

E C O N O M I C S B U L L E T I N

Oil rents and the tenure of the leaders in Africa

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Abstract

It is often underlined that African oil producing countries are politically unstable as a result of this natural resource. Based on the data relating to the duration in office of 101 heads of States exercises of power of 26 African countries (North Africa and Sub-Saharan Africa), our study finds that: this instability does not appear in the executive branch of the state. Conversely, using survival analysis including non-parametric and parametric estimators, and controlling for many factors which affect the leader's tenure, our results suggest a positive link between oil rents and the duration in office of the leader. While other minerals rents do not appear to have the same effect. An interpretation of these results is that; oil has a strategic aspect that other mining products do not have. Hence, no matter what the type of political regime is in country, the international community is tempted to exert fewer pressures for the change of the leader in an oil producing State.

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1. Introduction

At the end of 2003, Africa held nearly 400 billion of proven oil barrels reserves, which are the second greatest reserves of the world, after those of the Middle-East¹. In addition, sub-Saharan Africa is the area of the world with the highest growth of oil production. The production increased by 36% during the last ten years (compared with 16% in the rest of the world). In 2005, oil revenues of the eight main oil producers in Sub-Saharan Africa were estimated at 35 billions of US dollars (Wurthmann, 2006). Clearly, oil has a major role in several economies.

However, for many scholars in the literature on the “curse” of natural resources, African oil has created political instability. Two explanations are provided. First, the presence of a natural resource, like oil, in a country would provide motivations and means for armed conflicts (Collier and Hoeffler, 2002). Second, oil rents would weaken the state structure, because leaders do not rely on a solid social organization and bureaucracy to increase revenues (Fearon and Laitin, 2003). Moreover, oil rents increase the preference for the power; therefore there would be a competition for its control and the emergence of authoritarian governments (Jensen and Wantchekon, 2004). Authoritarian governments, which tend to be more unstable and transitory (Huntington, 1996).

Several studies note down the effects of the oil revenues on the type of political regime (Ross, 2001; Smith, 2004; Jensen and Wantchekon, 2004). Other studies, based on individual country data, note the relationship between the duration of Middle-East monarchies and oil revenues (Mahdavi, 1970; Beblawi and Luciani, 1987). Nonetheless, this relation is not subject of empirical test, and what’s more on the African countries. This study attempts to address this gap. Based on data relating to the duration in office of heads of States of 26 African countries (North and Sub-Saharan Africa) during the period 1958-2000, our study reveals the presence of a positive and significant relationship between oil revenues and the tenure of country’s executive branch, suggesting that the political powers of African oil producing States are actually the longest in the continent. This empirical result is consistent with the predictions of Ross (2001), and, Jensen and Wantchekon (2004); on the dominance of party elite in oil States. However, other metals and minerals countries do not present same characteristic.

In the second section of this article, we present the arguments that could explain longer duration of the leader’s tenure in oil States. In the third section, we expose an econometric model of the determinants of the tenure of the leader in African States, and, we test the assumption of a positive relation between oil rents and the duration in office. The fourth section returns in conclusion on the principal results and their implications.

2. Theoretical arguments

One of the recent issues, in the literature of natural resources “curse”, relates to the relation between natural resources and political regime. It highlights the interactions between the public decision maker and the various groups within population (Lane and Tornell, 1999; Ross, 2001; Robinson et al., 2002; Jensen and Wantchekon, 2004). To keep the power, the decision maker requires a minimum of support. A distribution of oil revenues to particular groups of the population is a way to ensure this support to the incumbent. Thus, politically

¹ IEA, World Energy Outlook, november 2004.

rational strategies consist in providing public goods to particular groups. The bureaucratic and political elites (including local communities), the trade unions of public sector and the army often succeed to obtain direct allocation of public expenditure in exchange of their support (Eifert et al., 2003). However, the relationship between oil revenues and the duration of the leader's tenure, which is revealed in this part of literature, is not subject to empirical tests. Our study attempts to address this gap. But before this, it is necessary to present the possible explanations of the long duration of political regimes in oil African states.

A report from the French national parliament underlines: "Because of oil revenues, incumbents manage to preserve their tenure by using force or corruption" (*Assemblée nationale française, 1999; P.156; §2*).

Thus, oil revenues affect political sphere, the policy guidelines are not done on the ideology basis (Jensen and Wantchekon, 2004). In absence of an ideological legitimation, the political power is legitimated by a principle: *the principle of symbolic system exchange*. This symbolic system exchange is based on a distribution of resources and tends to minimally respect the principle of reciprocity: it is the recourse of all forms of social exchange (Medard, 1991). Oil revenues are monopolized by the agents members or close to the State, they are redistributed in a private way or via clientelism networks, and maintain an excessive bureaucracy to this end²(Rosellini, 2005). Technological, institutional and political changes are likely to be hampered when they affect the privileges of the incumbent (Acemoglu and Robinson, 2006). Then, it becomes easier "to buy" the possible political challengers (Acemoglu et al., 2004).

The incumbent can also resort to the military force to maintain himself in office. In this case, he would tend to invest massively in armed forces, while the country is in a situation of non-war that does not justify such investments (Ross, 2001). Taken collectively, governments of African States would devote a higher proportion of the revenues drawn from oil production to military expenditure (Ngodi, 2005). They prohibit any form of organization, which would influence management, redistribution of the oil wealth when it is likely to harm the incumbent's position. The result is fewer claims for a change of the incumbent.

Though complementary with the use of repression or corruption, the major explanation of the longer duration of political regimes in oil States is the mechanism of rentier State³. Indeed, oil revenues reduce the dependence on taxes not related to oil. They even possibly end up replacing the pre-existent tax systems. This releases governments of producing States from their obligation of accountability and transparency toward the citizens, which are the ordinary counterparts of governments' right to tax their population (Ngodi, 2005). In fact, oil revenues end up loosening the links between population and their leaders. Therefore, there is less demand for a change of political regime (Beblawi and Luciani, 1987).

² For example, Gabon has a population 6 times less than Burundi, but Gabonese government is constituted by 42 members; Burundian Government has 22 members only (see, CIA publication 2006).

³ The concept of rentier state was introduced at the end of the Sixties by economists who worked on the Middle-East and North Africa oil exporting countries; it refers to a State which draws a larger part of its revenues from abroad in the form of rents (Mahdavi, 1970).

3. Empirical Design

To test the effect of oil revenues on the survival of leaders in African countries we have recourse to duration models. This modelling appears to be the most appropriate to the study in question: the influence of oil revenues on the leader's tenure in Africa. In this part we intend to describe sample and the main variables retained in the study. Finally, we will carry out an econometric analysis using non-parametric and parametric approaches.

3.1) Data description

Because of data availability, our study is limited to 101 occupancies of power in 26 African countries. The observed period referring to a country is the date of power seizure by the leader, for which the duration in office is indexed in the World Bank's database DPI2000. In duration models, the process observed can have begun at different dates for various individuals present in the sample. By construction, the observations are brought back to January first of each year. The first period of observation begins in 1958 and corresponds to the presidency of the Tunisian president Bourguiba. The year 2000 marks the end of all observation periods.

In our model, we express the duration in office as a function of oil rents. The variables oil rents and other mineral rents are drawn from the database "World Bank' S Adjusted Saving Project" of the World Bank. This database is relatively recent. It has been used in new empirical works on the effects related to revenues drawn from natural resources exploitation (Collier and Hoeffler, 2005). It pools together separated rents from several mining products country by country. As Rosser (2006) pointed out, the main problem of natural resources is that they generate rents; these rents lead to various behaviours. In this study, we assume that natural resources rents are used by political elites to stay in office. Therefore, the most relevant way to address this issue is to use a rent-based measure of natural resources.

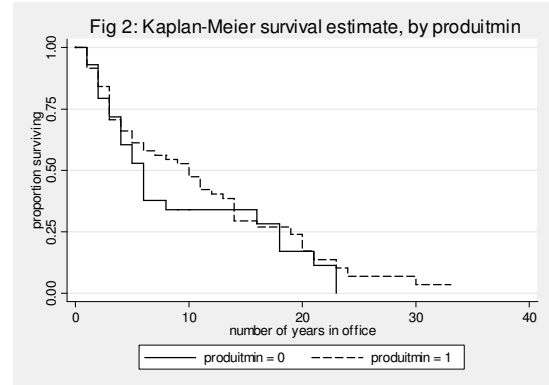
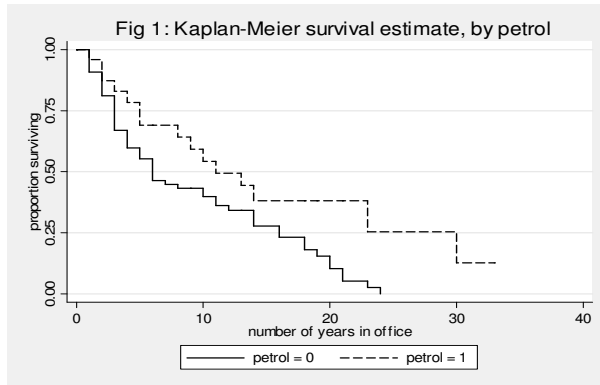
3.2) Non-parametric approach: kaplan-meier estimator

In a first analysis, we separate countries of the sample into two groups: oil countries and non-oil countries. A country is considered, as an oil country if oil rent variable as previously defined is higher than 0, and a non-oil country if it is equal to 0. We obtain a dichotomic variable, **petrol equal to 1** in the first case and 0 in the second one⁴. If oil does not influence the leader's tenure, the survival function curve of the leaders of oil countries and the one of non-oil countries should merge.

In figure 1, we observe that the curve representing the survival function of leaders of oil countries is at each time above the one representing the survival function of leaders of non-oil countries. This result of Kaplan-Meier estimator demonstrates that leaders of non-oil African countries run cumulatively a higher risk of leaving the power than the leaders of oil African countries. Thus, one may retain that 60% of the leaders of the non-oil African countries leave the power within the first 10 years, while only 45% do so in the oil African countries. In addition, Log-Rank and Wilcoxon tests (appendix table 1) respectively to 5 and 10% thresholds reject the null hypothesis of the equality of the two survival functions.

⁴ All countries of the sample with positive oil rents, except for Tunisia, are members of the African Petroleum Producers (APPA). Therefore, we do not find apparent reasons to discuss on the oil character of the countries.

In a second analysis, we separate the countries from the sample in two groups according to the criterion of other mineral rents. By analogy with the distinction made in the preceding paragraph, a country is as mining country if the mineral rents variable is higher than 0 and it is a non-mining country if the mineral rents variable is equal to 0. Again we obtain a dichotomic variable **produitmin**, equal to 1 in the first case and 0 in the second one. In contrast with figure 1, in figure 2, the survival function curve of the leaders of mining African countries and that of the leaders of non-mining African countries overlap several times.



The estimator of Kaplan-Meier seems to demonstrate that other mining revenues do not influence the leader's tenure. This result is not invalidated by Log-Rank and Wilcoxon tests (appendix table 2), which do not make it possible to reject the null hypothesis of the equality of the two survival functions. In other words, in the African States, mining resources do not significantly influence the duration in power of the head of the executive branch.

From these two analyses, it comes out that, in Africa, oil increases the tenure of the head of State, while other mining products do not have any influence on the leader's tenure. Is this result robust to the inclusion of other observable factors, which would influence the leader's tenure? To answer to this question, we resort to parametric analysis.

3.3) Parametric approach

The parametric approach allows us to take into account the effects of various explanatory variables. However, it requires a specification of the way in which the covariates intervene and the form of the hazard function. For our study, we consider the class of accelerated failure time (AFT) model, in this case the explanatory variables intervene in a multiplicative way over the duration, in other words they have an additive effect on the logarithm of the duration. Our model arises in the form:

$$\text{Log}(T) = \alpha + X\beta + \sigma\epsilon \quad \text{"(1)"}$$

Where **Log (T)** the dependent variable is the logarithm of the number of years in office. **X** indicates the matrix of covariates including in particular: oil rents (**renpetro**) and other mineral rents (**rentmin**) as a percentage of GDP, past removal (**passe**), the regime type (**demo**), GDP per capita (**Impib**), the lagged real GDP growth (**croisretard**), population (**Impop**), ethnolinguistic fragmentation (**fract**), the number of spells in office **dejpouv**. β is the vector of the coefficients associated to these various variables, σ is a scale parameter

equal to $1/P$. Finally ε is a random variable whose law determines that followed by Log (T) being given X.

The presence of censored data in our sample brings us to the estimation by the maximum likelihood method. Indeed, the estimation by ordinary least squares method would provide biased results (Box-Steffensmeier and Jones 2004). Thus, two cases of observations are considered as censored in our study. The first case concerns the heads of State, which are still in office after the year 2000. The second case concerns the heads of State deceased in office following natural causes, to include them as such in the model would amount treating them as “political deaths”, which is not relevant (Bueno de Mesquita et al., 2003).

In addition, we consider a monotonic hazard function. It is an assumption usually used in the survival analysis of the leaders (Bueno de Mesquita et al., 2003), it would like that two distinct moments correspond to two different risks. Indeed, intuition may suggest that more a tenure lasts, the lower is the risk for leader to leave the power *ceteris paribus*, in that case one would be in the presence of a monotonically decreasing hazard. Nevertheless, the same intuition may also suggest that more a tenure lasts, more “l'état de grâce” from which the leader benefited at the beginning erodes, and the higher the probability that the leader is “dismissed” from his office by the people. In that case one would be in the presence of a monotonically increasing hazard. In any of these cases, Weibull modeling is adapted⁵.

Table 3 present the results of three estimations by the maximum likelihood method. Oil and other mining rents are considered separately in the estimations exposed in the columns (1) and (2). The column (3) exposes an estimation including the two variables. We use three different regressions in order to check the robustness of the results. It appears that in the three estimations, the overall model is significant and the value of the coefficients as well as the level of significance associated to oil rents variable (**renpetro**) and other mineral rents variable (**rentmin**) remain unchanged. The marginal value of the coefficients cannot be interpreted in the metric with which they are given; only the associated signs are interpretable. A positive sign of the coefficient implies a positive effect of the variable considered on the duration of the tenure of the leader or, equivalently, a negative effect on the risk of exit at each period.

Thus, the coefficient associated to the interest covariate (**renpetro**) is positive and significant, which suggests that oil rents increase the tenure of the leader as assumed in assumption in the theoretical analysis. The coefficient associated to the other mineral rents variable (**rentmin**) is negative but non-significant, suggesting that rents of the other mining products do not significantly influence the duration in office of the heads of State considered.

An interpretation of these results is that oil requires massive financial investments and considerable production technology. To ensure the profitability of these investments, investors are tempted to give their supports to political leaders with which the contracts were negotiated, reducing thereby the risk of losing the property rights that could occur with a change of the executive branch of the state. In addition, the tensions on oil international market have global repercussions. Therefore oil has a strategic aspect that other mining

⁵ Moreover, the choice of this functional form is validated by Akaike Information Criterion (AIC). The estimate with functional form Weibull reveals the statistic AIC = 138,09; quite lower than those revealed using other functional forms alternatively met in the literature: AIC = 210, 32 for the exponential; AIC = 145,84 for the Lognormal; AIC = 151,5 for the Log-Logistic.

products do not have. Hence, no matter what the type of political regime is in country, the international community is tempted to exert fewer pressures for the change of the leader in an oil producing State.

In addition, one can note the positive influence of the economic variables (**Impib** and **croisretard**) on the leader's tenure. This means that better living conditions in a country are reduce claims for a change of the executive power. It is also noted that there is a negative influence of ethnolinguistic fragmentation (**fract**) and past removals (**passee**). This means that strongly fragmented population is harder to maintain under the control of the head of the executive. In the same way, the changes in executive power intervened in the recent past of a country increase the probability of this country changing executive power again. The absence of influence of political regime type (**demo**), can be related to the fact that the majority of the African countries transited to the democratic era lately in the beginning of the Nineties, for this reason, the democracy is still in consolidation (Block, 2002). In the same way, we do not find a significant relation between the size of the population (**Impop**), the number of spells in office (**dejpouv**), and the duration of the leader's tenure. Although, the signs of the associated coefficients are as expected by the theory.

Lastly, it appears that the value of σ estimated by the maximum likelihood is 0,37 implying $p > 1$. This suggests that hazard rate is monotonically increasing, in other words for the heads of State of African countries the risk to leave the power increases with the duration of its exercise⁶.

4. Conclusion

The African oil States are often viewed as politically unstable. This political instability would be due to the presence of oil resources. Our study finds that: this instability does not appear in the executive branch of the State. On contrary, oil causes stability of the political power. Given the mechanisms that underlie this result, it is very likely that this political characteristic does not contribute to the population's wellbeing or development in the States concerned. These mechanisms enable however to emphasize that the behaviour of public decision makers of oil African States fall under the logic of those their counterparts of Persian Gulf. Nevertheless, for African countries, the mechanisms associated with oil rents deserve further research in order to clarify the behaviour of repressive, clientelism and rentier States.

In addition, our study arises the need for a disaggregated analysis of natural resources. Indeed, our econometric results demonstrate that other mining products do not have an influence on the tenure of the leaders in the States considered, suggesting that the effects of natural resources on the variables can differ depending on the type of natural resource. Consequently, it would be relevant to analyze natural resources separately in order to give the most appropriate political and economic recommendation.

⁶ We confront our results to alternative reasoning to our model (sensitive analysis). For this purpose, we evaluate these results successively controlling for unobserved heterogeneity; excluding countries which were not oil producing countries at the date of their entrance in the sample; and finally excluding the set of oil countries in an analysis of mining countries. All these analyses (estimations not reported) confirm the conclusions of the preceding estimations.

Furthermore, our results suggest that many efforts aiming at a process of democratization in Africa are likely to be useless if the preliminary condition is neglected: it is essential to increase the transparency in the use of oil revenues, and to install a suitable framework that would prevent the public decision makers from absorbing the revenue. Here appears a fundamental role for the multilateral organizations that have the capacity to influence the behaviours of the African governments. However, the actions of multilateral organization should be combined with those of civil society, since public awareness is essential for the appropriation policy decisions.

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APPENDIX

Liste of countries of the sample (entrance date)

South Africa(1967)	Mauritania (1960)
Angola ^a (1980)	Mozambique(1976)
Algeria ^a (1966)	Niger (1975)
Burundi (1967)	Nigeria ^a (1967)
Burkina-Faso (1975)	Rwanda (1974)
Cameroon ^a (1960)	Centrafrican Republic (1966)
Congo ^a (1970)	Senegal (1961)
Egypt ^a (1971)	Sierra-Leone (1972)
Gabon ^a (1968)	Soudan (1970)
Bissau Guinea(1975)	Chad (1960)
Lesotho (1966)	Togo (1968)
Madagascar (1973)	Tunisia ^a (1958)
Mali (1969)	Zimbabwe (1966)

^aoil producing countries

Table 1 : Test test for equality of survivor functions by petrol

Petrol	Log-rank Test			Wilcoxon Test		
	Events Observed	Events expected	Statistics	Events Observed	Events expected	Statistics
0	59	50.27	chi2(1) = 5. 53**	59	50.27	chi2(1) = 2. 87*
1	15	23.73	Pr>chi2 = 0. 018	15	23.73	Pr>chi2 = 0. 090

Table 2: Test test for equality of survivor functions by produitmin

Produitmin	Log-rank Test			Wilcoxon Test		
	Events Observed	Events expected	Statistics	Events Observed	Events expected	Statistics
0	23	19.65	chi2(1) = 0. 87	23	19.65	chi2(1) = 0. 68
1	51	54.35	Pr>chi2 = 0. 350	51	54.35	Pr>chi2 = 0. 409

Table 3 : Results

Covariates	Dependent variable Log (T)		
	(1)	(2)	(3)
Renpetro	0.010 (0.005)**		0.010 (0.005)**
Rentmin		-0.005 (0.010)	-0.003 (0.010)
Passe	-1.694 (0.083)***	-1.707 (0.083)***	-1.693 (0.083)***
Lmpib	0.141 (0.063)**	0.170 (0.069)**	0.142 (0.063)**
Lmpop	-0.005 (0.003)	-0.001 (0.003)	-0.005 (0.003)
Demo	0.003 (0.010)	-0.003 (0.010)	0.002 (0.010)
Fract	-0.374 (0.207)*	-0.239 (0.202)	-0.371 (0.208)*
Croisretard	0.013 (0.006)**	0.012 (0.006)**	0.013 (0.006)**
Dejpouv	0.108 (0.116)	0.100 (0.136)	0.103 (0.116)
Constant	3.045 (0.175)***	2.944 (0.169)***	3.048 (0.175)***
Observations	101	101	101
Log-likelihood	-58.1186	-59.9371	-58.0454
Wald Test	522.79***	500.83***	535.64***
1/P	0.375587	0.38559	0.3756867

Robust standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Covariates definition and sources

Variables	Definition	Sources
rentpetro; rentmin	Oil rents ; other mineral rent as a percentage of GDP	The calculation of natural resources rents is described in Bolt et al. (2002)
Lmpib	GDP per capita in constant dollars 2000	World development indicator 2005
Croisretard	lagged real GDP growth	
Lmpop	size of population	
Fract	Ethnolinguistic fragmentation: considered as the probability that two individuals taken randomly in a given country do not belong to the same ethnolinguistic group (Easterly and Livine, 1997)	Alesina A., Devleeschauwer A., Easterly W., Kurlat S., Wacziarg R.(2003)
Demo	The regime type	Polity IV database of Marshall and Jaggers (2002)
Dejpouv	The number of spells in office	Derived from Archigos database of Chiozza, Goemans and Cleditsch (2006)
Passe	The past removals (passe) are taken into account through a dichotomic variable, which takes the value of 1 if the country knew a change of regime in the five years preceding the completion date of a spell and 0 otherwise	Author's construction based on DPI2000 world bank's database.