Relationship Between Natural Resources and Institutions

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Abstract :

This article analyses the relationship between institutions' quality and natural resources through a rent seeking model. Depending on the quality of the institutions, each country has a specific structural capacity to stand natural resources dependency. It is shown that there exists a threshold for each country, so that beyond this point, any additional amount of natural resources begins to have a negative impact on institutions. As the stock of natural resources increases, the expected profitability of rent seeking improves which, in turn, lowers the quality of institutions. The mechanism stems from a new balance of power within the country. However, the intensity of institutional degradation is determined by social interactions and depends on both the nature of resources and their appropriability level. The inverse U-shaped curve obtained by empirical studies, presented in this article, supports the notion of non-monotonic effect of natural resources on the institutions found in the model.

Keywords : Natural Resources, Institutions, Rent Seeking

JEL : Q32, O43, O10, F10

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1 Introduction

From Sachs and Warner (1995) we have extensive literature studying the relationship between natural resources and growth. It explores the following standard question : how is it possible to explain that oil is a curse in Nigeria and a blessing in Norway ? What are the channels to explain this stylized fact ? Table 1 (in appendix) distinctly shows that countries with a high natural resource rent (columns 1 to 3) do not consistently have a weak Human Development Indicator (HDI) but high natural resources dependence (columns 4 and 5) is highly correlated with a weak HDI.

Sachs and Warner (1995) offer one of the first explanations of this stylized fact. They found that dependence on natural resources has a direct impact on growth. According to them, this effect is more important than the indirect effect via the institutions and openness. Sala-i Martin and Subramanian (2003), Isham et al. (2005) and Boschini et al. (2007) conclude that the indirect effect via the institutions has a greater impact. They take into account the endogeneity problem for the institutions with some standard instrumental variables. [1] It introduces the institutions' importance for abundant economies of natural resources which is discussed in recent studies (e.g. Knack and Keefer (1995), Hall and Jones (1999), Acemoglu et al. (2002)) which show that institutional quality is a fundamental cause for economic growth and plays a key role in explaining cross-country differences in economic growth. Indeed, institutions affect economic incentives, notably thus to invest in physical and human capital. Moreover Easterly and Levine (2003), Rodrik et al. (2004) estimated the contribution of trade, geography and institutions on income levels. This "race" to determine the prevailing factor revealed that the institutions are one of the major factors determining a country's income level.

The two following graphs represent the institutional level difference between two groups illustrating the institutions' importance for the abundant economies of natural resources. [2] The institutional measure Polity IV (which varies from -10 to +10) leaves a gap between 7 and 12 points between these groups (graph 1). The same conclusions are drawn with the ICRG measure (ranging from 0 to 100) where the gap between these two groups varies between 10 and 35 (graph 2).

1. They take *"Settler Mortality"* according to Acemoglu et al. (2001a) and the fraction of the population speaking English and European languages according to Hall and Jones (1999)

2. Data are from R.Feenstra and my with own calculation from 1962 to 2000. The first group has a natural resources dependence (percentage of total exports from primary commodity exports) of below 40% each year and also a mean dependency along the period below 40%. The second group has a dependency over 90% each year and a mean dependency along the period over 90%. The third group brings together all countries.

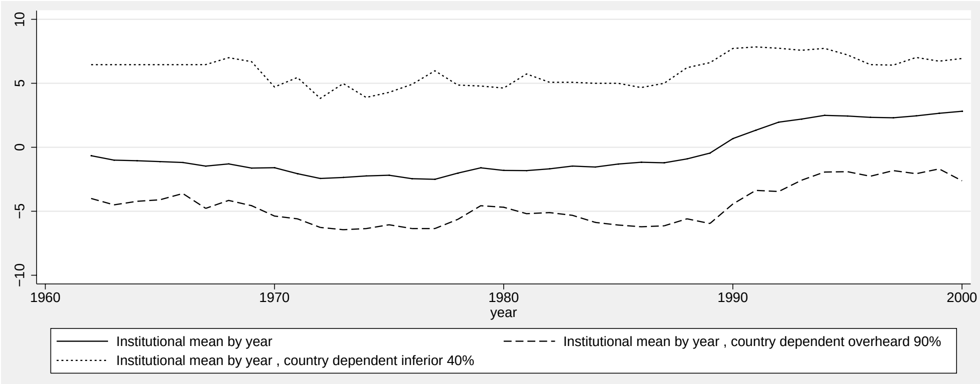

FIGURE 1 – Deviation of the institutional level measured by PolityIV according to the natural resources dependency

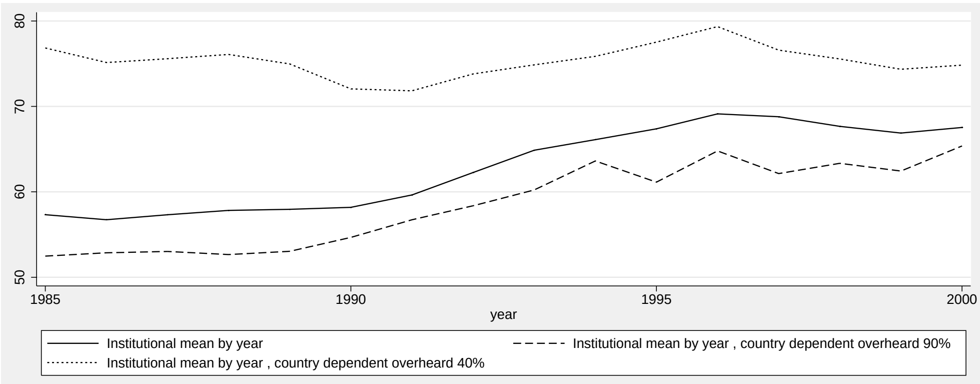

FIGURE 2 – Deviation of the institutional level measured by ICRG according to the natural resources dependency

These stylized facts are confirmed by political sciences which distinguishes three mechanisms to explain the impact of natural resources (more precisely, oil dependence) on the institutions : *"Rentier Effects", "Delayed Modernization" and "Entrenched Inequality"* (Ross (2001b) and Isham et al. (2005)). The first channel is certainly the most famous. The opportunity for a country's government to be entitled to financial windfall can have various significant consequences, which depend on the government's balance of power between (related to the elite) and the rest of society. Indeed, the State does not need to levy heavy taxes in order to develop modern systems, and can avoid over-taxing the population. With weaker institutions, as the population is less taxed, de facto, it will be less prone to protest, to organize and to develop a civilian society able to overthrow the present power (Beblawi and Luciani (1987)). In addition, the government could limit any ambition to challenge its power. The expected financial windfall makes it possible to distribute some allocation of it to keep the population satisfied (the Roman principle of “Panem and circemses"), in order to corrupt political opposition. It also enables the establishment to have a strong army which could use repression and violence if needed. [3]

The second channel is *“Delayed Modernization"*. Modernization also depends on education, urbanization, the specialization in production as well as greater (economic, political, cultural ...) openness which derives from the balance of power of different social groups within the society (Elite vs Rest of the society, Rural vs Urban ...) as well as on the country’s history (such as the colonial origins, the settler’s mortality (Acemoglu et al. (2001a)), the legal origin...). It appears that any modernization process triggers inevitable changes in the country. Consequently, a government that heads a country with abundant natural resources will have a tendency to keep this privilege which will enable it to have access to a financial windfall and delay the modernization process thus weakening its power and its capacity to capture the rent. For example, large enrolment rates or education expenditures are not found in a country with abundant natural resources (Gylfason (2001)). [4]

The third channel has mainly been identified by Engerman and Sokoloff (1997). *“Entrenched Inequality"* which draws a parallel between the growth trajectories of North and South American countries. They explain the development divergence through an interaction between the timing and the nature of decolonization, the natural resource endowment and agricultural capacity. This interaction results in institutions that have an impact on long term growth. Some types of natural resource appear to favor economic development and long-term growth through social hierarchy and have a significant influence on the institutional quality .

This paper focuses on the forming of institutions and changes but more precisely, on the preferences of different groups which have the power to build the institutions. We borrow the meaningful definition given by North (1994) which defines institutions as *“...the humanly devised constraints that structure human interaction. They are made up of formal constraints, informal constraints and their enforcement characteristics. Together they define the incentive structure of societies and especially economies."*. We take into account their endogeneity through a model of balance of power. Aghion et al. (2004), Acemoglu (2006), Acemoglu and Robinson (2007), have developed endogenous institutional models based on two powerful groups (Elite and Citizens). The balance of power between these groups explains the institutional level. Incentives for different groups play a key role for the institutional change. Mehlum et al.

3. Collier and Hoeffler (2005) already highlighted that the natural resources dependance emphasized the civil war probability.

4. Moreover, extractive activities do not require very intensive workers and the little requirements often come from or form foreign countries. In fact, the country does not necessarily need a very developed educational system in order to carry on the exploitation of its natural resources.

(2006) consider this assumption to build their model and take natural resources as a financial incentive which has an impact on the balance of power inside a country and therefore influences institutional quality. These authors highlight additional evidence : the resource curse could appear only in the countries with grabber institutions. [5] That means that natural resources' effect on growth depends on the quality of each institution (grabber friendly or producer friendly). This conclusion contrasts with the findings of Tornell and Lane (1999) and Torvik (2002) which showed a negative relationship between dependence on natural resources and growth, without institutional condition.

Our analysis extends the literature in several dimensions and provides an answer to the standard question : why is oil a curse in Nigeria and a blessing in Norway ? Our main contribution is to explain the relationship between institutions and rent on natural resources. A good understanding of this relationship can allow for a comprehensive enhancement of the natural resources' effect on growth. In order to identify the theoretical effect resulting from a relationship between natural resources and institutional evolution, we derive a new model from Mehlum et al. (2006). Our model is built on the balance of power between two groups, both belonging to the elite, which have no identical preferences over institutions. The group's constitution rides on the incentive, the payoff belongs or not to this group and each group payoff depends upon the natural resources rents. These rents account for the leading incentive of this model.

First, our main prediction from this model is that each country has a structural institutional capacity to bear some rent on natural resources. National institutions determine a threshold on the amount of natural resources and beyond this point, the positive impact of resources on institutions becomes negative. Moreover, after a natural resource shocks prices, each country has a variant feedback according to its institutional quality which could deteriorate or improve the institutional quality. Lastly, all these results depend on the abundance of type resource in each country.

Second, we confirm this prediction by an empirical study. We found a non linear effect of natural resources on institutions. In most cases, this effect stands for an inverse U-Shape. This result rests on a new World Bank natural resources panel data set. We also control a variety of variables used in the literature. To confirm our empirical results, following Koenker and Hallock (2001), we also use simultaneous quantile regression and confirm the presence of an inverse U-Shape, thanks to Lind and Mehlum (2007)'s test. We also use two other estimating procedures to check for our prediction : a Hausman-Taylor regression and the methodology of *Fixed Effects Vector Decomposition* (Plümper and Troeger (2007)).

5. Grabber institutions are the same as extractive institutions favoring the rent seeking activity (Acemoglu et al. (2001b)).

The remainder of the paper is organized as follows. Section 2 develops the model. Section 3 discusses the estimation method and the data used. Section 4 presents the empirical results and section 5 concludes our study.

2 The Baseline Model

2.1 Assumptions

We consider a homogeneous population of entrepreneurs (denoted N), as the elite which has the power to build institutions. Inside this population, there are two interest groups, the grabbers and the producers. Both of them have the power to change the institutional quality standard according to a balance of power between them (Aghion et al. (2004), Acemoglu (2006), Acemoglu and Robinson (2007)).

We have n_g as the grabbers' number and n_f as the producers' number with $N = n_g + n_f$ and α being the fraction of producers : $\alpha = \frac{n_f}{N}$. In contrast with Tornell and Lane (1999), we consider the number of grabbers and producers as endogenous.

The grabbers target rent from the natural resources. They use their entire effort on the rent-seeking activity. Our notation for natural resources is more precise and allows us to more accurately observe a shock price impact on the balance of power according to the type of resource and the quantity of the resource being traded. The rent from a natural resource i is worked out according to the difference between the price (p_i) and the cost (c_i) times the quantity (q_i). Natural resources' rent is the sum of all the natural products (from i=1 to i=V) extracted and exported by the country. Each natural resource is weighted by its appropriability's level (0 < γ_i < 1) (Boschini et al. (2007)).[6] This makes it possible to assign a higher weight to the natural resources that are highly appropriable (γ_i close to 0) as compared to those which are less appropriable (γ_i close to 1). For each grabber, the payoff is π_g :

$$\pi_g = \frac{s}{N} \sum_{i=1}^{V} \frac{1}{\gamma_i} q_i (p_i - c_i) \tag{1}$$

The grabber's payoff is a decreasing function of elite's size (N). Indeed, the more the power is concentrated in the hands of a minority, the higher is the potential rent for each agent belonging to

6. Boschini et al. (2007) uphold the concept of appropriability for a natural resource. A resource is highly appropriable if it has a highly intrinsic value and is easily transportable and storable. Precious stones for example, are highly appropriable whereas oil and gas are not if we just take into account non renewable resources. According to them, the more appropriable a resource is, the higher is the probability that the resource leads to rent-seeking, corruption or conflict. Isham et al. (2005) and Sala-i Martin and Subramanian (2003) also introduce a difference between the type of resource and their impact.

this elite. Moreover, the grabber's payoff function increases with the parameter s. It is a very important parameter often used in the conflict literature or rent-seeking literature (Mehlum et al. (2006)) and that calls for a modified function of Tullock (1975) :

$$s = \frac{1}{1 - \alpha + \alpha\lambda} \tag{2}$$

This expression of s, which comes from the effort from producers and grabbers, introduces the institutions (0< λ <1) where institutional quality is high when λ is close to 1, and low when λ is close to 0 (see the appendix for more explanation). s decreases in the institution's level and increases in α. It means that the lower the institutional quality is, the higher the grabber's payoff would be, ceteris paribus. Hence grabbers want institutions that allow for rent seeking, like "extractive" institutions (Acemoglu et al. (2001b)) : they are in support of an institution's deterioration . Moreover the grabber's payoff is increasing in n_f and decreasing, by definition, in n_g. The larger the grabbers numbers is, the lesser each of them gets paid.

The producer group is institutionally friendly. As for the production, as Mehlum et al. (2006), we follow Murphy et al. (1989) with L workers (the equilibrium wage is set to unity) and M different goods. The payoff of each producer (π_f , f for friendship) is the sum of the profit from production (π) and a share of the natural resource rent :

$$\pi_f = \pi + \lambda\pi_g \tag{3}$$

This share of the natural resource rent depends on the producer's effort in the rent-seeking activity. This effort is lower than the grabber's effort and depends on the institutional level. The better the institutional quality is, the more efficient is the effort to capture a part of rent.

We use a very simple form for the profit from production :

$$\pi = y(1 - \frac{1}{\beta}) - F\ , \tag{4}$$

where y is the quantity with a price equal to one, β the productivity. F is the fixed cost.

In Mehlum et al. (2006), the fixed cost doesn't depend on the institutional quality. But since Anderson and Marcouiller (2002) a large literature has demonstrated the institutional quality does matter in trade. Berkowitz et al. (2006) argue that a high institutional level allows a country to produce and export more complex goods. In the same way, in Do and Levchenko (2007) the fixed cost could highlight the quality of the institutions such as their degree of corruption, their investment climate or their judicial system's inefficiency. In our framework we introduce a decreasing fixed cost with the institutional level ($\frac{\delta F}{\delta\lambda} < 0$).

Combining equations (1) and (3), we obtain :

$$\pi_f = y(1 - \frac{1}{\beta}) - F + \lambda \frac{s}{N} \sum_{i=1}^{V} \frac{1}{\gamma_i} q_i (p_i - c_i) \tag{5}$$

This function increases with institutional quality, confirming that a producer is institutionally friendly. We then show the total income Y in order to determine the impact of the share of producer on the profit function. The total income is the sum of the total of natural resources sales and the production of the M differentiates goods with the same quantities y :

$$Y = \sum_{i=1}^{V} \frac{1}{\gamma_i} q_i (p_i - c_i) + My \tag{6}$$

At the equilibrium all is spent, hence, the total income is also the sum of wage income(L) and the sum of profits. Taking into account equations (1) to (3) and the equation (6) may be combined as follows :

$$Y = L + N(\alpha \pi_f + \pi_g (1 - \alpha)) = L + N\alpha\pi + \sum_{i=1}^{V} \frac{1}{\gamma_i} q_i (p_i - c_i) \tag{7}$$

After having found the expression of y, we can express π : [7]

$$\pi = \frac{\beta(L - FM) - L}{\beta(M - n_f) + n_f} \tag{8}$$

It appears that π increases with n_f and consequently π_f is also increasing in n_f. The model is solved according to a 3-stage game :

- At the initial period ($t = 0$), we have an initial institutional level (λ_0). The initial institutional level comes from a balance of power in previous periods if there are any between producers and grabbers. In our case, we avoid a previous institutional forming and we consider λ_0 as given. We also have a natural resource rent ($\sum_{i=1}^{V} \frac{1}{\gamma_i} q_{i,0}(p_{i,0} - c_{i,0})$) which defines, with the initial institutional level, the payoffs of producers and grabbers ($\pi_{f,0}$ and $\pi_{g,0}$).
- At $t = 1$, each agent observes the two payoffs and chooses to be producer or grabber. An equilibrium is found with or without grabbers inside the economy. This defines two different cases ($\alpha_1 = 1$ or $\alpha_1 < 1$). At this period, the institutional level is always the same as at $t = 0$ (λ_0 = λ_1).
- At $t = 2$, the interaction, the balance of power between producers and grabbers, if they exist, yields an institutional level (λ_2). [8]

7. See the appendix for more explanation

8. Our model does not take into account the direct relationship between α_1 and λ_2. This third stage leans upon seminal work on the building of endogenous institutions (Aghion et al. (2004), Acemoglu (2006), Acemoglu and Robinson (2007)). These one are building on a balance of power between groups. According to the power of each group appears a sure type of institution.

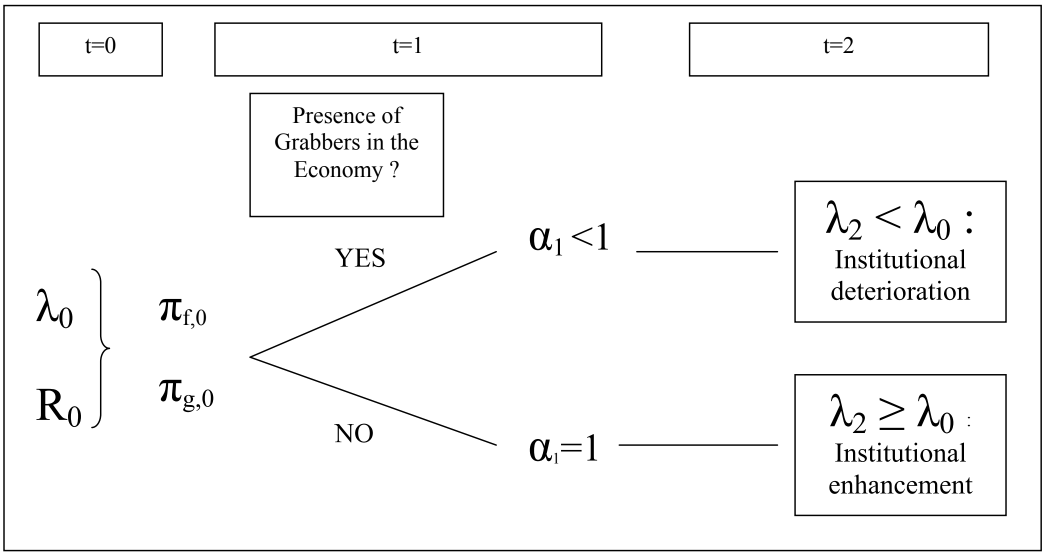

FIGURE 3 – 3-Stage Game

Both payoff π_f and π_g are increasing in the share of producers. Figure 4 shows the different possibilities of equilibrium according to producer's and grabber's payoffs. The dashed line represents the grabber's profit. We can distinguish two different cases :

<u>The first case :</u> $\pi_{f,0} > \pi_{g,0}$

The producer's profit is above the grabber's profit ($\pi_{f,0} > \pi_{g,0}$). In this case, all agents make the choice to be producer, $\alpha_1 = 1$, whatever α_0.[9] In the second step of the game, we always have $\pi_{f,1} > \pi_{g,1}$. For a given institutional quality, rents are not high enough to create incentives to become a grabber. In the same way, the institutional level is above the following threshold for a given natural resource rent :

$$\lambda_0 > \frac{(\alpha_0 - 1)N\pi_o + \sum_{i=1}^{V} \frac{1}{\gamma_i} q_{i,0}(p_{i,0} - c_{i,0})}{\sum_{i=1}^{V} \frac{1}{\gamma_i} q_{i,0}(p_{i,0} - c_{i,0}) + \alpha_0 N\pi_0} \tag{9}$$

Here, the institutional level is high enough to bear this natural resources rent. With these institutional and natural resources rent levels, nobody has an incentive to become a grabber.[10]

The extreme specification in this case is point A (fig. 4) where $\pi_{f,0} = \pi_{g,0}$. Hence, the institutional level is high enough to support the natural resources rent but now :

$$\lambda_0^A = \frac{(\alpha_0 - 1)N\pi_o + \sum_{i=1}^{V} \frac{1}{\gamma_i} q_{i,0}(p_{i,0} - c_{i,0})}{\sum_{i=1}^{V} \frac{1}{\gamma_i} q_{i,0}(p_{i,0} - c_{i,0}) + \alpha_0 N\pi_0} \tag{10}$$

9. α_0 is the fraction of producers at the game's beginning.

10. If $\alpha_0 = 1$ also $\lambda_0 > \frac{\sum_{i=1}^{V} \frac{1}{\gamma_i} q_{i,0}(p_{i,0} - c_{i,0})}{\sum_{i=1}^{V} \frac{1}{\gamma_i} q_{i,0}(p_{i,0} - c_{i,0}) + N\pi_0}$

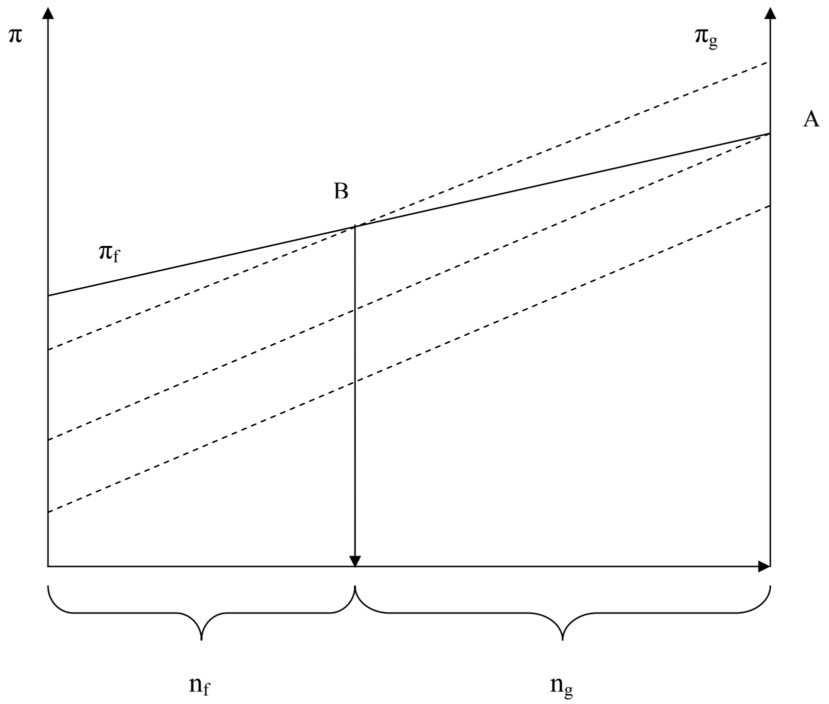

FIGURE 4 – Payoffs and grabbers appearance

At this point A (with $\alpha_0 = 1$), there are no incentives to becoming grabber, all agents make the choice to stay producers but it is the turning point from where some grabbers could appear. [11] This turning point is defined by the initial institutional level and more precisely by the institutional capacity to bear some natural resources rent.

The second case : $\pi_{f,0} < \pi_{g,0}$

Here, the grabbers's profit is above the producer's profit ($\pi_{f,0} < \pi_{g,0}$) , there is an incentive to become grabber. At t=0, the producer's number is above the following threshold and doesn't allow them to equalize the profits :

$$\alpha_0 > \frac{(\lambda_0 - 1)\sum_{i=1}^{V}\frac{1}{\gamma_i}q_{i,0}(p_{i,0} - c_{i,0}) + N\pi_0}{(1-\lambda_0)N\pi_0} \tag{11}$$

This incentive implies $\alpha_1 < \alpha_0 < 1$ as this defines the point B which is a single equilibrium where $\pi_{f,1} = \pi_{g,1}$ for a given rent's level and institutional quality. The grabbers' number allows for the

11. If $\alpha_0 = 1$ also $\lambda_0^A = \frac{\sum_{i=1}^{V}\frac{1}{\gamma_i}q_{i,0}(p_{i,0}-c_{i,0})}{\sum_{i=1}^{V}\frac{1}{\gamma_i}q_{i,0}(p_{i,0}-c_{i,0})+N\pi_0}$

adjustment between payoffs : [12]

$$\alpha_1 = \frac{(\lambda_0 - 1)\sum_{i=1}^{V}\frac{1}{\gamma_i}q_{i,0}(p_{i,0} - c_{i,0}) + N\pi_0}{(1-\lambda_0)N\pi_0} < \alpha_0 \tag{12}$$

The grabber's group is powerful and damages the institutional quality to obtain more rents from natural resources. The new power redistribution inside the country leads to a new institutional level where ($\lambda_0 > \lambda_2$). The institutional deterioration is intensified by the fixed cost at the production level increasing ($F_2 > F_0$).

At $t = 1$, the equilibrium is achieved thanks to the equality of the profits. But, this one arises from a social interaction. We refer to the definition of the social interaction by Brock and Durlauf (2001) : *"By social interactions, we refer to the idea that the utility or payoff an individual receives from a given action depends directly on the choice of others..."*. In this model, it appears clearly that the payoff of any individual depends on the choice of others in the sense that π_f and π_g increase with α.

Figure 4 proves that the equilibrium is unique and stable. If we are on the right side of the point B, $\pi_g > \pi_f$. There is a difference between both payoffs that create an incentive for some producers to switch to the grabber status. This incentive leads to a shift which implies a decreasing grabber's profit and an increasing producer's profit. This play leads again to the equality between π_g and π_f. The explanation is the same if we are on the left of point B. Moreover, at point B, there is no incentive to shift to another activity because the profit's variation is negative.

2.2 A price shock

What happens if we have a positive exogenous price shock on one natural resource ? [13] Results will be different according to the presence of grabbers inside the society when shock occurs.

The first case : No grabbers before the shock

Here we assume that $\alpha_0 = 1$. The natural resource rent is growing with p_i. Despite that π_g grows faster than π_f [14] and that the gap between π_g and π_f decreases, $\pi_f > \pi_g$ could hold. There are no incentive to become a grabber and the balance of power inside the country does not change. Therefore, this positive price shock has no negative impact on institutions, rather the impact could be positive. Indeed, this sudden increase in natural resource rent can imply a significant windfall, which could be used to

12. Like by assumption α_1<1, it occurs $\lambda_0 < \frac{\sum_{i=1}^{V}\frac{1}{\gamma_i}q_i(p_i-c_i)}{\sum_{i=1}^{V}\frac{1}{\gamma_i}q_i(p_i-c_i)+N\pi}$

13. The exogenous shock could be an increasing price or quantity of a natural resource or a decreasing cost of research.

14. Actually, $\frac{\delta\pi_f}{\delta p_i} > \frac{\delta\pi_g}{\delta p_i}$, only if $\lambda > 1$ or $0<\lambda<1$.

enhance the quality of institutions, since fixed cost decreases with institutional quality. Consequently, if another positive shock is anticipated which could involve an incentive for somebody to become a grabber, producers had better to promote institutions, reduce the fixed cost and then increase their payoff. This conclusion is useful until turning point A, where $\pi_g = \pi_f$.

Another effect could be observed even if at the beginning ($\alpha_0 = 1$). Indeed, if the price shock is intense, the grabber profit could be above the producer's profit ($\pi_g > \pi_f$). Some grabbers appear inside the economy because the institutional level (λ_0) is not high enough to bear this new windfall. The rent is also beyond the threshold defined by the institutional level (λ_0). It appears even if the initial institutional level is high enough at $t = 0$ that a big price shock could create an incentive to become grabber, involving an institutional deterioration.

<u>The second case :</u> In the presence of grabbers before the shock

Now, we assume that some grabbers settle in society ($\alpha_0 < 1$) . Considering equation (12), it appears that an increasing rent decreases α_1 leading to a new balance of power and so damaging the institutions :

$$\frac{\delta\alpha_1}{\delta p_i} = \frac{\frac{q_i}{\gamma_i}(\lambda_0 - 1)}{(1 - \lambda_0)N\pi} < 0 \tag{13}$$

Equation (13) explains the impact of a price increase when there are some grabbers in the economy. For the same variation of the resource's price i, the quantitative impact is different according to the appropriability level, the quantities of the product i and the initial institutional level. Note that the sign is always negative which leads to three conclusions.

Firstly, the more appropriable the resource i is (i.e γ_i is low) the more important its impact on α_1 becomes. The resource's appropriability is an important factor to determine the effect of an increasing commodity price on the balance of power inside society and therefore on the institutional level. The fact that the natural resource is very appropriable entails more rent opportunity because the resource has a highly intrinsic value and is easily transportable and storable.

Secondly, the larger the quantity (q_i) of the product i is, the larger the quantitative impact will be. This means that a country which produces a lot of natural resource i is more sensitive to a price variation than a country with a low production of the natural resource i .

The last conclusion concerns the initial institutional level. At the beginning, the worse the institutions are, the more an increasing price shock involves a bigger increase in the grabbers' number. It is logical in the sense that, poor institutions allow for a larger grabber's profit. The decreasing fixed cost with institutional quality reinforces this effect because the production profit (π) decreases with the fixed cost.

To put it in a nutshell, an increase in price could have some positive or negative effect depending on the initial institutional level (λ_0)(Figure 5). Indeed, each country (here country i, j, k) with its own initial institutional level has the capacity to bear a specific natural resources rent. This initial institutional level determines a natural resources threshold $\overline{R}_0$, which is different for each country . $\overline{R}_0$ is as well an indicator rent level or natural resource dependence.

If $R_0 < \overline{R}_0$, we could have an increase in the institutional quality. Because the incentive is not sufficient for a producer to switch to become a grabber, there is no institutional degradation ($\alpha = 1$). The rent is an income for the country which could allow for the improvement of public expenditures, for example, infrastructures, education or the institutions. Producers benefits from this improvement notably because the fixed cost decreases with the higher institutional level.

If $R_0 > \overline{R}_0$, the incentives to pursue rent-seeking is too strong and the institutional level too weak to bear this rent. As a result, more grabbers appear whose, by definition, interest is to degrade the institutions.

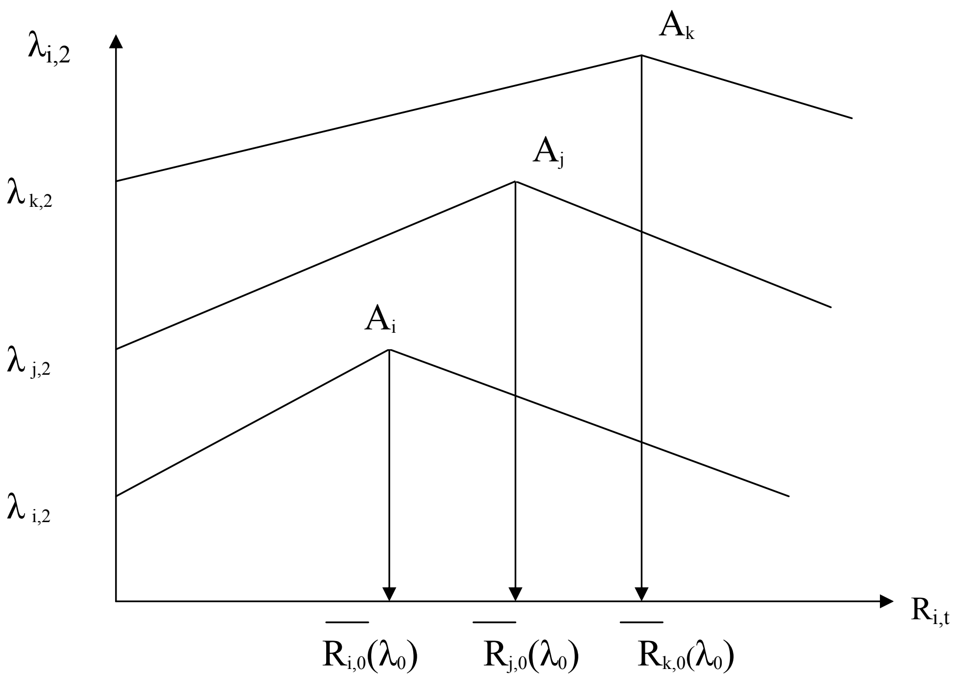

FIGURE 5 – Different turning point according the initial institutional level

2.3 Natural resource dependance

The conclusion could be extended for the natural resource dependence. Indeed, we show that the natural resource rent has a non-linear effect on institutions according to the initial institutional level quality. But much of the previous research did not take rents, but rather natural resources dependence as a natural resources variable. Hence, we introduce this measurement in the model.
We define : $X_a = \frac{\sum_{i=1}^{V} \frac{1}{\gamma_i} q_i(p_i - c_i)}{Y}$ and $X_b = \frac{\sum_{i=1}^{V} \frac{1}{\gamma_i} q_i(p_i - c_i)}{n_f \pi}$ .The new variable X_a represents the resource dependence on the GDP (Y). X_b could be seen as a production specialization measurement. This indicator compares the natural resources production and the manufacturing production inside a country. If α_0 = 1 the equation (9) becomes :

$$\lambda_a > \frac{X_a}{X_a + N\pi/Y} \tag{14}$$

$$\lambda_b > \frac{X_b}{1 + X_b} \tag{15}$$

Here, an increase in dependence has a positive effect on the institutional level($\frac{\delta\lambda_a}{\delta X_a} > 0$ and $\frac{\delta\lambda_b}{\delta X_b} > 0$) .

At the point B, with α_0 < 1, X_a, X_b and equation (12), we have :

$$\alpha_{a,1} = \frac{(\lambda_a - 1)X_a + N\pi/Y}{(1 - \lambda_a)N\pi/Y} \tag{16}$$

$$\alpha_{b,1} = \frac{(\lambda_b - 1)X_b + N/n_f}{N/n_f(1 - \lambda_b)} \tag{17}$$

But, in this case, an increased dependence leads to an increase in the number of grabbers and to an institutional deterioration($\frac{\delta\alpha_{a,1}}{\delta X_a} < 0$ and $\frac{\delta\alpha_{b,1}}{\delta X_b} < 0$).
There also exists a threshold, a turning point for the natural dependence which is determined by institutional level inside the country. On the other hand, we find theoretical evidence contrasting with the literature concerning the impact of the natural resource's dependence. Our conclusion is a non-linear effect. Under the threshold defined by the institutional level, the dependence's impact is positive on the institutions. But above this threshold, the impact is negative. In this case the institutions do not bear this dependence level and the producer switches to grabber status.

3 Estimation Method and Data

3.1 Regression Specification

In this section, we intend to empirically test some of our theoretical conclusions by using panel studies with the following equation :

$$\lambda_t = \beta_0 + \beta_1 RN_{t-n} + \beta_2 RN^2_{t-n} + \sum_{i=1} \beta_i X_{ti} + \xi_{ti} \tag{18}$$

where λ_t is an institutional measure at time t. RN_{t-n} is the variable which represents natural resources, with a lag n. It could either be the percentage of national income from primary commodity exports, the percentage of total exports from primary commodity exports, or the natural resources rents. In this paper, we restrict ourselves to the natural resources rents (cf infra). RN^2_{t-n} tries to capture the natural resources' non-linear effect on institutions. So we expect $\beta_1 > 0$ and $\beta_2 < 0$ to find an inverted U-Shape curve (Fig. 5).

X_i is a set of control variables used in the literature to explain the institutional level. We have 6 main variables. The first one is the Log of GDP per capita in 1990 or 1980 according to the institutional variable we use. The second one is the distance to the equator as in Rigobon and Rodrik (2005). [15] The third one is the economic openness with a lag of 5 years. [16] We also use the secondary school enrollment in 1965 and the fraction of the population who speaks an European language or English (Hall and Jones (1999)).

3.2 Data

3.2.1 Natural Resources Data

Two main points of criticisms could be raised on the natural resources measure used in academic research. First, many studies just measure a year as regards the natural resources dependency [17] and don't differentiate it according to the natural resources type [18]. It could have some bias with a single measurement for one year. In fact the measurement rides on natural resource prices and the quantities produced and are measured for only one year. If, for example, the natural resource prices increase, the

15. The calculation for distance to equator is : $abs(Latitude)/90$.
16. Results are not sensitive to the lag's modification.
17. Sachs and Warner (1995), Bulte et al. (2004), take a dependence for 1970, Boschini a dependence for 1971 and Isham et al. (2005) a dependence for 1980 for example
18. Isham et al. (2005), Sala-i Martin and Subramanian (2003) and Boschini et al. (2007) are the first to introduce a difference between the natural resources type. They conclude, according to the natural resource type that the impacts on their interests variables are not the same.

ratio of natural dependency grows artificially. In the same way, there could be a problem for the natural resources extraction (Climatic matters, political matters...) and, by definition, dependence would be under-evaluated. Secondly, many authors use World Bank measurement (SXP) which reflects the GDP dependence, which allows us to understand the natural resources economic importance for a country. But it does not include precious stones which could have a great influence, in the sense that these natural resources are very appropriable (e.g. diamond) (Fearon (2005)). Moreover, this ratio does not give any information about the country's specialization.

An additional criticism of this natural resources measurement is that, in our case, this one must be the most exogenous towards outdoor institutions. The ratio of primary commodity exports to total exports and the ratio of primary commodity exports to national income could be influenced by the institutional level. Indeed, GDP as well as total exports are related to economic development, economic policies and institutions (Brunnschweiler (2008), Brunnschweiler and Bulte (2008)). Consequently we face of a potential problem of endogeneity.
To avoid this problem we use an alternative measure of natural resources rents calculated by the World Bank. [19] First, this measure allows to use a panel study. Data are available from 1970 to 2004 for 15 different commodities. [20] Secondly, rents are derived by making the difference between world prices and the average unit extraction or harvest costs (including a 'normal' return on capital). The cost is calculated by region. [21]. For some resources (e.g., Oil, Gas...) there are different world prices. The unique price is calculated as the weighted average of all available prices.
Natural resource rents allow an exogenous measurement from the national institutional level. Indeed, we could assume that national institutions have no effect on world prices. In other words, countries are price takers. It is true that in a few markets, national institutions could have some power and could influence the world price. It is the case with the oil's market with the Organization of the Petroleum Exporting Countries (OPEC). But in the long term, we argue that price depends only on the market's power. In the same way, the amount sold could be influenced by institutional levels if the extraction or harvest is done by a national firm. We make the assumption that even these firms make their product choice according to world prices. We could then consider natural resources rents more exogenous like other natural resources measurements. [22]

19. See website for more explanation :`http://web.worldbank.org`
20. Gas, oil, hard coal, brown coal, bauxite, copper, gold, iron, lead, nickel, phosphate, silver, tin, zinc and forest
21. Rent = (National Production Volume) (International Market Price - Average Unit Production Cost)
22. For another reason, we do not take an indicator which reflects natural resources abundance (The World Bank 1994, 2000). Indeed, data are available only for two years. Yet our empirical procedure consists in a panel study and we have not enough

We also build three new indicators from natural resources rents according to the appropriability level. For this classification, we follow the standard classification on these topics used in the literature according SITC classification. We aggregate rents from gas, oil, hard coal, brown coal on a single variable (named rents 3) ; bauxite, copper, gold, iron, lead, nickel, phosphate, silver, tin, zinc in an another variable (named rents 6). A third variable is created with forest. We separate this one because it is the only natural resource which is renewable.

3.2.2 Institutional Data

A new far-reaching literature uses institutional data. We use different indicators to empirically test our theory through a panel data analysis.

PolityIV provides a measure from 1960 to 2004. We take Polity2 as a measure for institutions from PolityIV. This one is computed by substracting an autocracy score from a democracy score and measures a balance of the "Competitiveness of executive recruitment", the "Openness of executive recruitment", the " Constraint on chief executive", the "Competitiveness of political participation" and the "Regulation of participation". This measure is clearly a political score.

The PRS Group has been producing the International Country Risk Guide (ICRG) since 1984. This provides a synthetic indicator that could be distinguished between political, economic and financial risks. These measurements range from 0 (Low Institutions) to 100 (Good Institutions).

To complete institutional data with a large time series, we take a measure for corruption (cri). It comes from *Risk International* and ranges from 0 (High Corruption) to 8 (Low Corruption).

Kaufman's data provides interesting details with indicators which are more precise than ICRG or PolityIV. We use 6 variables : "Voice and Accountability" (VA) which measures political, civil and Human rights ; "Political Stability" (PS) which gives the probability to reverse a government ; "Government Effectiveness" (GE) is a quality government measurement ; "Regulatory Quality" (RQ) takes into account politics against the economy market ; "Rule of Law" (RL) and "Control of corruption" (CC). They range from -2.5 (Bad Institutions) to 2.5 (Good Institutions) and are available from 1996 to 2004. [23] These data are very helpful because it provides different measures according to various institutional characteristics and allows for the observation of whether natural resource's impacts are the same through the institutional measure. Heritage's data concerns economic freedom. Composite indicator and its components are available. They capture trade freedom, business freedom, property rights and corruption. The temporal availability is larger than that of Kaufman's data and considers the years from 1995 to 2007. Each

variation in this data.

23. Data are missing for 1997, 1999, 2001.

component ranges from 0 (Bad Economic Freedom) to 100 (Good Economic Freedom). To complete the institutional dataset, we introduce two measures from Heritage, the first is a composite variable (heri) and the second is a variable which measures the property rights (pr). Each variable is ranked from 0 (Weak Institutions) to 100 (Good Institutions) and is available from 1995 to 2007.

To check the robustness of our empirical work, we used some other variables which could influence the institutions. We have provided a list of these variables in the appendix.

4 Results and Estimation Procedures

In this section we test equation 18. Each section uses different estimation procedures to provide empirical proof of the theoretical conclusion.

4.1 Results with Random-effects

For tables 3 to 5, we use a panel with random-effects. For some specifications, Hausman test indicates that the model with fixed effect is the best. But for four main reasons we consider a model with random-effects. First, the descriptive statistics for the main variables indicate clearly that standard deviation "between" is bigger than "within". Second, that most of the specifications have a weak time dimension. Third, classical institutional determinants are mostly invariant. Fourth, for each specification, we make a Breusch Pagan Lagrange-multiplier test. In all our cases, random-effects are significant. These four reasons give a motivation to use GLS random-effect models.

Table 3 shows for the baseline results. We have 8 different institutional measure which are endogenously determined by natural resources rents and control variables.

Table 3 here.

All equations give the expected results, $\beta_1 > 0$ and $\beta_2 < 0$. These results seem to be robust whatever the institutional measure. This provides a support for the theoretical result. For low rent levels, the effect on the institutional level is positive and after the turning point, the effect is negative, producing the predicted inverted U-shape curve.
We calculate the turning point for each equation. It appears to be different according to the institutional nature which is measured. Voice and Accountability (equation 1) breaks up with a great amount of rents (Turning point at 26.2 Millions dollars) as Rule of Law (Turning point at 8.9 Millions dollars). With Kaufman's data, Government Effectiveness and Control of Corruption show the same turning point. The

natural resources impact has a different intensity according to the institutional nature measured.

The literature considers that if the quadratic terms are significant (positive or negative) we have a non linear effect (U-shaped or inverted U-shape curve respectively). Lind and Mehlum (2007) supply a new theory which allows us to confirm the non-linearity. Indeed they find that a significant quadratic term is too weak criteria. According to them, we must estimate if the turning point is in the data-range and test slopes on the interval's beginning and ending. In our case (for an inverse U-shape), we must find for the lower bound, a positive slope and for the upper bound, a negative slope. They adopt a test which has been developed by Sasabuchi (1980). The Sasabuchi Test indicates whether we have an inverted U-Shape curve or not.

Table 4 here.

Table 4 summarizes all the results with this methodology for the first eight specifications. Specifications (1), (2), (4) and (8) are strongly significant and confirm natural resources non linear effect on institutions with an inverted U-Shape curve.
Results for specifications (3), (5), (6) and (7) suggest some different interpretations. Indeed the slope at the lower bound is less significant (but always positive), Sasabuchi Test is significant but only at 5% or 10%. For these specifications, the lower bound of the confidence interval with Fieller method is very quite or lower at the lower bound of Log rent's interval. The turning point could be outside the data range even though Sasabuchi test is significant. But, if the turning point is near the lower bound of the Log rent interval, the significance inverse hump shaped relationship is weak. Therefore, we could reconsider the natural resources positive effect on institution's quality. The inverted U-shape curve is not always identified, and for some special institutional measure, we could only have a negative effect.

4.2 Results for Different Turning Points

One of our main predictions is that the turning point should be different for different countries depending on institutional quality (see fig. 5).

Table 5 here.

Table 5 shows that this theoretical assumption is confirmed by data and even by using a panel with random-effects. We take 4 institutional measure to test this prediction, always with random-effects. We split the sample into two parts according to the institutional level at the initial period. We take the institutional level mean in 1996 for each measure. Specification (1) and (2) show that the turning point is different if we consider the full sample (26.2 Million dollars) or if we just take countries which have a lower initial institutional level than the mean (20.4 Millions dollars). It appears clearly that for countries with a low institutional level, natural resources degrade the institutional level more quickly. Specifications (3) to (8) confirm this hypothesis. The turning point for countries with an initial institutional level superior to the mean is higher than the turning point for the sample as a whole.

To provide additional proof we carry out a simultaneous quantile regression (Table 6). This methodology considers the error correlation between different quantiles. It enables comparison between coefficients in different quantiles (Koenker and Hallock (2001)).

Table 6 here.

In our case, it allows for an observation of the evolution and the intensity of the impact from β_1 to β_2. We split the sample into seven groups according to the Polity 2 measurement. It appears clearly that the turning point increases with quantiles. The higher the quantile is, the higher the turning point. This means that natural resources' positive impacts prevail less for a country with weak institutions than for a country with a high institutional level. Intensity for β_1 and β_2 between specifications (5) and (6) fail. We test if β_1 between equations (5) and (6) are significantly different. We cannot reject the hypothesis according to which β_1's in each equations are equal. It allows to minimize the turning point for specification (6) and where the turning point is lower for the last quantile than for the next to last quantile . We also observe that, for higher quantiles, the model's power of explanation is reduced. Indeed, countries with a high institutional level are less influenced by rents or by the *Distance to Equator*, which are significant for the first four quantiles. Table 6 confirms one of our predictions about the different turning points according to the institutional level.

4.3 Results with the *"Fixed Effects Vector Decomposition"* Method

We choose a model with random-effects to avoid the estimation problem with fixed effets and time-invariant variables. Plümper and Troeger (2007) provide a new methodology, *Fixed Effects Vector Decomposition"* (FEVD), which enables estimation of models with time-invariant variable with fixed effects and provide a new robustness check. The *FEVD* estimation procedure consists of a three-step estimation.

The first step consists in estimating the fixed effects with a panel regression without time-invariant variable. The second step provides the regression of the fixed effects on the time-invariant variable using OLS. The residual part of this regression is the unexplainable part of fixed effects by the time-invariant variable. The third and last step is an estimation of a pooled OLS that includes time-varying and time-invariant variables, and the unexplained part of fixed effects.

Table 7 here.

Table 7 contains *Fixed Effects Vector Decomposition*, which assumes problems with a random-effect model, yields $\beta_1 > 0$ and $\beta_2 < 0$. Even results with random-effects seem to be robust.

4.4 Results with the Hausman-Taylor Procedure

According to Plümper and Troeger (2007), the *FEVD* seems to perform better than a model with random-effects or the Hausman-Taylor procedure. Nevertheless, in our case, the Hausman-Taylor procedure is able to overcome the endogeneity problem which could appear in our main specification and the time-invariant variable with a fixed effects problem. Indeed a model with random-effects assumes that random individual effects are exogenous with others variables. Hausman and Taylor (1981) assume that some regressors could be correlated with individual random effects. Therefore, they use various dimensions of variation in the model to build instruments and estimate a 2SLS regression. In our specification, we consider that the GDP per capita and Economic Openness are the potential endogenous time-invariant variable and endogenous time-variant variable. Table 8 provides further proof about the robustness of our main specification.

Table 8 here.

The same conclusions hold with table 8. Hausman-Taylor procedure allows to overcome the endogeneity problem which could appear with the random individual effect and the time-invariant variable with fixed effets problem. Except for the specification (3) and (7) we regain $\beta_1 > 0$ and $\beta_2 < 0$ and confirm our results about the non linear natural resources effect on institutions.

4.5 Results According to the Appropriability's Level

Table 9, with random-effects, illustrates another theoretical prediction about the appropriability level. The effect on institutions is not the same according to the natural resources type.

Table 9 here.

Specification (1) is the baseline and gives a non linear effect on ICRG for a global rent (Model with random-effects is always used). Specifications (2) to (4) take into account the different natural resources types. The effects are different. Indeed, specification (2) indicates a U-Shape which is confirmed by Lind and Mehlum (2007)'s theory even though Fieller interval is near the lower bound of the dataset. With this closeness between the turning point and the Fieller interval, if the negative effect exists, we quickly have a positive effect. This particular case could be explained by the nature of the natural resource. In fact, the variable *Rents 4* includes only a measurement for forests. Although it is a renewable resource and all our predictions and the literature about this topic are about non-renewable natural resources.
For products ranked in class 3, we again find the inverted U-shape curve which is confirmed by Lind and Mehlum (2007)'s test. On the other hand, specification (4) indicates a U-Shape with a Turning Point at 98.5 Millions Dollars but the test does not find the presence of a U-Shape. We could suppose that there is just a negative effect without a Turning Point. Specifications (5) and (6) refine this assumption. If we split the sample between those that belong to the High Income OECD Countries and those that don't, we observe two distinct effects. For the richest countries, we again find an inverted U-Shape curve which is confirmed by the test. For poorer countries, we have a U-Shape. But the test indicates clearly that the turning point does not exist in the data. This one is outside the data range. *De facto*, with this test, we could have only a negative effect. According to the natural resource type, the effect on institutional level measured by ICRG could be different. If we do not have an inverted U-Shape curve, it appears that the effect is negative which is developed by the literature on this topics. We explain this permanent negative effect by a very weak institutional quality which is not able to bear natural resource rents.

4.6 Robustness Check

Table 10 provides a robustness check with ICRG used as the institutional measurement. Indeed, with ICRG we have a large panel and with these data we are clearly in the presence of an inverted U-Shape curve. Following the literature, we test some variables which explained the institutional level.

Table 10 here.

The first specification is the baseline using panel data with random-effects. We introduce ethnic fractionalization, malaria in 1994 and the part of population that lived on a temperate zone in 1995. The estimated coefficients of these three variables are not significant and natural resources effects don't vary.

Ethnic fractionalization is insignificant as Alesina et al. (2003), Hodler (2006) found once when they controlled for distance to equator.

We test the robustness of our results with civil war lagged for one year. It appears that civil war damages the institutional level but we still find that the natural resources have a non linear effect on institutional quality, but it is less significant. This point could be explained by the literature about the conflict, notably by Collier and Hoeffler (2004). They found that natural resource dependence increases probability of civil war because rents provide a financial opportunity for rebellion. Indeed, without natural resources dependence, the probability of civil war is near 0.5% and with a percentage of national income from primary commodity exports at 23%, the probability climbs to 26%. Fearon (2005) offers a new interpretation. He thinks that rebels could finance themselves with natural resources only marginally. The probability of civil war increases because there is an institutional degradation and the country chooses "extractive" institutions. [24] These authors found a negative relationship between natural resource and civil war which could explain our specification (4).

To check the robustness of our results, we control for the geographic localization by regions. We test for 8 diverse areas but we present just two specifications (6) and (7). [25] However, in all cases, the natural resources effect is robust. The last two robustness checks concern legal origin matter. Again, we test for 4 diverse legal origins and we find, for each one, that the natural resource's effect is robust. Specifications (8) and (9) show regressions with French and German legal Origin.

5 Conclusion

This paper examines the natural resource's effect on institutions. Our conclusion about a hump shaped or negative effects on institutions partially confirm the view provided by various authors such Ross (2001a), Leite and Weidmann (1999), Sala-i Martin and Subramanian (2003), Isham et al. (2005), Bulte et al. (2004) . But these authors do not contemplate a positive effect. Brunnschweiler (2008) finds that *"Natural resource abundance does not necessarily lead to worse institutions..."*. Moreover, why has Norway strong institutions whereas Nigeria has weak institutions ? Our results offer a response to this puzzle. Each country has a structural institutional capacity to bear some natural resource rent. National institutions determine a threshold in the amount of natural resources and beyond this point the resource's positive impact on institutions becomes negative.

24. Acemoglu et al. (2001b) consider "extractive" institutions as a main cause of bad economic performance.
25. Others are available upon request

Further interesting research could take into account this finding about the non linear effect to explain another discord within the literature on rent-seeking. Indeed there is a large debate on the natural resource's impact on growth. Since Sachs and Warner (1995), many authors found a negative relationship but some authors (Stijns (2003), Brunnschweiler (2008)) reject this negative relationship. Mehlum et al. (2006) provide a first response to this debate : natural resources could be a blessing for countries with good institutions or a curse if a country has bad institutions. But authors do not weigh the natural resources non linear effect on institutions. Our findings provide one complementary explanation to this debate.

6 Technical Appendix

6.1 Proof for s value

To find s, we must take into account the shares of resources for each group (like Mehlum et al. (2006)). Grabbers use their entire effort for the rent-seeking activity, that's why we have a proportion $(1-\alpha)$ with the effort normalized to one. The producer's effort is lower than the grabber's effort and depends on the institutional level. The better the institutional quality, the more efficient is the effort to capture a part of rent. The sum of shares cannot exceed one. It comes : $\alpha\lambda s + (1-\alpha)s \leq 1$. If the constraint is saturated (no waste), it is implying : $s = \frac{1}{(1-\alpha)+\alpha\lambda}$

6.2 Proof for π

First : $\pi = y(1-\frac{1}{\beta}) - F$ then we have : $n_f\pi = yn_f(1-\frac{1}{\beta}) - n_fF$. We express GDP like :

$$Y = L + N(\alpha\pi_f + \pi_g(1-\alpha)) = L + N\alpha\pi + \sum_{i=1}^{V}\frac{1}{\gamma_i}q_i(p_i - c_i) \tag{19}$$

Which gives : $n_f\pi = My - L$. With a factorization, we found : $y = \frac{\beta(L-n_fF)}{\beta(M-n_f)+n_f}$. We have an expression for π that does not depend on the institutional level : $\pi = \frac{\beta(L-FM)-L}{\beta(M-n_f)+n_f}$

If $\pi_f > \pi_g$ then,

$$\lambda > \frac{(\alpha-1)N\pi + \sum_{i=1}^{V}\frac{1}{\gamma_i}q_i(p_i-c_i)}{\sum_{i=1}^{V}\frac{1}{\gamma_i}q_i(p_i-c_i) + \alpha N\pi} \tag{20}$$

and if α =1,

$$\lambda > \frac{\sum_{i=1}^{V}\frac{1}{\gamma_i}q_i(p_i-c_i)}{\sum_{i=1}^{V}\frac{1}{\gamma_i}q_i(p_i-c_i) + N\pi} \tag{21}$$

If $\pi_f = \pi_g$ then,

$$\alpha = \frac{(\lambda-1)\sum_{i=1}^{V}\frac{1}{\gamma_i}q_i(p_i-c_i) + N\pi}{(1-\lambda)N\pi} \tag{22}$$

6.3 The turning point A

On the point A, we have $\pi_f = \pi_g$ and no grabbers in the economy ($\alpha = 1$). If the price increasing, we can stay on the same point A and have some improvements on the institutional quality :

$$\lambda = \frac{\frac{s}{N}\sum_{i=1}^{V}\frac{1}{\gamma_i}q_i(p_i - c_i)}{\frac{s}{N}\sum_{i=1}^{V}\frac{1}{\gamma_i}q_i(p_i - c_i) + N\pi} \tag{23}$$

$$\frac{\delta\lambda}{\delta p_i} = \frac{\frac{q_i}{\gamma_i}N\pi}{(\sum_{i=1}^{V}\frac{1}{\gamma_i}q_i(p_i - c_i) + \alpha N\pi)^2} > 0 \tag{24}$$

with the assumption that $\pi > 0$.

TABLE 1 – Natural Resources and Human Development Indicator

Average Rent	Rent per capita	Rent/GDP	Resource dependence on total exportation	Resource dependence on GDP
U.S. (10)	Qatar (40)	Turmenistan (97)	Iraq (.)	Oman (71)
Saudi Arabia (77)	Kuwait (44)	Iraq (.)	Angola (160)	Equatorial Guinea (121)
Russia (62)	United Arab Emirates (41)	Liberia	Equatorial Guinea (121)	Angola (160)
China (85)	Saudi Arabia (77)	Kuwait (44)	Yemen. Rep. (151)	Saudi Arabia (77)
Iran (99)	Bahrain (43)	Saudi Arabia (77)	Congo (142)	Gabon (123)
Mexico (53)	Oman (71)	Nigeria (158)	Nigeria (158)	Iraq (.)
Canada (5)	Libya (58)	Libya (58)	Mauritania (152)	Congo (142)
Venezuela (75)	Trinidad and Tobago (57)	Iran (99)	Cameroon (148)	Qatar (40)
India (127)	Norway (1)	Qatar (40)	Gabon (123)	Kazakstan (80)
Kuwait (44)	Venezuela (75)	Oman (71)	Central Afr. Rep. (171)	Nigeria(158)
Iraq (.)	Gabon (123)	Azerbaijan (101)	Congo. Dem. Rep. (142)	Liberia (.)
Nigeria (158)	Turkmenistan (97)	Bahrain (43)	Guinea (156)	Congo. Dem. Rep. (142)
Indonesia (110)	Canada (5)	Russia (62)	Burundi (169)	Kuwait (44)
United Arab Emirates (41)	Iraq (.)	Papua New Guinea (137)	Rwanda (159)	Papua New Guinea (137)
U.K. (15)	Australia (3)	Trinidad and Tobago (57)	Iran (99)	Iran (99)
Algeria (103)	Iran (99)	Algeria (103)	Libya (58)	Suriname (86)
Libya (58)	Russia (62)	Angola (160)	Algeria (103)	United Arab Emirates (41)
Australia (3)	U.S (10)	Gabon (123)	Kuwait(44)	Algeria (103)
Brazil (63)	Algeria (103)	Congo (142)	Uganda (144)	Libya (58)
South Africa (120)	Malaysia (61)	Kazakhstan (80)	Ivory Coast (163)	Ecuador(82)
Norway (1)	Kazakhstan (80)	Mauritania (152)	Chad (173)	Estonia(38)
Malaysia (61)	Mexico (53)	United Arab Emirates (41)	Cuba (52)	Tajikistan (122)
Oman (71)	Chile (37)	Uzbekistan (111)	Saudi Arabia (77)	Russia (62)
Qatar (40)	Suriname (86)	Syria (106)	Oman (71)	Yemen. Rep. (151)
Egypt (119)	Syria (106)	Venezuela (75)	Tanzania (164)	Mongolia (114)
High Human Development : 10	High Human Development : 10	High Human Development : 4	High Human Development : 2	High Human Development : 4
Medium Human Development : 13	Medium Human Development : 14	Medium Human Development : 16	Medium Human Development : 11	Medium Human Development : 17
Low Human Development : 1	Low Human Development : 0	Low Human Development : 3	Low Human Development : 11	Low Human Development : 3
Missing HDI : 0	Missing HDI : 1	Missing HDI : 2	Missing HDI : 1	Missing HDI : 1

Note : It is a decreasing ranking. We calculate the mean on the dependency ratio on natural resources (or the rent) from 1962 to 2000. Inside the brackets we have the ranking for the human development index from Human Development Report 2005. PNUD ranks countries on three categories : High Human Development (1 to 57) ; Medium Human Development (58 to 145) Low Human Development (146 to 177).

TABLE 2 – Variables and Sources

Variable	Definition	Source
Log GDP/cap	Log of GDP per capita. GDP is measured in constant dollar for the year 2000	The World Bank
Openness	It is the sum between exportations and importations for a country for one year divised by GDP	Dataset from Robert Feenstra
Distance to Equator	We calculate the distance for each country such as Distance to Equator = abs(Latitude)/90	The World Bank and my own calculation
Fraction European/English Speaking	It is the fraction of the population speaking English and the fraction speaking one of the major languages of Western Europe : English, French, German, Portuguese, or Spanish	Hall and Jones (1999)
Secondary Schooling 1965	The rate of Secondary Schooling Enrollment for 1965	The World Development Indicator
Ethnic Fractionalization	Index of Ethnic Fractionalization. It is ranking from 0 (least fractionalized) to 1 (extremely fractionalized)	Alesina *et al.* (2003)
Malaria 1994	Percentage of population which could be infect by Malaria	Dataset from A.Shleifer
Population Temperate Zone 1995	Part of population living in temperate zone	Dataset from A.Shleifer
Civil War	It is a binomial variable coded 1 if there are at least 1000 deaths by year. This civil war must be an organized military act and dummy doesn't take into account "external war' and "extra-systemic war"	Correlate of War (COW)
Geographical Variable	Middle East and North Africa, East Asia and Pacific	The World Bank
Legal Origin	We distinguish five diverse legal Origins : British, French, Socialist, German, Scandinavian.	The World Bank
Dummy Income Level	We have six dummies to narrow countries through our income : low, lower-middle, upper-middle, highoecd, high non oecd and developing	The World bank

TABLE 3 – Natural Resources Impact on Institutional Quality

Model :	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Depvar :	VA	RL	GE	CC	pr	heri	PS	icrg
$LogRent_{t-1}$	0.205**	0.224***	0.155*	0.248***	4.724**	2.180**		
	(0.081)	(0.072)	(0.080)	(0.080)	(2.226)	(1.034)		
$LogRent^2_{t-1}$	-0.006***	-0.007***	-0.005**	-0.008***	-0.177***	-0.066**		
	(0.002)	(0.002)	(0.002)	(0.002)	(0.061)	(0.029)		
$LogRent_{t-3}$							0.169*	3.059**
							(0.103)	(1.312)
$LogRent^2_{t-3}$							-0.006**	-0.091**
							(0.003)	(0.037)
Log GDP/cap 1990	0.105	0.329***	0.313***	0.349***	8.807***	3.469***		
	(0.065)	(0.058)	(0.061)	(0.060)	(1.663)	(1.102)		
Distance to Equator	0.325	0.979**	1.108**	1.003**	-7.676	-5.162	1.022*	12.170 *
	(0.472)	(0.423)	(0.439)	(0.431)	(11.941)	(7.982)	(0.547)	(6.825)
Openness_{t-5}	0.164***	-0.080*	0.040	-0.148***	-2.577	1.609**	0.083	4.614***
	(0.054)	(0.048)	(0.054)	(0.053)	(1.646)	(0.707)	(0.079)	(1.119)
Fraction European Speaking	0.700***	0.061	0.196	0.067	0.831	6.994***	0.408**	3.279
	(0.155)	(0.139)	(0.144)	(0.141)	(3.921)	(2.622)	(0.184)	(2.238)
Fraction English Speaking	-0.186	0.260	0.306	0.410*	9.989	3.145	0.082	-0.469
	(0.256)	(0.229)	(0.238)	(0.233)	(6.458)	(4.329)	(0.306)	(3.875)
Secondary Schooling 1965	0.022***	0.012***	0.011**	0.011***	0.287**	0.105	0.011**	0.178***
	(0.005)	(0.004)	(0.004)	(0.004)	(0.116)	(0.077)	(0.005)	(0.066)
Log GDP/cap 1980							0.228***	4.365***
							(0.081)	(1.004)
N	597	597	594	588	918	918	555	1564
R^2	0.7251	0.8004	0.8019	0.8078	0.6447	0.5290	0.6176	0.7332
Turning Point (Millions Dollars)	26.2	8.9	5.4	5.4	0.6	14.9	1.3	19.9

Note : Standard errors in parentheses with ***, ** and * respectively denoting significance at the 1%, 5% and 10% levels. Sample : Algeria, Argentina, Australia, Austria, Bangladesh, Barbados, Belgium, Bénin, Bolivia, Brazil, Bulgaria, Burkina Faso, Burundi, Cameroon, Canada, Central African Republic, Chad, Chile, Colombia, Congo, Costa Rica, Ivory Coast, Cyprus, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Fiji, Finland, France, Gabon, Gambia, Ghana, Greece, Guatemala, Guinea, Haiti, Honduras, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Kuwait, Laos, Liberia, Madagascar, Malawi, Malaysia, Mauritania, Mauritius, Mexico, Morocco, Mozambique, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Pakistan, Papua New Guinea, Peru, Philippines, Poland, Portugal, Romania, Rwanda, Saudi Arabia, Senegal, Sierra Leone, Somalia, South Africa, South Korea, Spain, Sri Lanka, Sudan, Suriname, Sweden, Switzerland, Syria, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, United Kingdom, Uruguay, Venezuela, Yemen, Zambia, Zimbabwe.

TABLE 4 – Test for U-Shaped (Lind and Mehlum (2007))

Model :	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Depvar :	VA	RL	GE	CC	pr	heri	PS	icrg
Interval :	[6.36 ; 26.03]	[6.36 ; 26.03]	[6.36 ; 26.03]	[6.36 ; 26.03]	[6.36 ; 26.03]	[6.36 ; 26.03]	[6.36 ; 26.03]	[6.36 ; 26.03]
Slope at Lower Bound :	0.127***	0.135***	0.093**	0.151***	2.46**	1.33**	0.088*	1.89**
Slope at Upper Bound :	-0.111***	-0.138***	-0.095***	-0.146***	-4.51***	-1.27***	-0.161***	-1.69***
Sasabuchi Test for inverse U-shaped :	2.39***	2.87***	1.77**	2.90***	1.69**	1.97**	1.33*	2.25**
Turning Point :	17.08	16	15.5	15.5	13.3	16.51	14.07	16.8
95% confidence interval for extreme point :	[12.32 ; 18.98]	[12.86 ; 17.64]	[-3 ; 18.59]	[13.28 ; 17.9]	[3 ; 15.74]	[6.52 ; 19.32]	[-21.04 ; 16.17]	[11.84 ; 19.51]
(Fieller method)								

Note : With ***, ** and * respectively denoting significance at the 1%, 5% and 10% levels

TABLE 5 – Diverse Turning Point

Model :	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Depvar :	VA	VA	RL	RL	CC	CC	heri	heri
$LogRent_{t-1}$	0.205**	0.303***	0.224***	0.410***	0.248***	0.276**	2.180**	3.063*
	(0.081)	(0.116)	(0.072)	(0.107)	(0.080)	(0.108)	(1.034)	(1.690)
$LogRent_{t-1}^2$	-0.006***	-0.009***	-0.007***	-0.012***	-0.008***	-0.008***	-0.066**	-0.090**
	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.029)	(0.043)
Log GDP/cap 1990	0.105	-0.001	0.329***	0.342***	0.349***	0.338***	3.469***	1.788**
	(0.065)	(0.083)	(0.058)	(0.073)	(0.060)	(0.093)	(1.102)	(0.809)
Distance to Equator	0.325	-0.703	0.979**	0.402	1.003**	0.954	-5.162	2.113
	(0.472)	(0.551)	(0.423)	(0.526)	(0.431)	(0.598)	(7.982)	(5.452)
Openness_{t-5}	0.164***	0.220***	-0.080*	-0.115**	-0.148***	-0.175**	1.609**	2.021*
	(0.054)	(0.067)	(0.048)	(0.045)	(0.053)	(0.070)	(0.707)	(1.128)
Fraction European Speaking	0.700***	0.815***	0.061	0.112	0.067	0.325*	6.994***	3.554**
	(0.155)	(0.228)	(0.139)	(0.153)	(0.141)	(0.188)	(2.622)	(1.623)
Fraction English Speaking	-0.186	-6.071	0.260	0.316	0.410*	0.252	3.145	4.921**
	(0.256)	(5.592)	(0.229)	(0.229)	(0.233)	(0.264)	(4.329)	(2.318)
Secondary Schooling 1965	0.022***	0.014**	0.012***	0.007*	0.011***	0.009	0.105	0.011
	(0.005)	(0.007)	(0.004)	(0.004)	(0.004)	(0.006)	(0.077)	(0.045)
N	597	333	597	237	588	250	918	495
Sample	All countries	VA96< Mean VA96	All Countries	RL96> Mean RL96	All Countries	CC96> Mean CC96	All Countries	heri96> Mean heri96
R^2	0.7251	0.3924	0.8004	0.7553	0.8078	0.8440	0.5290	0.5741
Turning Point (Millions Dollars)	26.2	20.4	8.9	26.2	5.4	31	14.9	16.9

Note : Standard errors in parentheses with ***, ** and * respectively denoting significance at the 1%, 5% and 10% levels

TABLE 6 – Impacts on Pol2 With Quantiles

Model :	(1)	(2)	(3)	(4)	(5)	(6)
Depvar :	pol2	pol2	pol2	pol2	pol2	pol2
Quantiles :	q15	q30	q45	q60	q75	q90
$LogRent_{t-1}$	0.556*	0.671***	0.915**	1.80***	1.121*	0.708***
	(0.323)	(0.192)	(0.441)	(0.284)	(0.654)	(0.213)
$LogRent^2_{t-1}$	-0.023*	-0.025***	-0.028*	-0.048***	-0.029*	-0.019***
	(0.012)	(0.006)	(0.015)	(0.008)	(0.016)	(0.006)
Log GDP/cap 1962	-0.876**	0.457	0.603	0.805**	-0.130	0.475***
	(0.428)	(0.414)	(0.804)	(0.348)	(0.212)	(0.136)
Distance to Equator	-1.078	-4.506***	-6.591***	-5.270***	0.230	-0.333
	(1.107)	(1.125)	(1.584)	(1.129)	(0.898)	(0.252)
Openness_{t-5}	-0.279	-0.781***	-0.516	-0.944*	0.177	-0.112
	(0.254)	(0.260)	(0.643)	(0.527)	(0.405)	(0.143)
Fraction European Speaking	5.098***	6.589***	8.290***	5.015***	3.783***	0.759***
	(1.018)	(0.726)	(0.725)	(0.469)	(0.499)	(0.123)
Fraction English Speaking	7.406***	-1.091*	-3.962***	-3.385***	-2.486***	-0.572***
	(2.677)	(0.652)	(0.763)	(0.451)	(0.506)	(0.172)
Secondary Schooling 1965	0.143***	0.225***	0.217***	0.184***	0.121***	0.023***
	(0.037)	(0.010)	(0.031)	(0.013)	(0.016)	(0.009)
R^2	0.1992	0.3557	0.3780	0.2871	0.1813	0.0605
Turning Point (Millions Dollars)	0.17	0.67	12.47	139	247.7	123.47

Note : Standard errors in parentheses with ***, ** and * respectively denoting significance at the 1%, 5% and 10% levels

TABLE 7 – Fixed Effects Vector Decomposition

Model :	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Depvar :	VA	RL	GE	CC	pr	heri	icrg	PS
$LogRent_{t-1}$	0.252***	0.294***	0.180***	0.352***	9.792***	2.463***		
	(0.0296)	(0.0304)	(0.0263)	(0.0311)	(0.745)	(0.295)		
$LogRent^2_{t-1}$	-0.00595***	-0.00875***	-0.00496***	-0.00970***	-0.357***	-0.0717***		
	(0.000775)	(0.000777)	(0.000688)	(0.000812)	(0.0203)	(0.00785)		
$LogRent_{t-3}$							0.206***	4.950***
							(0.0432)	(0.640)
$LogRent^2_{t-3}$							-0.00607***	-0.152***
							(0.00114)	(0.0177)
Openness$_{t-5}$	0.160***	-0.143***	-0.0202	-0.223***	-5.013***	1.250***	-0.0841***	4.215***
	(0.0212)	(0.0216)	(0.0272)	(0.0228)	(0.690)	(0.291)	(0.0314)	(0.538)
Log GDP/cap 1990	0.0597***	0.327***	0.292***	0.331***	10.28***	3.075***		
	(0.0101)	(0.00838)	(0.0108)	(0.0121)	(0.371)	(0.127)		
Distance to Equator	0.200**	0.891***	0.995***	0.880***	-8.343***	-4.738***	0.845***	11.00***
	(0.0776)	(0.0702)	(0.0787)	(0.0754)	(2.467)	(1.019)	(0.115)	(1.693)
Fraction European Speaking	0.692***	0.0381**	0.170***	0.0434**	-0.124	6.311***	0.369***	2.818***
	(0.0230)	(0.0181)	(0.0242)	(0.0216)	(0.715)	(0.304)	(0.0345)	(0.579)
Fraction English Speaking	-0.213***	0.283***	0.311***	0.410***	12.61***	3.772***	0.0437	0.532
	(0.0314)	(0.0454)	(0.0377)	(0.0289)	(1.305)	(0.483)	(0.0484)	(0.746)
Secondary Schooling 1965	0.0247***	0.0127***	0.0125***	0.0132***	0.213***	0.114***	0.0141***	0.164***
	(0.000648)	(0.000602)	(0.000705)	(0.000678)	(0.0282)	(0.00979)	(0.00122)	(0.0170)
Log GDP/cap 1980							0.190***	4.907***
							(0.0202)	(0.304)
Residuals	1***	1***	1***	1***	1***	1***	1***	1***
	(0.0155)	(0.0153)	(0.0209)	(0.0186)	(0.0178)	(0.0127)	(0.0247)	(0.0315)
N	597	597	594	588	918	918	1564	555
R^2	0.959	0.971	0.962	0.966	0.894	0.932	0.75	0.919

Note : Standard errors in parentheses with ***, ** and * respectively denoting significance at the 1%, 5% and 10% levels

TABLE 8 – Hausman Taylor

Model :	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Depvar :	VA	RL	GE	CC	pr	heri	PS	icrg
$LogRent_{t-1}$	0.238**	0.283***	0.160	0.323***	9.942***	2.60**		
	(0.097)	(0.085)	(0.098)	(0.098)	(2.754)	(1.155)		
$LogRent^2_{t-1}$	-0.006**	-0.009***	-0.005*	-0.009***	-0.358***	-0.074**		
	(0.003)	(0.002)	(0.003)	(0.003)	(0.077)	(0.032)		
$LogRent_{t-3}$							0.150	4.951***
							(0.122)	(1.573)
$LogRent^2_{t-3}$							-0.005	-0.153***
							(0.004)	(0.047)
Openness$_{t-5}$	0.161***	-0.142***	-0.018	-0.219***	-5.015***	1.247*	-0.080	4.242***
	(0.057)	(0.050)	(0.057)	(0.055)	(1.770)	(0.747)	(0.084)	(1.217)
Distance to Equator	2.738*	0.743	1.442	1.153	-90.870	6.201	1.412	-1.463
	(1.571)	(0.890)	(0.959)	(0.922)	(58.152)	(14.408)	(0.859)	(10.826)
Fraction European Speaking	1.387***	-0.008	0.293	0.113	-22.890	9.683**	0.565*	-0.999
	(0.468)	(0.263)	(0.283)	(0.274)	(17.192)	(4.231)	(0.299)	(3.444)
Fraction English Speaking	-0.403	0.293	0.288	0.414	18.147	2.706	-0.027	2.614
	(0.503)	(0.261)	(0.290)	(0.290)	(19.213)	(4.460)	(0.409)	(5.042)
Secondary Schooling 1965	0.059***	0.009	0.017	0.015	-1.031	0.286	0.023*	-0.044
	(0.021)	(0.013)	(0.014)	(0.013)	(0.785)	(0.203)	(0.013)	(0.142)
Log GDP/cap 1990	-0.864*	0.414	0.154	0.274	43.061**	-1.221		
	(0.523)	(0.314)	(0.334)	(0.315)	(19.107)	(4.975)		
Log GDP/cap 1980							-0.068	11.253***
							(0.314)	(3.721)
N	597	597	594	588	918	918	555	1564
R^2	0.	0.	0.	0.	0.	0.	0.	0.

Note : Standard errors in parentheses with ***, ** and * respectively denoting significance at the 1%, 5% and 10% levels

TABLE 9 – Impact on Institutional Quality According Natural Resource Types

Model :	(1)	(2)	(3)	(4)	(5)	(6)
Depvar :	icrg	icrg	icrg	icrg	icrg	icrg
$LogRent_{t-3}$	3.059**					
	(1.312)					
$LogRent^2_{t-3}$	-0.091**					
	(0.037)					
$LogRent_{t-3}$ 4		-10.797***				
		(3.016)				
$LogRent^2_{t-3}$ 4		0.456***				
		(0.094)				
$LogRent_{t-3}$ 3			2.929*			
			(1.561)			
$LogRent^2_{t-3}$ 3			-0.112***			
			(0.043)			
$LogRent_{t-3}$ 6				-2.540**	5.966***	-3.228**
				(1.243)	(2.021)	(1.474)
$LogRent^2_{t-3}$ 6				0.069*	-0.171***	0.092*
				(0.039)	(0.060)	(0.047)
Log GDP/cap 1980	4.365***	10.153***	4.748***	3.480***	6.762**	2.847**
	(1.004)	(1.777)	(1.125)	(1.243)	(3.290)	(1.370)
Distance to Equator	12.170*	-0.248	8.934	9.833	-11.806	3.977
	(6.825)	(11.296)	(7.010)	(7.218)	(12.543)	(8.556)
Openness$_{t-5}$	4.614***	6.546***	3.648***	5.302***	12.754***	5.147***
	(1.119)	(1.629)	(1.322)	(1.304)	(1.910)	(1.548)
Fraction European Speaking	3.279	-0.531	4.593*	3.406	2.219	2.357
	(2.238)	(4.308)	(2.541)	(2.413)	(3.081)	(2.954)
Fraction English Speaking	-0.469	-144.778*	1.227	-0.873	-0.850	-3.936
	(3.875)	(80.806)	(4.099)	(4.213)	(3.302)	(8.483)
Secondary Schooling 1965	0.178***	-0.056	0.157**	0.268***	0.123	0.245**
	(0.066)	(0.097)	(0.070)	(0.071)	(0.099)	(0.095)
N	1564	566	1146	1253	298	955
Sample	All countries	All countries	All countries	All countries	High Income OECD Countries	Non OECD Countries
R^2	0.7332	0.563	0.699	0.7219	0.4487	0.3930
Turning Point (Millions Dollars)	19.9	0.14	0.47	98.5	37.7	41.6

Note : Standard errors in parentheses with ***, ** and * respectively denoting significance at the 1%, 5% and 10% levels

TABLE 10 – Robustness Check With ICRG

Model :	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Depvar :	icrg	icrg	icrg	icrg	icrg	icrg	icrg	icrg	icrg
$LogRent_{t-3}$	3.059**	3.280**	3.073**	2.464*	2.780**	3.180**	2.510*	3.105**	2.889**
	(1.312)	(1.314)	(1.314)	(1.295)	(1.326)	(1.292)	(1.283)	(1.305)	(1.297)
$LogRent^2_{t-3}$	-0.091**	-0.099***	-0.092**	-0.075**	-0.082**	-0.096***	-0.071*	-0.091**	-0.084**
	(0.037)	(0.038)	(0.037)	(0.037)	(0.038)	(0.037)	(0.036)	(0.037)	(0.037)
Log GDP/cap 1980	4.365***	4.588***	4.239***	3.717***	4.176***	4.359***	4.914***	4.509***	4.135***
	(1.004)	(1.056)	(1.062)	(0.915)	(1.017)	(0.948)	(0.938)	(0.988)	(0.966)
Distance to Equator	12.170*	12.538*	11.296	10.928*	5.428	20.168***	17.604***	12.283*	11.531*
	(6.825)	(7.398)	(7.212)	(6.154)	(8.744)	(6.802)	(6.414)	(6.688)	(6.540)
$Openness_{t-5}$	4.614***	4.672***	4.607***	3.923***	4.668***	4.662***	5.018***	4.695***	4.782***
	(1.119)	(1.199)	(1.119)	(1.154)	(1.119)	(1.107)	(1.107)	(1.115)	(1.112)
Fraction European Speaking	3.279	3.871	2.957	3.557*	3.267	5.027**	1.179	5.036**	2.822
	(2.238)	(2.421)	(2.392)	(2.022)	(2.230)	(2.162)	(2.134)	(2.349)	(2.152)
Fraction English Speaking	-0.469	-1.604	-0.316	-1.318	-0.577	-2.289	-0.187	-3.999	1.203
	(3.875)	(4.036)	(3.915)	(3.491)	(3.839)	(3.679)	(3.533)	(4.156)	(3.767)
Secondary Schooling 1965	0.178***	0.195***	0.175***	0.201***	0.155**	0.106	0.121*	0.160**	0.165***
	(0.066)	(0.068)	(0.067)	(0.060)	(0.069)	(0.066)	(0.063)	(0.065)	(0.064)
Ethnic Fractionalization		0.037							
		(0.033)							
malaria 94			-1.190						
			(3.022)						
Civil War t-1				-8.505***					
				(0.901)					
Population Temperate Zone 95					4.879				
					(3.902)				
East Asia and Pacific						9.038***			
						(2.535)			
Middle East and North Africa							-8.432***		
							(2.418)		
French Legal Origin								-3.624**	
								(1.747)	
German Legal Origin									9.698***
									(3.722)
N	1564	1524	1564	1480	1561	1564	1564	1564	1564
R^2	0.733	0.736	0.733	0.775	0.739	0.768	0.771	0.747	0.755

Note : Standard errors in parentheses with ***, ** and * respectively denoting significance at the 1%, 5% and 10 > % levels

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