

# The Politics of Resource Boom\*

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## Abstract

This paper investigates how resource-driven economic booms shape the political equilibrium of resource-rich societies. Political equilibrium is defined in accordance to the relationship between the state and citizens. We find that, following a windfall of resources that call for private exploitation make the society inch towards more liberal regimes. However, booms in resources exploited by the state—such as oil and natural gas—bring forth more dictatorial regimes. There is still the third type of resource that can be exploited either by the state or the private citizens; this particular variety can incite preemptive actions by both parties potentially leading towards civil war.

**Key Words:** Resource Boom, Predatory State, Rational Bureaucratic State.

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## Abstract

The paper attempts to understand why a resource boom in the form of either as a surge in price of cash crops or more visibly in exploration of underground minerals can sometimes undermine the prevailing political equilibrium whereas in some other times, the political structure remains unruffled. We quote the case of Saudi Arabia in particular and Middle East in general where the discovery of oil changed the socio-political landscape. In contrast, we quote the examples of Botswana and Norway where the society could easily endure the prospective storm that could be incited due to resource boom.

We define two types of states - rational bureaucratic and predatory. In rational bureaucratic state, the government retains the monopoly of violence but cannot predate because if they do so, the citizens have credible threat to oust them. Whereas in the case of predatory state, the government not only possesses the monopoly of violence but also remains uncontested as the citizens are no longer a credible threat. Resource also comes in three varieties: (i) one where the government can only effectively explore (ii) second one which can only be exploited by the citizens and still (iii) the third one, exploration of which can be by either one.

Exploration of resource such as oil, Kimberly diamond are mostly state-aided in underdeveloped nations. Resources such as these ones enhance the power of the government being an additional source of revenue. If the nations begins as a rational bureaucratic state, there is imminent possibility that resource boom of this kind can trigger a conversion towards more dictatorial regime. This insight is amply verified by widespread prevalence of autocracy in oil-exporting nations.

Rise in prices of coffee, wool etc. comprise of another variety of resource boom. Because of low cost in exploration and dispersed nature of production, citizens gain an upper hand over the government. If a nation starts as a rational bureaucratic regime or a more liberal regime, such a boom will preserve the prevailing political structure. Even when an economy inherits a predatory state, the predatory power of the government will wane and the society will inch towards more democratic regime.

The last type of resource which can either be explored by the state or the citizens creates conflict of interest. Since the possession of resource boom can bring greater power, resource boom can turn into curse when a war is ensued. Such is the case of Sierra Leon. The paper also brings the example of Colombia where dissimilar dynamics of conflict resulted when different categories of resource boom took place.

# 1 Introduction

When are resources cursed? While the discovery of oil reserves in the Middle East in the 1940s changed the socio-political landscape of the region (Chaudhry, 1997), resource windfalls in mineral-rich countries like Botswana and Norway have never been threat to the countries political stability.

In this paper we develop a simple model to study the effect of resource-driven economic shocks on the political equilibrium of resource-rich societies. Previous theoretical research in political economy has highlighted the conditions under which the state can rise endogenously to enforce property rights and promote production and exchange (Bates et al., 2002). However, besides the protection of property rights, the monopoly of violence gives the state the means to predate from the productive sectors of society. We allow for such possibility in our model and consider two types of state: a *Rational Bureaucratic* state and a *Predatory* state. While in the former the government retains the monopoly of violence but cannot predate because the citizens have a credible threat to oust them, Predatory governments are powerful enough to remain uncontested.

In our model, we study how unanticipated resource windfalls affect the existing political equilibrium. By distinguishing between three types of resources: i) resources that only the government can effectively exploit; ii) resources that only the citizens can exploit and iii) resources that can be exploited by either group; we lay out the conditions under which resource booms can help consolidate the current form of government or else trigger a transition *to* or *from* a Rational Bureaucratic or a Predatory state. In addition, we explore the extent to which resource-driven economic shocks may result in civil war.

For instance, exploitation of resources such as oil and Kimberly diamonds are mostly carried-out by the state in developing nations. Such sources of revenue enhance the power of the government: If a country begins as a Rational Bureaucratic state, a resource boom of this kind can trigger a conversion towards a more Predatory regime. This insight is amply verified by the widespread prevalence of autocracy in oil-exporting nations (Ross, 2001). In contrast, a rise in the price of cash crops such as coffee or cocoa can be interpreted as another variety of *resource boom*. Because of low fixed costs and the geographically dispersed nature of production, it is more likely that the citizens produce such crops. If a country starts as a Rational Bureaucratic state, such a boom will most likely preserve

the prevailing political structure. Even if such shock is faced by a Predatory regime is, the increased economic power of the citizens may force a transition towards a more democratic regime. Finally, a resource that can either be exploited by the state or the citizens, creates conflict of interest that increases the probability of a resource boom-driven civil war.

The phenomenon of 'Resource Curse' implies three aspects regarding the society - the presence of natural resource reduces economic growth, generates more authoritarian regime and finally may even trigger civil war. There is extensive literature in all three of these areas. Our emphasis in this paper is with the last two aspects not the first one.

Paradoxical impact of resource boom on the economy has been investigated from several angles. Traditionally, it has been postulated that boom in one sector appreciates exchange rate and as a consequence the traditional exports suffer. In sum, one shot gain sacrifices the long-term growth. This has been formalized by Corden and Neary (1982). In addition, abundance of natural resource has been accused to weaken of bureaucracy via soft budget constraint. Another mechanism via which growth rate is affected is through greater rent-seeking activities and less entrepreneurial one (Robinson, 2006). The negative relationship has been supported by Sachs and Warner (1997, 2001).

Recent history has amply illustrated that natural resource affects more than economic aspect of a nation. In fact, it is said to trigger civil wars and altering its duration if it had started earlier. Collier and Hoeffler (1998, 2004) first found a positive correlation with the incidence of civil wars and boom in natural resource. Fearon and Laitin (2003) and Fearon (2005) found similar relation with respect to oil-exporting nations. Dube and Vargas (2007) found empirical support in Colombia that conflict increases when prices of oil rose and prices of coffee increased. Our paper however does not deal with whether resources intensify the civil wars but rather whether it at all causes it or not.

Snyder and Bhavnani (2005) and Snyder (2004) as opposed to large-N empirics quoted above emphasizes the importance of in-depth small-N case studies. They convincingly point out that whether a particular natural resource will trigger civil war depends on three conditions: (i) the mode of extraction (ii) the coercive power of the state and (iii) the nature of spending by the state. Their in-depth studies point out that despite the presence of alluvial diamond failed to create strife between the state and the citizens in Guinea while the neighbouring Sierra Leone could not escape from it.

Snyder (2004) provides us with the example of Burma, the drug money helped to end the civil war while in Sierra Leone it was otherwise with diamonds.

The other hypothesis that a particular variety of resource hinders democracy was fervently supported by Mideast experts. It was however, Ross (2001) who showed that this phenomenon is not restricted to this particular geographic area but other oil-exporting countries too share the same fate. It is in fact not even restricted exclusively to only oil-producing nations - it extends to other mineral resources that require extensive public exploration and gradual state empowerment as a consequence. Chaudhry (1997) illuminated that labor remittances in Yemen and oil revenue in Saudi Arabia led to very different political developments in the respective nations.

The present paper does not dwell with the economic aspects of resource curse. Our main focus is upon the political implications of it. Following Snyder and Bhavnani (2005) we identify that political consequences depend on existing political structure as well as different mode of extraction.

In the rest of the paper we develop our the model according to the following structure: In the next section we present the set up by illustrating plausible differences between a Rational Bureaucratic and a Predatory state in terms of the equilibrium tax rate and size of the army. We then study the effect of an unexpected resource windfall that accrues mainly to the citizens. We show how such effect differs if the political *status quo* is a Rational Bureaucratic or a Predatory state. In section four we explore the potential impact of a resource boom on a state-exploited resource. In section five we study the potential impact of resource booms that generate conflict of interests given their potential exploitation by either the government or the citizens. Finally we offer some discussion and lines of future research.

## 2 The Model

### 2.1 Set-Up

Consider a simple production economy in which there are  $N$  number of individuals. These  $N$  number of people can either be in productive economy (L), state (S) or be recruited for insurrection (I). In other words,  $S+I+L=N$ . The production function of the economy is:

$$Q = P(S)aL. \text{ where } \alpha > 0 \text{ and } \frac{\partial P}{\partial s} > 0 \quad (1)$$

Unlike the economy of Grossman (1991), here Pareto optimal allocation demands certain amount of

state involvement to protect the property rights of the citizens. Thus citizens themselves have incentive to allocate  $S$  or drive some people away from actual production. The Pareto optimal allocation dictates:

$$\frac{Max}{x, S} P(S)(1-x)\alpha(N-S) + \ell [P(S)xa(N-S) - P(S)(1-x)aS] \quad (2)$$

$x$  is the tax rate that is collected to pay for the soldiers to be hired for protecting property rights. The entire revenue is collected to pay for soldiers.

This allocation can only take place when there is no insurrection. However, one must keep in mind that even though a certain amount of  $S$  is certainly good, overdose of it can lead to exploitation. Hence, when the citizens are in power to maximize they make sure that they do not create a Frankenstein.

In fact, we consider two types of states where no insurrection takes place but the roles of citizens and that of the state are reversed. In rational bureaucratic state, it is citizens who maximize their wealth and in predatory state, it is state who maximizes profit.

There is still a third state when insurrection takes place and the citizens and the state are in war. During the civil war, the state wants to retain its dominance of being a predatory state and the citizens in their turn wants to fight against it and win back their cherished freedom to make the decisions to create a state.

In the first stage, the level of  $S$  is decided. After the level of  $S$  has been decided, the government decides whether to predate or not.  $S$  indicates both the strength of government and the extent of property rights.

If the government predate, the citizens decide whether wage rebellion or to acquiesce. If the citizens do not rebel and the government predate, the state becomes predatory.

### **Game 1**

Stage 0: Either the government or the citizens decide  $S$  and dictates the allocation of funds. It is decided by nature that will choose the level of  $S$ .

Stage 1: The government decides whether to predate or not to predate. If they do not predate, rational bureaucratic state emerges. Otherwise, we move into the next stage.

Stage 2: If they predate, the citizens can rebel or decide against it. If they rebel, civil war ensues. Alternatively, the state claims predominance.

During rebellion, both incur losses. Thus, rebellion is only profitable when the party can benefit more. Under predatory state, the government selects  $S$  at a level high enough such that citizens do not find it optimal to rebel. This decision is taken by the state. While under rational bureaucratic state, it is the citizens who restrict the level of  $S$  so that the government prefers to yield than to predate.

Since decision regarding rebellion starts at the last stage, backward induction dictates that we start from the value obtained from civil war and proceed then to the other stages when  $S$  is decided by either party.

## 2.2 Civil War

The probability of winning during the civil war by the citizens is given by  $\beta(S, I)$ . It is negatively related to  $S$  and positively to  $I, \alpha$ . Since  $\alpha$  denotes the productivity of the economy which is in the hand of the citizens, more of it implies greater combative ability for them. For the government, it is  $(1 - \beta(S, I))$

Consider the utility during state  $i$  of the government (The King) and a group of the citizens (Oliver Cromwell) as  $V_c^i, V_g^i$  where  $i$  can be  $\{w, p, r\}$  where  $w$  is civil war,  $p$  is predatory state and  $r$  is rational bureaucratic state.

We assume that the government cannot collect any taxes during the war. In addition, we critically hold that the government cannot hire anymore soldiers than has been done previously. This is because as soon as the war breaks out it is customary that citizens are united against their enemy and will capture and kill any defectors.

During the war, a reasonable assumption will be that previous recruits of the government remain with it while rebel leaders hire from rest of the population.

*Assumption (a): If there is a war, the government cannot hire more than what they had in the previous period.*

When the government is the winner during war, it is predatory state. If otherwise, we arrive at rational bureaucratic state. The expected payoff to the government amounts to:

$$V_g^w = -w_m S^- + \beta(S^-, I) V_g^r + (1 - \beta(S^-, I)) V_g^p \quad (3)$$

Here  $S^-$  is a constant number describing the amount of soldiers hired in the previous stage that

cannot be changed during the war.  $w_m$  is some minimum wage needed to motivate the soldiers.

During civil war marginal productivity of the individuals is  $P(0)\alpha$  since the state is not at work as a protector. The utility of the group of citizens who act unitedly decide upon how many insurrectionists will there be. They leave some individuals for production and others are left for insurrection. The expected average benefit of winning and losing of the war is added next to it. It amounts to:

$$-P(0)\alpha I + \beta(S^-, I)V_c^r + (1 - \beta(S^-, I))V_c^p. \quad (4)$$

When there is civil war the citizens maximize their utility:

$$V_c^w = \frac{Max}{I} [-P(0)\alpha I + \beta(S^-, I)V_c^r + (1 - \beta(S^-, I))V_c^p.] + \nabla [N - S^- - I]. \quad (5)$$

We assume that the constraint is never binding or  $N - S^- > I$ . Thus,  $\nabla = 0$ . In short, we get an interior solution of  $I$ :

$$\frac{\partial V_c^w}{\partial I} - P(0)\alpha + \frac{\partial \beta(S^-, I)}{\partial I} (V_c^r - V_c^p) = 0. \quad (6)$$

We can write  $I(S^-)$ . In short, we get an interior solution of  $I$ . So, we can write the value as:

$$V_c^w(\alpha, S^-, I(S^-)) = [-P(0)\alpha I(S^-) + \beta(S^-, I(S^-))V_c^r + (1 - \beta(S^-, I(S^-)))V_c^p]. \quad (7)$$

*Assumption (b):*  $\frac{\partial V_c^w(\alpha, S^-, I(S^-))}{S^-} < 0$ .

This is a reasonable assumption which asserts that the value of civil war to the citizens goes down as the strength of the state grows stronger. While the utility of the government from its own perspective becomes:

$$V_g^w(\alpha, S^-, I(S^-)) = \beta(S^-, I(S^-))V_g^r + (1 - \beta(S^-, I(S^-)))V_g^p - w_m S^- \quad (8)$$

The values of the above optimization problem is defined as:

$$V_c^w(\alpha, I(S^-), S^-)$$

$$V_g^w(\alpha, I(S^-), S^-)$$

### 2.3 Predatory State

Under predatory state, government moves first by paying off the citizens just enough so that they do not rebel. So the government acts like Stackelberg leader while the citizens are the followers.

The pay off to the citizens is:  $P(S)(1-x)\alpha L$ . The wage of the soldiers must equal at least that of the after tax income of the citizens or  $P(S)(1-x)\alpha$ . Thus the objective function becomes:  $P(S)x\alpha L - P(S)(1-x)\alpha S$ .

A predatory government maximizes the tax revenue minus the wage paid to the soldiers. It also must ensure that the citizens are unable to rebel. Thus the residual income after tax for rest of the population must be large enough to deter them from fighting a civil war whose value have been stated before. If there is a predatory government, it maximizes:

$$\frac{Max}{x, S} P(S)x\alpha(N-S) - P(S)(1-x)\alpha S \quad (9)$$

*Subject to*

$$P(S)(1-x)\alpha L \geq V_c^w(\alpha, I, S)$$

It is noteworthy that the government is considering the expected payoff from war from the perspective of the citizens. Because any payoff that is lower than  $V_c^w(\alpha, I, S)$ , will lead to civil war. The above inequality can be called as incentive compatibility constraint of the citizens under predatory state or  $IC_c^p$ . It mentions that the government should be strong enough to deter the citizens to challenge its hegemony.

In other words, the state must be strong enough to refrain the citizens to rebel and at the same time obtain some positive revenue after paying the soldiers. It is important to note that because the state cannot hire further during civil war, the strength of the state is (equal to value of  $S$ ) determined within the optimization problem. The problem becomes:

$$\frac{Max}{x, S} P(S)x\alpha(N-S) - P(S)(1-x)\alpha S + \lambda [P(S)(1-x)\alpha(N-S) - V_c^w(\alpha, I(S), S)] \quad (10)$$

If  $\lambda=0$ ,  $x$  will become 1 or the entire income is taxed. But that cannot happen when citizens can effectively protest. So  $\lambda > 0$ :

$$P'(S) [x\alpha(N - S) - (1 - x)\alpha S] + P(S) [-x\alpha - (1 - x)\alpha] + \lambda \left[ P'(S)(1 - x)\alpha(N - S) - P(S)(1 - x)\alpha - \frac{\partial V_c^w}{\partial S} \right] = 0$$

$$P(S)aN + \lambda [-P(S)\alpha(N - S)] = 0$$

$$[P(S)(1 - x)\alpha(N - S) - V_c^w(\alpha, I, S)] = 0$$

The values obtained from the above problem is

$$V_c^p(\alpha, I(S^p), S^p)$$

$$V_g^p(\alpha, I(S^p), S^p)$$

The government prefers this outcome over rational bureaucratic state if:

$$V_g^p(\alpha, I(S^p), S^p) \geq V_g^r(\alpha, I(S^r), S^r) \quad (11)$$

## 2.4 Rational Bureaucratic State

Under rational bureaucratic state, it is civic society that moves first by paying off the government just enough so that they do not predate. So the government acts like Stackelberg follower under the tight leash of the citizens being the leader this time.

Now, it is citizens who maximize their utility. The state is subject to revenue constraint that citizens provide. However as mentioned earlier that when  $S$  is too large, the state may predate. So the state must not be so strong such that it becomes interested in predated.

To refrain the state from predated, the citizens needs to make sure that the state is better off than being at war and the citizens themselves will wage a war rather than accept predatory state where the state predominates. In addition to these constraints, the payment to the soldiers must equal to the income of any citizens. So, the problem becomes:

$$\frac{Max}{x, S} P(S)(1 - x)\alpha(N - S) \quad (12)$$

*subject to*

$$P(S)x\alpha L - P(S)(1 - x)\alpha S \geq V_g^w(\alpha, I(S), S)$$

$$V_c^w(\alpha, I(S), S) \geq V_c^p(\alpha, I(S^p), S^p)$$

$$P(S)x\alpha L - P(S)(1 - x)\alpha S \geq 0$$

Constraint (I) emphasizes the fact that the value of payoff to the state must be at least as large as that of from waging a war. It is called the incentive compatibility constraint of the state under rational bureaucratic one or  $IC_g^r$ .

Constraint (II) is called incentive compatibility constraint of the citizens under rational state or  $IC_c^r$ . In other words, the citizens will prefer to wage a war if the state predates. The constraint (III) is merely the participatory constraint of the state,  $PC_g$ .

*Assumption (c): (i) If indifferent, the citizens prefer predatory state over war.*

*(ii) If indifferent, the government prefer rational bureaucratic state over war.*

Because of the above assumption, we need  $\theta_2 = 0$ .

If  $V_c^w(\alpha, I(S), S) = V_c^p(\alpha, I(S^p), S^p)$ , the citizens cannot pre-commit them themselves such that they will wage a war if the government predates. Thus the state will move to a predatory one. Thus, it must be true that,

$$V_c^w(\alpha, I(S^r), S^r) > V_c^p(\alpha, I(S^p), S^p) \quad (13)$$

We can convert the inequality constraint as:

$$V_c^w(\alpha, I(S^r), S^r) - A^2 - V_c^p(\alpha, I(S^p), S^p) = 0 \quad (14)$$

Thus the problem becomes:

$$\begin{aligned} & \frac{Max}{A, x, S} P(S)(1-x)\alpha(N-S) + \\ & \theta_1 [P(S)x\alpha L - P(S)(1-x)\alpha S - Max\{V_g^w(\alpha, I(S), S), 0\}] + \\ & \theta_2 [V_c^w(\alpha, I(S), S) - A^2 - V_c^p(\alpha, I(S^p), S^p)] \end{aligned}$$

The values obtained from the above problem is:

$$\begin{aligned} & V_c^r(\alpha, I(S^r), S^r) \\ & V_g^r(\alpha, I(S^r), S^r) \end{aligned}$$

For the existence of rational bureaucratic state we need to have:

$$V_c^w(\alpha, I(S^r), S^r) > V_c^p(\alpha, I(S^p), S^p). \quad (15)$$

Under these circumstances, civil war ceases to exist because it is inefficient for both and a better bargain always awaits.

**Proposition 1** (i)  $V_c^r(\alpha, I(S^r), S^r) > V_c^p(\alpha, I(S^r), S^p)$

(ii)  $S^r < S^p$ .

Proof:

(i) Under predatory state, citizens have no incentive to wage a war since  $V_c^w(\alpha, I(S^p), S^p) = V_c^p(\alpha, I(S^p), S^p)$  but under rational bureaucratic state  $V_c^w(\alpha, I(S^r), S^r) > V_c^p(\alpha, I(S^p), S^p)$ .

$$V_c^w(\alpha, I(S^p), S^p) = V_c^p(\alpha, I(S^p), S^p)$$

$$\text{or, } \beta(S^p, I(S^p))V_c^r + (1 - \beta(S^p, I(S^p)))V_c^p - P(0)\alpha I(S^p) = V_c^p$$

$$\text{or, } \beta(S^p, I(S^p)) [V_c^p - V_c^r] = -P(0)\alpha I(S^p)$$

Since  $-P(0)\alpha I(S^p) < 0$  and  $\beta(S^p, I(S^p)) > 0$ ,

$$[V_c^p - V_c^r] < 0$$

or,  $V_c^r(\alpha, I(S^r), S^r) > V_c^p(\alpha, I(S^p), S^p)$ .

(ii) From assumption (b), we know that  $\frac{\partial V_c^w(S^-, I(S^-), \alpha)}{S^-} < 0$ .

For rational bureaucratic state it is true that

$$V_c^w(\alpha, I(S^r), S^r) > V_c^p(\alpha, I(S^p), S^p).$$

While for predatory state, it is true that

$$V_c^w(\alpha, I(S^p), S^p) = V_c^p(\alpha, I(S^p), S^p)$$

Thus,  $V_c^w(\alpha, I(S^r), S^r) > V_c^w(\alpha, I(S^p), S^p)$

It will be true only when  $S^r < S^p$

$$\left[ \text{Since, from assumption (b), we know that } \frac{\partial V_c^w(S^-, I(S^-), \alpha)}{S^-} < 0. \right]$$

QED

When it is predatory state the government dictates the payment so as to ensure that citizens do not rebel. Thus the payoff to the citizens under predatory arrangement is just equal to the value of war to the citizens. If citizens win, they will form a rational bureaucratic state and if they lose, a predatory state will be formed. Since there is a cost to the war and the probability of winning itself is less than unity, the payoff from rebellion is less than that from rational bureaucratic state.

The second part asserts that the strength of government is less under rational bureaucratic state than under predatory state. Why? If the government is too strong, the value of civil war declines

to the citizens. Hence, the threat of rebellion is no longer credible. To prevent such predation, the citizens must restrict the power of the state.

## 2.5 Discussion

Weber (1958) defined state as a monopoly of violence. Bates et al (2002) defined state as an equilibrium order that is created because of the need to protect their property rights. They also contrasted stateless societies from the ones that have one. Hence, rather than assuming the existence of state being a priori, the evolution of it was endogenized.

Unlike Bates et al (2002), we do not discuss how the presence of the state as a monopoly of violence becomes necessary. We in fact assume a priori that state is useful for production. This paper however extends the definition of Weber (1958) by distinguishing between two cases - where the state predate and when it does not.

The main benefit of the existence of state is the provision of property rights. A stateless society does not have monopoly of violence and hence impersonal exchange becomes difficult to flourish. However, the very power that enables the state to protect citizens can also be used to predate. In the present section, we have discussed when the state will refrain from predated and when they will predate.

In our model, when the government decides the coercive power, it becomes so large that the citizens cannot protest and hence the state can predate easily. This has been the legacy for most part of the world history. However, development of independent commercial class and subsequent industrial revolution in England tilted the balance towards citizens gradually. In Germany, where the industrial revolution was basically state induced., instead of restricting it only enhanced the power of the state. Hence, all powerful state came into being. This comes close to our definition of predatory state.

In both cases, the state had monopoly of violence but with very different implications. In one case, citizens or at least a group of them could restrict arbitrary rules and in the other, there was no way the citizens could restrain the predation of the state. Broadly speaking, these are our rational bureaucratic and predatory states.

In order to assess the impact of a particular resource on political institutions, we believe that it is important to know about the history of different nations. That is why we defined these state

analytically. Of course, we do not go as far as distinguishing which society generates which type. Rather, we leave *nature* to decide it.

### 3 Resource Boom

#### 3.1 Set-Up

The economy starts from the previous period and it can be either of the two types: predatory or rational. At the beginning of the game nature chooses the type of state. In the stage 1 of the present period, resource boom takes place.

We consider a particular type of resource boom in this section. Under this resource boom, the marginal productivity of the worker goes up. Price of wool or coffee are examples that fit into this criteria. In our model this is akin to increase in  $\alpha$ .

Now, the citizens can buy more arms. So, bargaining power has moved to  $\bar{\beta}(S^-, I) > \beta(S^-, I)$ . The values from civil war, predatory state and that of rational bureaucratic state has altered to  $\bar{V}_c^i, \bar{V}_g^i$ . Let us consider the consequences of rise in  $\alpha$  on  $V_c^i, V_g^i$  where  $i$  can be  $\{w, p, r\}$ . When there is civil war the citizens maximize their utility:

$$\frac{Max}{I} - P(0)\bar{\alpha}I + \bar{\beta}(S^-, I)\bar{V}_c^r + (1 - \bar{\beta}(S^-, I))\bar{V}_c^p \quad (16)$$

$$Subject\ to,\ L + I = N - S^-$$

Thus given  $S^-$ , the probability of winning has gone up. On the other hand, the opportunity cost of war has gone up as well. So,  $I$  may go up or go down. In addition, the values of  $\bar{V}_c^r$  and  $\bar{V}_c^p$  have altered as well. We assume the following:

*Assumption (d):* If  $\bar{\alpha} > \alpha$  :  $\bar{V}_c^w(\bar{\alpha}, \bar{I}(S^p), \bar{S}^p) - \bar{V}_c^p(\bar{\alpha}, \bar{I}(S^p), \bar{S}^p) > V_c^w(\alpha, I(S^p), S^p) - V_c^p(\alpha, I(S^p), S^p)$

Given a certain level of government force  $S^-$  determined in the previous period as  $\alpha$  goes up, the citizens are more likely to favor war over predation. In other words, the rise in individual productivity leads to more combative ability and hence, predation is less likely to be tolerated. While the utility of the state during war becomes:

$$\bar{\beta}(S^-, I)\bar{V}_g^r + (1 - \bar{\beta}(S^-, I))\bar{V}_g^p - w_m S^- \quad (17)$$

If  $\alpha$  goes up,  $V_g^r$  will obviously go up as well. More interestingly,  $V_c^p$  will increase because the government has to give more resource to the citizens as their threat point has increased.

Even though the opportunity cost of war has increased but as both bargaining power and the value of winning and losing the war has increased substantially - it is more probable that the value of civil war has increased. So timing is as follows:

**Game 2:**

Stage 0: Nature chooses the type of state

Stage 1: Resource boom takes place and fighting powers have shifted towards the citizens.

Stage 2: The government choose either to predate or not. If the government does not predate, rational state emerges.

Stage 3: If however the government predate and citizens choose to go for war, war is the outcome. Alternatively, citizens acquiesce to predatory state.

If a civil war breaks out, the government retains the same number of soldiers from the previous period but the civilians can recruit more  $I$  to carry out insurrection. If no war breaks down, given the resource boom, the government and the citizens choose  $L, x, S$ .

### 3.2 Starting with Predatory State

Suppose the game had predatory state before. In other words, the government was maximizing such that the citizens were indifferent between war and not war. Alternatively, the threat of civil war by the citizens was not credible.

Even though the total number of state recruits remain the same, since if the resource lies with the citizens, the combative power of civilian population increases. We denote this as the increase in winning probability of the insurrectionists. Previously to make civil war not credible, the government ensured that:

$$V_c^w(\alpha, I(S^p), S^p) = V_c^p(\alpha, I(S^p), S^p) \tag{18}$$

Note that at this value of fighting power of the citizens there existed a value  $x$  such that the government preferred to have predatory state over the rational bureaucratic one or:

$$V_g^p(\alpha, I(S^p), S^p) - V_g^r(\alpha, I(S^r), S^r) > 0 \tag{19}$$

Now as the bargaining power of the citizens have increased, the citizens can wage war given  $S^p$ . This  $S^p$  was determined before the resource boom had taken place. This is the total government force since no hiring can take place during the war. Now citizens maximize:

$$\bar{V}_c^w = \frac{Max}{I} - P(0)\bar{\alpha}I + \bar{\beta}(S^p, I)\bar{V}_c^r + (1 - \bar{\beta}(S^p, I))\bar{V}_c^p \quad (20)$$

The solution can be written as:  $\bar{V}_c^w(\bar{\alpha}, S^p, \bar{I}(S^p))$ . The new  $\bar{I}$  depends upon  $S^p$  determined before. Given these new values the  $x$  that will ensure the continuation of predatory state have to satisfy:

$$\bar{\beta}(S^p, \bar{I}(S^p)) [P(S^p)(1 - \bar{x})\alpha(N - S^p) - \bar{V}_c^r] = -P(0)\alpha\bar{I}(S^p) \quad (21)$$

There can be two cases:

**Case 1:** Thus the government may find it difficult to exploit give previously determined  $S^p$  as it was decided given the fact that citizens were weaker than now. So,  $\bar{x}$  can decline so much that it can very well be true that,

$$\bar{V}_g^p(\bar{\alpha}, \bar{I}(S^p), S^p) - \bar{V}_g^r(\bar{\alpha}, \bar{I}(\bar{S}^r), \bar{S}^r) < 0. \quad (22)$$

This occurs precisely because  $S^p$  was determined prior to resource boom. The resource boom changed the balance of power so much that the government can no longer credibly commit itself in maintaining predatory state. At this point, the government will withdraw from predation and give the power to the citizens to decide their own fate.

**Case 2:** Even if complete shift of power does not take place or we still have  $\bar{V}_g^p(\bar{\alpha}, \bar{I}(S^p), S^p) - \bar{V}_g^r(\bar{\alpha}, \bar{I}(\bar{S}^r), \bar{S}^r) \geq 0$ , the citizens do now have more say as the threat level has gone up. Thus, it is a positive move towards rational bureaucratic state. The payment to the citizens will be:

$$Max [\bar{V}_c^p(\bar{\alpha}, \bar{I}(\bar{S}^p), \bar{S}^p), \bar{V}_c^w(\bar{\alpha}, \bar{I}(S^p), S^p)].$$

The citizens have to be paid at least  $\bar{V}_c^w(\bar{\alpha}, \bar{I}(S^p), S^p)$  because otherwise a war will break out which will lead to a Pareto-inferior outcome. If however,  $\bar{V}_c^p(\bar{\alpha}, \bar{I}(\bar{S}^p), \bar{S}^p)$  or the payoff during the predatory state under this new level of combative ability yields higher payoff, citizens will acquiesce to that. Hence the payment is  $Max [\bar{V}_c^p(\bar{\alpha}, \bar{I}(\bar{S}^p), \bar{S}^p), \bar{V}_c^w(\bar{\alpha}, \bar{I}(S^p), S^p)]$ .

### 3.3 Starting with Rational Bureaucratic State

Consider the nation has rational bureaucratic state to start with. The rise in  $\alpha$  only enhances the bargaining power of the citizens, which in turn only lead to reinforcement of the power of the citizens. Thus there will not be any change in the situation.

To begin with the citizens maximized their income such that the government found it profitable not to predate. In other words, the bargaining power was sufficient to deter the government becoming Frankenstein. Now if a war breaks out, the situation is even more favorable for the citizens. Hence, reallocation of resources does take place but not the type of the state.

To start with, it was true that:

$$V_c^w(\alpha, I(S^r), S^r) > V_c^p(\alpha, I(S^p), S^p) \quad (23)$$

$$\text{or, } \beta(S^r, I) [V_c^r(\alpha, I(S^r), S^r) - V_c^p(\alpha, I(S^p), S^p)] > P(0)aI(S^r) \quad (24)$$

The probability of winning has gone up for the citizens as the government becomes even weaker vis a vis citizens now. Since  $\bar{\alpha} > \alpha$ , by *assumption (d)* we know:

$$[\bar{V}_c^w(\bar{\alpha}, \bar{I}(S^r), S^r) - \bar{V}_c^p(\bar{\alpha}, \bar{I}(\bar{S}^p), \bar{S}^p)] > [V_c^w(\alpha, I(S^r), S^r) - V_c^p(\alpha, I(S^p), S^p)] > 0 \quad (25)$$

By combining these three factors, we can conclude that:

$$\bar{\beta}(S^r, \bar{I}(S^r)) [\bar{V}_c^r(\bar{\alpha}, \bar{I}(\bar{S}^r), \bar{S}^r) - \bar{V}_c^p(\bar{\alpha}, \bar{I}(\bar{S}^p), \bar{S}^p)] > P(0)\bar{\alpha}\bar{I}(S^r) \quad (26)$$

Or, the citizens are willing to go for war. If the government opts for it, then war emerges as the outcome. Otherwise, rational bureaucratic state is retained. If the government can wage a war, the ex ante expected pay-off is:

$$\bar{V}_g^w(S^r, \bar{I}(S^r), \bar{\alpha}) = -w_m S^r + \bar{\beta}(S^r, \bar{I}(S^r))\bar{V}_g^r + (1 - \bar{\beta}(S^r, \bar{I}(S^r)))\bar{V}_g^p \quad (27)$$

But the citizens can ensure a payoff equivalent (a credible commitment) to it under rational bureaucratic state or it can even better it under new rational bureaucratic state when  $\bar{V}_g^r(\bar{\alpha}, \bar{I}(\bar{S}^r), \bar{S}^r) > (\bar{V}_g^w(S^r, \bar{I}(S^r), \bar{\alpha}))$ . If that is so, it makes no sense to wage a war from the government's point of view. The nation remains a rational bureaucratic state. Thus the payment to the government becomes:

$$\text{Max} [\bar{V}_g^r(\bar{\alpha}, \bar{I}(\bar{S}^r), \bar{S}^r), (\bar{V}_g^w(S^r, \bar{I}(S^r), \bar{\alpha}))].$$

**Proposition 2** *Suppose the income of the citizens have increased or  $\alpha$  is higher now and so is the power of the citizens.*

(a) *If the nation started out with a predatory regime, a rational bureaucratic state will evolve if the government can no longer credibly threaten or  $\bar{V}_g^p(\bar{\alpha}, \bar{I}(S^p), S^p) - \bar{V}_g^r(\bar{\alpha}, \bar{I}(\bar{S}^r), \bar{S}^r) < 0$ . Otherwise, predatory regime will persist.*

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

When resource boom such as surge in price in cash crops occur, the power of the citizens is enhanced. Thus, this is clearly a move towards more liberal regime. If the country starts out from predatory arrangement, given the level of force  $S^p$ , it may be totally inadequate for the government to pursue it still when it becomes unprofitable to ally the newly strengthened rebels. In other words, predatory arrangement at  $S^p$  or  $\bar{V}_g^p(\bar{\alpha}, \bar{I}(S^p), S^p)$  yield less payoff than rational bureaucratic system,  $\bar{V}_g^r(\bar{\alpha}, \bar{I}(\bar{S}^r), \bar{S}^r)$ . If so, the government can no longer credibly commit itself in maintaining predatory state and hence gives up the power to citizens.

When the nation starts out as a rational bureaucratic one, the initial power structure was such that state was strengthened enough to uphold the rights of the citizens but not to violate it. When a particular resource boom increases the combative ability of the citizens, the political structure is likely to remain even so.

### 3.4 Discussion

The resource boom of this kind empower the citizens as it calls for private exploration. Obviously, this is a positive impetus towards rational bureaucratic state. In general, resources that require industrial scale exploration generate revenue for the government. The resources that only need artisans scale exploration enhance the pockets of the citizens. Alluvial diamond, wool, coffee falls into such category.

However, it is not only technology but also social structure that determines whether a particular resource will be explored by the government or by the citizens. In a well-developed market, oil can be explored by private citizens (the case of U.S.A). On the other hand, where the market is in its nascent stage of development, it is the government that generally takes the burden of such exploration. <sup>1</sup>

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<sup>1</sup>How different social structure can cause the same resource boom lead society towards different outcomes can be

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.

## 4 Resource Boom

### 4.1 Set-Up

Now consider another kind of resource boom. This is lumpy kind of resource. Oil, Kimberly diamond fall into this category. Usually, the government gets involved in exploration of such cases. Thus, with

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illustrated by the process of industrialization of England and Germany.

In England, the feudalism grew in opposition to the monarch. According to Moore (1966) thus when commercialization of agriculture finally took place, an independent entrepreneurial class grew that could challenge authority of the state. Thus, commercial agriculture if permitted to be interpreted as a resource boom led to rationalization of the role of the state.

In Germany in striking contrast, industrialization in large measure was state-led. Thus, instead of being independent of the monarch, commercial class was very much part of it. Thus, the state eventually became more and more powerful - it was, in our words, a move towards predatory state.

the money obtained the government can get more bargaining power by buying arms and ammunition. So assume, the post-resource probability of winning by the government to be  $(1 - \tilde{\beta}(S^-, I)) < (1 - \beta(S^-, I))$ .

Consider, the value of the resource to be  $W$ . If there is rational bureaucratic state to begin with, the resource will be distributed equally among all the citizens. The state will receive its equal share. The maximization problem becomes:

$$\begin{aligned} & \frac{Max}{x, S} (1 - x) [LP(S)\alpha + W] + \\ & \theta_1 \left[ x (LP(S)\alpha + W) - S(1 - x) \left( P(S)\alpha + \frac{W}{L} \right) - Max \{ \tilde{V}_g^w(\alpha, I, S), 0 \} \right] + \\ & \theta_2 \left[ \tilde{V}_c^w(\alpha, I, S) - A^2 - \tilde{V}_c^p(\alpha, I, S^p) \right] \end{aligned}$$

Under predatory state, the optimization problem amounts to:

$$\begin{aligned} & \frac{Max}{x, S} P(S)x\alpha(N - S) - P(S)(1 - x)\alpha S + W + \\ & \lambda \left[ P(S)(1 - x)\alpha(N - S) - \tilde{V}_c^w(\alpha, I, S) \right] \end{aligned}$$

Note that we are assuming that the government is keeping all the resources. Actually, redistribution can take place by lowering of  $x$  since the government can no longer depend solely on taxes for revenue.

The value of  $\tilde{V}_c^p$  equals to  $\tilde{V}_c^w$  which amounts to:

$$\tilde{V}_c^p = -P(0)\alpha\tilde{I}(\tilde{S}^p) + \tilde{\beta}(\tilde{S}^p, \tilde{I}(\tilde{S}^p))\tilde{V}_c^r + (1 - \tilde{\beta}(\tilde{S}^p, \tilde{I}(\tilde{S}^p)))\tilde{V}_c^p \quad (28)$$

The probability of winning the battle has gone down for the citizens, given all else remain the same. However,  $\tilde{V}_c^r$  has gone up since citizens can gain more under rational bureaucratic state. So the citizens may mobilize more resources for war. Thus,  $\tilde{V}_c^w$  may go up or down. The game is similar to the above except the power has shifted towards the government.

### Game 3:

Stage 0: Nature chooses the type of state

Stage 1: Resource boom takes place and fighting powers have shifted towards the government.

Stage 2: The government choose either to predate or not. If the government does not predate, rational state emerges.

Stage 3: If however the government predate and citizens choose to go for war, war is the outcome. Alternatively, citizens acquiesce to predatory state.

## 4.2 Starting with Predatory State

Consider the economy starts with predatory state. There is resource boom in the beginning such that the power of the government has increased because it has all the resources in hand. The government now can decide whether to predate or not to do so. If they predate, the citizens can wage a war.

Since the government is stronger, the citizens are less likely to win. Moreover as the government has more resources in hand, it can easily quell the rebellion by mere redistribution like lowering  $x$ . Hence, the government is likely to remain predatory.

On the other hand, now there is more motive for the rebels to mobilize forces since benefit increases. Thus given  $S^p$ , the force of the rebel can decline or may increase. After the resource boom the payoff of the citizens during war is:

$$\tilde{V}_c^w(\alpha, S^p, \tilde{I}(S^p)) = -P(0)\alpha\tilde{I}(S^p) + \tilde{\beta}(S^p, \tilde{I}(S^p))\tilde{V}_c^r + (1 - \tilde{\beta}(S^p, \tilde{I}(S^p)))\tilde{V}_c^p \quad (29)$$

So, it is undecided whether  $\tilde{I}(S^p)$  will increase or decrease. Consequently, it is also not clear what will be the intention of the citizens. For newly enhanced given level force of the government, the citizens may decide to rebel or may refrain from it. All of it boils down to whether:

$$\tilde{V}_c^w(\alpha, \tilde{I}(S^p), S^p) - V_c^p(\alpha, \tilde{I}(\tilde{S}^p), \tilde{S}^p) < / > 0.. \quad (30)$$

Note that, and are two different level of forces.  $S^p$  is the pre-resource boom force that the government needed to keep the citizens at bay and  $\tilde{S}^p$  is the level that is needed after the boom.

In the beginning before the boom, the government had level of forces such that citizens found it optimal not to rebel or:

$$V_c^w(\alpha, I(S^p), S^p) - V_c^p(\alpha, I(S^p), S^p) = 0. \quad (31)$$

The government can predate since the citizen will not protest. Now, there can be two cases for a given  $S^p$ :

**Case 1:** Suppose,

$$V_c^w(\alpha, I(S^p), S^p) - V_c^p(\alpha, I(S^p), S^p) = 0. \quad (32)$$

Under these circumstances, the government will not find it optimal to give away the power to the citizens. So the state remains predatory. The payment to the citizens amounts to  $Max$   $\left[ \tilde{V}_c^w(\alpha, \tilde{I}(S^p), S^p), \tilde{V}_c^p(\alpha, \tilde{I}(S^p), S^p) \right]$ .

**Case 2:** If however,

$$\tilde{V}_g^p(\alpha, \tilde{I}(S^p), S^p) - \tilde{V}_g^r(\alpha, \tilde{I}(\tilde{S}^r), \tilde{S}^r) \leq 0. \quad (33)$$

It is no longer credible threat for the government to maintain the predatory arrangement. So rational bureaucratic state emerges.

### 4.3 Starting with Rational Bureaucratic State

Consider a country beginning with rational bureaucratic state. Before the resource boom,  $V_c^w(\alpha, I(S^r), S^r) - V_c^p(\alpha, I(S^p), S^p) > 0$ . In other words,

$$-P(0)\alpha I + \beta(S^r, I(S^r))V_c^r + (1 - \beta(S^r, I(S^r)))V_c^p > V_c^p. \quad (34)$$

Note that the level of government power or  $S^r$  was determined before the resource boom took place. So with more resources in hand and a given  $S^r$ , the maximization problem for the citizens during the war becomes:

$$\frac{Max}{I} - P(0)\alpha I + \tilde{\beta}(S^r, I)\tilde{V}_c^r + (1 - \tilde{\beta}(S^r, I))\tilde{V}_c^p. \quad (35)$$

The resulting  $\tilde{I}(S^r)$  can be  $> / < I(S^r)$ . Hence, there can be two contrasting situation:

**Case 1:** It can very well be true that states become so powerful that:

$$-P(0)\alpha\tilde{I}(S^r) + \tilde{\beta}(S^r, \tilde{I}(S^r))\tilde{V}_c^r + (1 - \tilde{\beta}(S^r, \tilde{I}(S^r)))\tilde{V}_c^p < \tilde{V}_c^p. \quad (36)$$

Now, the alternative of predatory state may be less unattractive as the state can redistribute more revenue as it have a different source of it. Here the citizens can no longer credibly threaten the state. Thus, the state becomes predatory.

**Case 2:** If however, the citizens still remain powerful enough to deter the predation or we have:

$$-P(0)\alpha\tilde{I}(S^r) + \tilde{\beta}(S^r, \tilde{I}(S^r))\tilde{V}_c^r + (1 - \tilde{\beta}(S^r, \tilde{I}(S^r)))\tilde{V}_c^p > \tilde{V}_c^p. \quad (37)$$

At this time, the government reverts back to original type - the rational bureaucratic one. This can happen when  $\tilde{V}_c^w(\alpha, I, S)$  increases or when the citizens mobilize more rebels with the lure of increased prosperity from more resources.

In order to do that one needs the gap  $V_c^w(\alpha, I(S^r), S^r) - V_c^p(\alpha, I(S^p), S^p) > 0$  to be substantially larger to make the citizens remain unruffled. In addition, we need the increase in power of the state or the new value of  $(1 - \tilde{\beta}(S^p, I))$  not to differ much from the previous one. The payment to the government again becomes:  $Max \left[ \tilde{V}_g^w(\alpha, S^r, \tilde{I}(S^r)), \tilde{V}_g^r(\alpha, \tilde{S}^r, \tilde{I}(\tilde{S}^r)) \right]$ .

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

(a) *If the nation began as predatory state, it will remain so as long as the government can credibly threaten or when  $\tilde{V}_g^p(\alpha, \tilde{I}(S^p), S^p) - V_g^r(\alpha, \tilde{I}(\tilde{S}^r), \tilde{S}^r) > 0$ .*

(b) *When rational bureaucratic arrangement prevailed, it will be violated when the citizens can no longer make credibly commit or  $\tilde{V}_c^w(\alpha, \tilde{I}(S^r), S^r) < \tilde{V}_c^p(\alpha, \tilde{I}(\tilde{S}^p), \tilde{S}^p)$*

When it is predatory state, it is state who is the residual claimant and they must ensure that they prefer the current arrangement over any other. Thus when the power of the state is enhanced by resource boom, such predatory arrangement is more likely to remain unruffled if not strengthened. An unlikely situation will arise when the newly found resource lure the citizens to garner more rebels for future prosperity, the government may find it possible to maintain the threat any longer.

A very plausible and an empirically interesting case comes into picture when we the nation begins with a rational bureaucratic state. Now, when the balance of power shifts towards the government, 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 predatory state.

#### 4.4 Discussion

The implications of 'resource curse' have mostly focused upon two aspects: slow growth and violent conflict. Ross (2001) found a third one: the creation of authoritarian states. In his paper, Ross (2001) found strong correlation between dependence on oil and other mineral resources and the possibility of dictatorship.

The type of resource discussed in this section calls for exploration in industrial scale. Even though a nation with established market economy can explore these privately (USA), in most underdeveloped nations it becomes the domain of the government. Hence, exclusive public exploration (Snyder, 2004) is called for.

The government subsequently becomes more powerful from having another source of revenue other than the one provided by the citizens. Thus for a given army or internal security arrangement, possession of this revenue can ruffle the previous contract between the government and the citizens.

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 insignificant geographically, the colonial masters did not tamper with the local institutions much. Hence pre-colonial institutions survived 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.

## 5 Civil War

### 5.1 Set-Up

In the previous section, 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 bargaining power took place instantly and
- (ii) The possession of resource was decided instantaneously.

We now reconsider both reasons. Suppose, the shift in bargaining power does not take place instantaneously. But it will unless either the state or the citizens do not strike first. So, after the resource boom the probability of winning remains  $\beta(S^-, I)$  or as before.

We are basically telling the story where the winner captures the resource. In the previous case, it was assumed a priori who possess it but it is no longer so. However, if preemptive strike does not take place, the resource will be possessed by the party that can induce credible threat. So the timing is as follows:

#### Game 4:

Stage 0: Nature chooses the type of state.

Stage 1: Resource boom takes place but the fighting powers **have not shifted**. The probability of winning remains:  $\beta(S^-, I)$ .

Stage 2: The government chooses either to predate or not. If the government does not predate, rational state emerges. If the government predates, the citizens can either go for war or not.

Stage 3 : If civil war breaks out, the winner captures the resource and bargaining power is shifted accordingly. If the citizens decide not to go for war, we move to the other node.

Stage 4: If the government is opting for war but the citizens choose not to go for it, predatory state will emerge. The bargaining power will eventually shift in favor of the government.

Thus when a civil war breaks out, the government not only retains the same number of soldier but also probability of winning remains the same. However, the payoff of winning or losing the war has

changed since the victorious side will possess the resource allocation when either predatory or rational state reemerges.

Before the resource boom takes place, the citizen's probability of winning is  $\beta(S^-, I)$ . If the citizens win, the probability will be  $\bar{\beta}(S^-, I)$ . If government is the winner, it becomes:  $\tilde{\beta}(S^-, I)$ .

$\beta(S^-, I)$  is the ex ante probability of winning the war and  $\tilde{\beta}(S^-, I)$  is the ex post probability of winning if the war is won by the government. Otherwise, it becomes  $\bar{\beta}(S^-, I)$ . And  $\bar{V}_c^r$ ,  $\tilde{V}_c^p$  are the ex post pay off of the respective winners. Citizens would rather strike first because giving time will only lead to lower probability of winning and less effective deterrence.

Suppose there is an oil boom. The bargaining power will shift in favor of the government if the citizens do not strike first. If the citizens choose to go for war, the expected payoff is:

$$\frac{Max}{I} - P(0)\alpha I + \beta(S^-, I)\bar{V}_c^r + (1 - \beta(S^-, I))\tilde{V}_c^p \quad (38)$$

If the war is won, citizens will get  $\bar{V}_c^r$ . If it is lost, they will get  $\tilde{V}_c^p$ . These values are determined as stated in the above section. However, the government has not increased its combative facilities. Furthermore, it cannot pre-commit to distribute the resources as once the capacity has gone up, it will act differently. Such a predicament calls for preemptive actions by both parties.

## 5.2 Starting with Predatory State

Suppose the nature chooses predatory state. If the state remains unchallenged, the value of predatory state becomes:

$$\frac{Max}{I} - P(0)\alpha I + \beta(S^-, I)\bar{V}_c^r + (1 - \beta(S^-, I))\tilde{V}_c^p \quad (39)$$

But before it, the value of war is:

$$\hat{V}_c^w = \frac{Max}{I} - P(0)\alpha I + \beta(S^p, I)\bar{V}_c^r + (1 - \beta(S^p, I))\tilde{V}_c^p \quad (40)$$

The above expression is different from  $\tilde{V}_c^p$ . Define  $\hat{I}(S^p)$  as the solution to the above problem. So,

$$\hat{V}_c^w(\alpha, S^p, \hat{I}(S^p)) = \frac{Max}{I} - P(0)\alpha I + \beta(S^p, I)\bar{V}_c^r + (1 - \beta(S^p, I))\tilde{V}_c^p \quad (41)$$

*Lemma:*  $-P(0)\alpha\hat{I}(S^p) + \beta(S^p, \hat{I}(S^p))\bar{V}_c^r + (1 - \beta(S^p, \hat{I}(S^p)))\tilde{V}_c^p > \tilde{V}_c^p$ .

Proof: The winning party will be more powerful after the possession of resources. So it is true that:  $\bar{V}_c^r \geq V_c^r$ . Also, accepting predatory state yields lower value because then state is assumed to take control of the resources and becomes more powerful

Before the resource was discovered, it was true that:

$$V_c^w = -P(0)\alpha I(S^p) + \beta(S^p, I(S^p))V_c^r + (1 - \beta(S^p, I(S^p)))V_c^p = V_c^p.$$

It was true that

$$-P(0)\alpha + \frac{\partial \beta(S^p, I(S^p))}{\partial I} (V_c^r - V_c^p) = 0$$

At this time,  $\bar{V}_c^r \geq V_c^r \geq \tilde{V}_c^r$  and  $V_c^p > \tilde{V}_c^p$ . Thus, it must be true that  $\bar{V}_c^r - \tilde{V}_c^p > (V_c^r - V_c^p)$ . So at  $I(S^p)$ :

$$-P(0)\alpha + \frac{\partial \beta(S^p, I(S^p))}{\partial I} (\bar{V}_c^r - \tilde{V}_c^p) > 0$$

This yields:  $\hat{I}(S^p) > I(S^p)$ . This implies:  $\beta(S^p, I(S^p)) < \beta(S^p, \hat{I}(S^p))$ .

We know that:

$$-P(0)\alpha I(S^p) + \beta(S^p, I(S^p))V_c^r + (1 - \beta(S^p, I(S^p)))V_c^p = V_c^p.$$

$$\text{or, } -P(0)\alpha I(S^p) + \beta(S^p, I(S^p))\bar{V}_c^r + (1 - \beta(S^p, I(S^p)))V_c^p \geq V_c^p. \quad [\text{as } \bar{V}_c^r \geq V_c^r]$$

$$\text{or, } -P(0)\alpha I(S^p) + \beta(S^p, I(S^p))\bar{V}_c^r + (1 - \beta(S^p, I(S^p)))V_c^p \geq V_c^p.$$

$$\text{or, } -P(0)\alpha I(S^p) + \beta(S^p, I(S^p))\bar{V}_c^r + (1 - \beta(S^p, I(S^p)))\tilde{V}_c^p \geq \tilde{V}_c^p. \quad [\text{as } V_c^p > \tilde{V}_c^p]$$

But  $I(S^p)$  does not maximize the RHS, it is  $\hat{I}(S^p) > I(S^p)$  that does it. So, it definitely must be

$$-P(0)\alpha \hat{I}(S^p) + \beta(S^p, \hat{I}(S^p))\bar{V}_c^r + (1 - \beta(S^p, \hat{I}(S^p)))\tilde{V}_c^p > \tilde{V}_c^p.$$

QED

Because  $\bar{V}_c^r > \tilde{V}_c^r$  and  $\tilde{\beta}(S^p, I) < \beta(S^p, I)$ , the ex ante value of war can be larger than the previous value of it

For the government, the value is:  $-w_m S^p + \beta(S^p, \hat{I}(S^p))\bar{V}_g^r + (1 - \beta(S^p, \hat{I}(S^p)))\tilde{V}_g^p$ . There can be two sub-cases:

**Case 1:** The government will go for the war if:

$$-w_m S^p + \beta(S^p, \hat{I}(S^p))\bar{V}_g^r + (1 - \beta(S^p, \hat{I}(S^p)))\tilde{V}_g^p > \bar{V}_g^r. \quad (42)$$

Since the citizens are going for war if the government decides to go as well, war becomes a reality. Alternatively, when  $-w_m S^p + \beta(S^p, \hat{I}(S^p))\bar{V}_g^r + (1 - \beta(S^p, \hat{I}(S^p)))\tilde{V}_g^p > \bar{V}_g^r$ , war emerges as the

unfortunate outcome. This happens precisely because of inability of both parties cannot bargain ex ante.

**Case 2:** However, when the following is true that:

$$-w_m S^p + \beta(S^p, \hat{I}(S^p)) \bar{V}_g^r + (1 - \beta(S^p, \hat{I}(S^p))) \tilde{V}_g^p < \bar{V}_g^r, \quad (43)$$

the government prefers being under rational bureaucratic state than being in war. An unlikely situation will arise, as the state prefers to go for rational bureaucratic state.

The benefit of going to war for the government has increased since if they lose, the citizens will allocate the resources 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.

If the citizens generate substantial amount of rebels, the government will back up and give away the task of governance to the citizens. If however, the government perceives the citizens to be only mildly more pro-active, war will emerge as the inevitable outcome.

### 5.3 Starting with Rational Bureaucratic State

To begin with under rational bureaucratic state, the state is not as strong as opposed to the case discussed before. The citizens could check the government from pre-dating. However, when the resource boom takes place, the possession of it might lead to fighting because first of all it is a discrete decision and secondly, the possibility of pre-commitment is absent.

The benefit from going to war is:

$$\frac{Max}{I} - P(0)\alpha I + \beta(S^p, I) \bar{V}_c^r + (1 - \beta(S^p, I)) \tilde{V}_c^p. \quad (44)$$

Define  $\hat{I}(S^r)$  as the solution to the following optimization problem:

$$\hat{V}_c^w(\alpha, S^r, \hat{I}(S^r)) = -P(0)\alpha \hat{I}(S^r) + \beta(S^r, \hat{I}(S^r)) \bar{V}_c^r + (1 - \beta(S^r, \hat{I}(S^r))) \tilde{V}_c^p. \quad (45)$$

*Lemma:*  $-P(0)\alpha \hat{I}(S^r) + \beta(S^r, \hat{I}(S^r)) \bar{V}_c^r + (1 - \beta(S^r, \hat{I}(S^r))) \tilde{V}_c^p > \tilde{V}_c^p.$

*Proof:* We know that, because rational bureaucratic state prevailed:

$$\begin{aligned} -P(0)\alpha I(S^r) + \beta(S^r, I(S^r)) V_c^r + (1 - \beta(S^r, I(S^r))) V_c^p &> V_c^p. \\ -P(0)\alpha + \frac{\partial \beta(S^r, I(S^r))}{\partial I} (V_c^r - V_c^p) &= 0 \end{aligned}$$

If predatory state prevails, the government will possess the resource. So,  $\tilde{V}_c^p < V_c^p$ . On the other hand when rational bureaucratic state emerges, because citizens will possess resource, it becomes:  $\bar{V}_c^r \geq V_c^r$ .

So at  $I(S^r)$ , it must be true that  $-P(0)\alpha + \frac{\partial\beta(S^r, I(S^r))}{\partial I} (\bar{V}_c^r - \tilde{V}_c^p) > 0$ .

So the solution  $\hat{I}(S^r)$  must be greater than  $I(S^r)$ . If so:  $\beta(S^r, I(S^r)) < \beta(S^r, \hat{I}(S^r))$ .

$$-P(0)\alpha I(S^r) + \beta(S^r, I(S^r))V_c^r + (1 - \beta(S^r, I(S^r)))V_c^p > V_c^p$$

$$\text{or, } -P(0)\alpha I(S^r) + \beta(S^r, I(S^r))\bar{V}_c^r + (1 - \beta(S^r, I(S^r)))V_c^p > V_c^p \quad [as, \bar{V}_c^r \geq V_c^r]$$

$$\text{or, } -P(0)\alpha I(S^r) + \beta(S^r, I(S^r))\bar{V}_c^r + (1 - \beta(S^r, I(S^r)))\tilde{V}_c^p > \tilde{V}_c^p \quad [as, \tilde{V}_c^p < V_c^p]$$

But,  $I(S^r)$  does not lead to the maximum of the LHS, it is  $\hat{I}(S^r) > I(S^r)$  that maximizes the LHS.

So it definitely must be:

$$-P(0)\alpha\hat{I}(S^r) + \beta(S^r, \hat{I}(S^r))\bar{V}_c^r + (1 - \beta(S^r, \hat{I}(S^r)))\tilde{V}_c^p > \tilde{V}_c^p$$

QED

The above lemma implies that if there is rational bureaucratic 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 pay off of the government becomes:  $-w_m S^r + \beta(S^r, \hat{I}(S^r))\bar{V}_g^r + (1 - \beta(S^r, \hat{I}(S^r)))\tilde{V}_g^p$

**Case 1:** The war will break out if:

$$-w_m S^r + \beta(S^r, \hat{I}(S^r))\bar{V}_g^r + (1 - \beta(S^r, \hat{I}(S^r)))\tilde{V}_g^p > \bar{V}_g^r. \quad (46)$$

**Case 2:** The war will not break out if:

$$-w_m S^r + \beta(S^r, \hat{I}(S^r))\bar{V}_g^r + (1 - \beta(S^r, \hat{I}(S^r)))\tilde{V}_g^p < \bar{V}_g^r. \quad (47)$$

Comparing with the predatory state, here the government is rather tame. That is why the possibility of the government going for war is rather limited. Hence, most likely the rational bureaucratic state will reemerge again.

If the government does not go for war, the inevitable outcome will be rational bureaucratic regime. Because of the possession of resource, the citizens are more powerful and the value to the government will be  $\bar{V}_g^r$ . and the winning probability of the citizens have increased to  $\bar{\beta}(S^r, I)$ .

**Proposition 4** *When a resource falls neither exclusively in the hands of the state nor in that of the citizens, a war may ensue because of preemptive action on the behalf of both sides.*

Resource of any kind helps a party to gain power. The previous analysis and examples amply showed how the shift in power can destabilize the political equilibrium. However, a violent conflict never followed since both parties could bargain ex post. However, when resource of a particular variety can fall in either hands, creates a divergence between ex ante payoff of war and ex post value of it. This is precisely because whoever wins the battle, possess the resource and invariably becomes the more powerful of the two. Hence, a possibility arises where neither can strike a bargain and everyone opts for the costly consequence.

The ex ante value of war is greater for the citizens regardless of the regime one is in. We in particular point out that under predatory arrangement, a war is a more likely outcome. The reason being the government being stronger in the predatory state, would more likely to opt for the battle.

#### 5.4 Change in $\alpha$

Change in  $\alpha$  is not too different than the case discussed above. Only difference is that the opportunity cost of going for war will go up. This may restraint the citizens to opt for it. We however must state that increase in  $\alpha$  is less likely to create war because of two different reasons:

- (i) Bargaining power is more likely to shift instantaneously like the previous section.
- (ii) Since the resource is not as lumpy as that of oil, more likely an amicable solution can be reached by the parties.

#### 5.5 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.<sup>2</sup> 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.

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<sup>2</sup>The latter assumes that civil war had already started for reasons unrelated to resource profile of the nation.

Compared to previous sections, war can take place now because both sides are fighting for possession of resource. The possession of resource to a particular party 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 semidemocracy, 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.

## 6 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 due to 'Dutch Disease'. 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 calls for exclusively private exploration. If resource boom of this type occurs, democratic regimes are likely to remain democratic. Even if dictatorship prevailed, a positive move usually incurs in the direction of a more liberal regime. On the contrary, when boom occurs in the form of resource 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 waits for when exploration of resources is neither exclusively public nor private. Since whoever owns the resource constitutes 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 will honor the promise to the other. 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. In fact, in some resources in one country may call for private exploration and in some others only state can lead such activities. The stage of economic development as well as the prevailing power of the state vis-à-vis citizens requires to be incorporated.

We defined predatory state and rational bureaucratic state analytically but have left the actual social underpinnings that give rise to such political equilibrium. We need to discuss how a particular societal organization leads to a more liberal regime or a more dictatorial one.

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