}{\gamma} \right) > 0$.*

(b) When democracy existed before the resource boom, autocracy will emerge when the citizens can no longer make credible threat or $\tilde{V}_c^W \left(\frac{SD}{\gamma} \right) < \tilde{V}_c^A$.

When it is autocracy, the state is the residual claimant and the government must ensure that the current arrangement is the more preferable one. Thus when the power of the state is enhanced further, such arrangement is more likely to remain in existence. An unlikely situation will arise when the newly found resource encourages the citizens to fight and the government finds it impossible to maintain the threat credible any longer.

A very plausible and an empirically interesting case comes into picture when the nation begins with democracy and the balance of power shifts towards the government. Now, the prospect of maintaining credible threat of the citizens dwindles and the unfortunate consequence of more authoritarian regime becomes a reality. This will only happen when the citizens can no longer credibly commit to prefer a civil war over an autocracy.

3.2.3 Discussion

The case of Saudi Arabia is a classic case where the evolution of a rational bureaucratic state was completely disrupted due to oil boom. In her illuminating study of Saudi society, Chaudhry (1997) illustrated how despite having differences with pre-modern Europe in social structure, the Saudi society evolved towards rational centralized bureaucratic state before the boom occurred.

In fact, along side political elite from one region (Nejdi) there was a group of business elites as well from another (Hijazi). The centralized bureaucracy created formal rules and replaced system of complex subcontracting that existed before (Chaudhry, 1997). The order of the day was similar to that of England where the state was merely a provider of property rights not a predator.

However with the arrival of oil revenue, this entire episode of modernization ended abruptly. The oil revenue requiring industrial scale extraction made the government the sole beneficiary of it. The internal security increased and the former business elite lost their stature to wealthier and more powerful people in the government. In other words, a neo-patrimonial (predatory) state emerged.

The exploration of these resource can on the other hand lead people to be more conscious of their eventual deprivation under predatory regime. This may lead to credible threat of revolution, which under some circumstances may cause reinforcement of rational bureaucratic regime. The case of Botswana reveals itself as one such example.

Even though Botswana was colonized, being in insignificant geographically, the colonial masters did not tamper with the local institutions much. Hence pre-colonial institutions sur-

vived intact (Acemoglu, 2003). One of such institution was kgotla that challenged the tribal chief in decision making.

Thus, from its very inception Botswana was stepping towards modern rational bureaucratic state where the authority of the state was not going to remain uncontested. When diamond was found in the 70s, the evolution was not disrupted. The existence of ingrained check and balance in the society ensured that the revenue from it is shared equally across all spheres.

3.3 Mixed exploited resource boom

In sections 3 and 4, the civil war does not take place as both the citizens and the government can bargain and arrive at a better outcome. Two reasons why it did not take place:

- (i) The change in combative abilities took place instantaneously and
- (ii) The possession of resource was decided instantaneously.

We now reconsider both reasons. Suppose, the shift in combative ability does not take place instantaneously. But the change will be imminent unless either of them (the government or the citizens) does not strike first. In other words, after the resource was discovered, the probability of winning remains $P(S^-)$ or as it was before.

In the previous case, it was assumed a priori who possessed the resource but it is no longer the case in this section. Additionally, if preemptive strike does not take place, the resource will be possessed by the party that can induce credible threat. The timing is as follows:

1. Nature decides $\{A, D\}$ and the entitled body chooses S and τ .
2. Resource boom takes place but the fighting powers **have not shifted** since neither the government nor the citizens are in possession of the resource. The probability of winning remains: $P(S^-)$.
3. The government chooses either to install A or not. If the government does not install A , D emerges and the citizens capture the resource.
4. If the government attempts to install A , the citizens can either go for war or not. If the citizens choose not to go for war, A will emerge and the government owns the resource.
5. If civil war breaks out, the winner captures the resource and combative ability shifts accordingly.

In Stages 3, 4 and 5, S and τ can be re-optimized. In Stage 3, when the government decides not to install autocracy, values become: \bar{V}_g^D, \bar{V}_c^D . In Stage 4, if the state remains unchallenged, values are: $\tilde{V}_g^A, \tilde{V}_c^A$.

Thus when a civil war breaks out, the government not only retains the same number of soldiers but also the probability of winning remains the same. The payoff of winning or losing the war is different from the previous sections since the victorious side will possess the resource afterwards.

We have to distinguish between ex ante and ex post probability of winning a civil war. Before the resource boom takes place, the citizen's probability of winning is $p(S^-)$ – this is ex ante probability. If the citizens win, they will possess the resource and the probability will be $p(\gamma S^-)$. If government is the winner, possession will belong to him, the probability becomes: $p(\frac{S^-}{\gamma})$. $\bar{V}_c^D, \tilde{V}_c^A$ are the ex post payoffs of the citizens as a winner and a loser of the war.

If the citizens choose to go for war, the expected payoff is:

$$\hat{V}_c^w = p(S^-)\tilde{V}_c^A + (1 - p(S^-))\bar{V}_c^D - \delta \quad (22)$$

If the war is won, the citizens get \bar{V}_c^D and if lost, they will get \tilde{V}_c^A . These values are determined as in sections 3 and 4. Since the combative abilities will change once either of them possesses it, neither can pre-commit. This is precisely because neither the government nor the citizens will be keeping their promises once the war is won and the resource is captured by the winner. We assume :

$$\text{Assumption (e): } \bar{V}_c^D - \tilde{V}_c^A > V_c^D - V_c^A.$$

According to this assumption the stake of winning a civil war has become higher for the citizens since not only the nature of the state will change (from A to D) but the war will decide whether they capture the resource or not. Previously, the latter factor was not present.

3.3.1 Autocracy

Before the resource is possessed by either one, the value of war to the citizens is:

$$\hat{V}_c^w = p(S^A)\tilde{V}_c^A + (1 - p(S^A))\bar{V}_c^D - \delta. \quad (23)$$

Lemma 1: $\hat{V}_c^w(S^A) > \tilde{V}_c^A$.

(Proof is in the appendix)

The citizens obtain $\hat{V}_c^w(S^A)$ if they opt for war and if they do not, the resource is lost and

the payoff is $\tilde{V}_c^A < \hat{V}_c^w(S^A)$. Thus, the citizens have every incentive to fight for the possession of the resource.

The government will opt for the war if:

$$\hat{V}_g^w(S^A) = p(S^A)\tilde{V}_g^A - \delta > 0. \quad (24)$$

Since the citizens are going for war if the government decides the same, war becomes a reality. This happens precisely because neither party can bargain ex ante.

The benefit of going to war for the government has increased since if they lose, the citizens will allocate the resource and it will lose substantial power. Similar situation lies with the citizens. The citizens also thus want to mobilize more rebels than it was possible before the resource boom.

When the citizens generate substantial threat, the government will relinquish power without any bloodshed. This will happen when:

$$\hat{V}_g^w(S^A) = p(S^A)\tilde{V}_g^A - \delta < 0. \quad (25)$$

3.3.2 Democracy

Under democracy, the state is not as strong as opposed to autocracy to begin with. The citizens could effectively check the government. When the resource boom takes place, the possibility of a war arises because first of all it is a discrete decision and secondly, the problem of pre-commitment still remains.

The benefit from going to war for the citizens is:

$$\hat{V}_c^w(S^D) = p(S^D)\tilde{V}_c^A + (1 - p(S^D))\bar{V}_c^D - \delta \quad (26)$$

Lemma 2: $\hat{V}_c^w(S^D) > \bar{V}_c^A$.

(Proof is in the appendix)

Compared to autocracy, if there is democratic regime to begin with, the citizens would profit even more by going to war because the state is weak to start with. Thus, if challenged the citizens will definitely not acquiesce.

The government will go for the war when:

$$\hat{V}_g^w(S^D) = p(S^D)\tilde{V}_g^A - \delta > 0. \quad (27)$$

Since the government is weaker, the possibility of the government going for war is rather limited. Therefore, it is likely that the democratic state will reemerge without any bloodshed or the government is unwilling to fight:.

$$\widehat{V}_g^w(S^D) = p(S^D)\widetilde{V}_g^A - \delta < 0. \quad (28)$$

Proposition 4 *When a resource is possessed by neither the government nor the citizens, a war may ensue because of preemptive action on the behalf of both sides.*

3.3.3 Discussion

Resources have been associated with civil wars for two reasons: triggering it or altering its duration. We rest our case with the former not the latter. The latter assumes that civil war had already started for reasons unrelated to resource profile of the nation.

In Collier and Hoeffler (2004), the effect of primary commodities on conflict risk is highly significant and it is nonlinear. The risk of conflict is at its peak when primary commodity exports is around 32 percent of GDP. At that level of exports, the probability of civil war is 22 percent and without any such exports, it is only 1 percent.

The results of Collier and Hoeffler (2004) were not replicated in the subsequent studies by Fearon and Laitin (2003) and Fearon (2005). Fearon and Laitin (2003) found no relation between primary commodity exports and conflict except for oil-producing nations. In Fearon (2005), the empirical association between commodity exports and conflict was neither robust nor strong.

In general, when resources are in need of industrial scale of extraction, the coercive capacity of the state is enhanced (Snyder (2004) and Snyder and Bhavnani (2005)). When artisanal form of extraction is used, the citizens are empowered. However, in a dubious case arises when both types of extraction are possible.

We argue that, war can take place because the possession of resource can alter the bargaining power. But the parties cannot commit ex ante of transferring resource since possession of it will inevitably change the incentive structure. Hence, war can occur because of preemptive strike of the respective parties.

Sierra Leone presents itself as a classic case where the presence of alluvial diamond in fact caused the civil war. It should be emphasized that not all countries that possess this particular resource experience civil war nor did Sierra Leone had this war to begin with. From the beginning, the government established a patron-client relationship with a group of Lebanese

traders. The military leader Stevens ensured that a certain amount of revenue came in the way of the government. Gradually, however with the weakening of state capacity, the traders themselves became independent from their erstwhile patron.

The successor to Stevens inherited a very weak state facing independent groups who contested the monopoly of violence. In an attempt to restore old order, the government tried to alter the mode of extraction from the hands of Lebanese middleman to a more conventional form of industrial variety. The success of such an action would end the prospect of rebels while the failure of it would dwindle the future of the government itself. Hence, neither side had any other options other than to mount an attack on each other.

Guinea shared many other attributes with Sierra Leone. Both had semi-democracy, alluvial diamonds, low per-capita income and share the similar geographical location in West Africa. Yet none of those shared coincidences led to violent eruption of internal fight. The reason being the main resource of Guinea is Bauxite and it can only be extracted by the large-scale investment. That is why even if the rebels tried their hand, the government was firm enough to uproot them.

In Collier and Hoeffler (2004), the geographic distribution of resources was not taken into account. Even though, their model could successfully predict civil war DRC, according to Ndikumana and Emizet (2005), it is geographic distribution that mattered more than the amount itself. According to Ndikumana and Emizet (2005),

At independence, Katanga accounted for 75% of the Congos mineral output, about 50% of total natural resources, and (but) roughly 20% of the total budgetary expenditures. Such discrimination prevailed because resource rich region Katanga was underrepresented politically. Thus, unlike the political center did not have the credibility of ensuring fair division of the pie. This led to preemptive attacks from both sides.

In Indonesia too, the rebellion of resource rich province Aceh was not due to looting of natural resource but because of the failure of the government to precommit on a fair division of the income from it (Michael Ross, 2005). The political center Jakarta did have a strong presence in Aceh but local population resented it since an autonomy would have ensured greater revenue.

If the government of Indonesia captures the resource rent, it will be more powerful and hence will have no incentive to share. If the the local residents of Aceh possess it, the government will be weakened vis-a-vis others. That is why both parties were unable to arrive at a peaceful agreement.

4 Conclusion

It has remained a persistently pertinent question why a potentially beneficial resource boom can be a curse rather than a boon. This paradoxical phenomenon aptly described, as *'Resource Curse'* constitute much more than slow down of economic growth. As evidenced by recent political history, it is the disruption in prevailing political equilibrium that deserves to be the main concern.

The political curse due to resource boom includes a pronounced shift towards more dictatorial regime and fight for the possession of resource leading towards civil war. Our paper investigates why the prevailing political regimes are often destabilized and new ones are formed. Not surprisingly, we find that it all depends on the type of resource we are talking about and the nature of existing citizen-state relations in that particular polity.

Resources such as cash crops call for exclusively private exploration. When resource boom of this type occurs, democratic regimes are likely to prevail. Even if dictatorship existed before, a positive move usually incurs in the direction of a more liberal regime. On the contrary, when boom occurs in resources such as oil, the balance of power tilts towards the state. This as a consequence can adversely affect the democratic prospect of a nation. This is exemplified by the widespread prevalence of dictatorship in oil-producing nations.

Even more dire consequences arise when there is uncertainty regarding rights of exploration. Since whoever owns the resource will gain power, both the state and the civic society are eager to possess it. However, it is difficult to strike a bargain under these circumstances, as there is no guarantee that once one party becomes more powerful, the earlier promise will be honored. Thus, a civil war may ensue due to preemptive action.

One important lacuna in our analysis is that we have not described why a particular resource is exclusively for private or public exploration or neither. We defined autocracy and democracy analytically but have left the actual social underpinnings that give rise to such political equilibrium.

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5 Appendix

5.1 Proof of Proposition 1

$$\begin{aligned}
 \text{(i)} \quad & p(S^D)V_c^A + [1 - p(S^D)] V_c^D - \delta > V_c^A \\
 & (p(S^D)V_c^A + [1 - p(S^D)] V_c^D) > V_c^A + \delta > V_c^A \\
 & [1 - p(S^D)] V_c^D > [1 - p(S^D)] V_c^A \\
 & V_c^D > V_c^A
 \end{aligned}$$

$$\text{(ii)} \quad V_c^w = p(S)V_c^A + [1 - p(S)] V_c^D - \delta$$

Deriving with respect to S :

$$\frac{\partial V_c^w}{\partial S} = p'(S) [V_c^A - V_c^D] < 0$$

$$\text{(iii)} \quad \text{We know that } V_c^D(S^D) > V_c^A(S^A) = V_c^w$$

Because of (ii) and above, we can find that

$$S^D < S^A$$

QED

5.2 Proof of Lemma 1

Before the resource was discovered, it was true that:

$$\begin{aligned}
 & p(S^A)V_c^A + [1 - p(S^A)] V_c^D - \delta = V_c^A \\
 & p(S^A)V_c^A + [1 - p(S^A)] \bar{V}_c^D - \delta > V_c^A \quad \left[\text{as } \bar{V}_c^D > V_c^D \right] \\
 & p(S^A)\tilde{V}_c^A + [1 - p(S^A)] \bar{V}_c^D - \delta > \tilde{V}_c^A \quad \left[\text{as } V_c^A > \tilde{V}_c^A \right] \\
 & \hat{V}_c^w(S^A) > \tilde{V}_c^A
 \end{aligned}$$

QED

5.3 Proof of Lemma 2

The Proof is similar to the above lemma and hence omitted. QED