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On the allocation of talented people in developing countries: the role of oil rents [≠]

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Abstract

Evidence has shown that the allocation of talented people affects the long-term growth. It has been found that a large population of engineers tends to foster innovation and growth more rapidly than population of lawyers and other activities with access to the public rent. Yet little is known about what determines the allocation of talents. This paper uses a sample of 69 developing countries to address this question. It shows that the oil rent tends to orient talents towards productive activities in well-governed countries, and towards rent-seeking activities in poorly governed countries. These results are robust to different specifications, datasets on governance quality and estimation methods. The paper sheds light on the sources and mechanisms of the resource curse through its effect on human resources and rent-seeking activities.

Key words: Rent-seeking; occupational choice; oil rents.
JEL Classification: D72; J24; Q32

Résumé

Il est démontré que la répartition des personnes les plus talentueuses affecte la croissance à long terme. Une grande population d'ingénieurs tend à favoriser l'innovation et la croissance plus rapidement qu'une population de juristes et d'autres métiers qui ont accès à la rente publique. Pour autant, nous savons encore peu sur ce qui détermine l'allocation des talents. Cet article utilise un échantillon de 69 pays en développement pour faire face à cette question. Il montre que l'allocation des talents est conditionnée par la rente pétrolière et la qualité de la gouvernance dans un pays. Ainsi, la rente pétrolière tend à orienter les talents vers les activités de recherche de rentes dans des pays mal gouvernés. Ces résultats sont robustes à des spécifications, des bases de données et des méthodes d'estimation différentes. Le document met en relief, les sources et les mécanismes de la malédiction des ressources naturelles par le biais de son effet sur les ressources humaines.

Mots clés: recherche de rente; choix de profession; rente pétrolière.
Classification JEL: D72; J24; Q32

1. Introduction

Education plays an important role in the debate over the curse of natural resources. The work conducted so far has focused on aggregated education rather than on its composition. Gylfason (2001) and Birdsall et al. (2001) argue that there is a negative correlation between dependence on natural resources and investment in education, yet Stijn (2006) objects to this result. This paper investigates the impact of natural resource on the choice of investment in human capital and goes beyond this quantitative question by looking at the composition of specializations in tertiary education. Murphy et al. (1991) argue that growth is spurred when the most talented people become entrepreneurs, they stimulate innovation and technological development, by contrast, it is harmed when the most talented people become rent-seekers, and dedicate themselves to less productive activities. In their empirical analysis, the authors relate entrepreneurship to training in engineering sciences and rent-seeking activities to training in law schools. The authors find that a larger number of engineers has a positive impact on growth, while a greater number of law majors, tends to reduce economic growth.

Agents move towards the acquisition of one specific talent as a reaction to the incentives provided by the country. These incentives are mainly determined by the size of the market, the nature of the contract, and the returns to scale of the activity. The work of Murphy et al. (1991) is fundamental to understanding the allocation of talent in an economy yet it does not test the elements that determine this allocation. This paper analyzes the role of natural resources and governance in the rent and incentive structure of the country, which is expected to affect the allocation of talents. This paper is the first one to investigate whether the existence of natural resource rents affect the students' decision between training rent seeking activities (law, economics and Marketing), and engineering courses. By contrast with Murphy et al. (1991) and most of the previous literature on this topic, we do not claim that law majors (as well as economics and marketing) are inherently less productive. Instead, it assumes that all activities have a decreasing marginal return and certain activities (with a law, economics or marketing degree) have a higher access to the rent than others. The model shows that the

combination of poor institutions, which makes rent seeking possible, and oil resources, which increase the size of the cake, leads more talents towards rent seeking activities, which creates a gap with the marginal productivity of engineers and thus generates economic inefficiencies and harms long term growth.

Like Mehlum et al. (2006), this paper studies the impact of natural resources and governance on the choice of activity and its consequences on economic growth, yet the approach differs substantially in many aspects. Melhum et al. restrict their theoretical analysis to a population of entrepreneurs and grabbers, and test the empirical implications using growth regressions.

By contrast, the model of this paper allows different productive activities which are complementary and have different levels of access to the rent. This allows the empirical test of the conclusions, looking at the choice of professional orientation of a wide student base, and shows that the combination of oil and poor governance increases the proportion of students who opt for activities with a higher access to the rent. Hence our analysis offers new insights on the origins and mechanisms of the resource curse.

The theoretical analysis shows that, on one side, oil rich countries have a higher need for engineers because of the complementarity between oil extraction and engineering. However, in countries with poor governance, oil increases the appeal of skills which provide a higher access to the rent, such as law, management and economics. Indeed, the analysis conducted on a sample of 69 developing countries under various econometric methods, shows that, in a country with good governance, oil rents shifts the orientation of talents from law, management and economist degrees, to engineer degrees, while the effect goes in the opposite direction in countries with poor governance.

The effect of oil rents on the allocation of talents conditional on the governance quality could be affected by either the demand or the supply side. On the demand side

individuals may opt for trainings that facilitate rent-seeking when the governance and institutional background of the countries is poor. In such a context, participating in rent-seeking activities is less subject to sanctions and gives a high payoff to the rent-seekers.[1] On the supply side, countries that are oil rich but badly governed may provide less engineering degrees. As a form of political patronage, this can be a strategy for the government to better control the voters through the instruments of wages and employment. Whether intentional or not, bad governments are more likely to use oil resources to inflate the size and remuneration of the administration[2] rather than redirecting the oil resources toward productive public or private investments.

The remainder of the paper is as follows. Section 2 offers a brief literature review. Section 3 highlights the theoretical mechanisms. Section 4 provides an empirical test of the hypothesis that talented individuals are mainly observed in rent seeking activities in developing oil rich countries that suffer from governance problems. Section 5 performs robustness checks and section 6 concludes.

2. Literature review and theoretical discussion

The literature on the resource curse has discussed the performance of resources-rich countries since the seminal regression of Sachs and Warner (1995), which shows a negative correlation between dependence on natural resources and economic growth. The authors attribute their results to the Dutch disease phenomenon. Many authors who have followed Sachs and Warner (1995) extend the analysis to other mechanisms and other outcomes (than growth). For example, Hausmann and Rigobon (2003) observe the impact of natural resources

[1] Another explanation comes from the fact that individuals living in oil badly governed countries may choose training that will provide them with a high probability to find a job due to the small private sector size. In such a context, individuals choose training that can increase their probability to be hired in the public sector, the main employer in the absence of a strong private sector.

[2] The distribution of the rent may or may not be in the form of corruption. The official creation of positions that are remunerated beyond their marginal productivity is also a form of redistribution of the oil rent.

on volatility. Tornell and Lane (1999) and Mehlum et al. (2006) present the institutional deficit as an explanatory factor for the curse. Other authors extend the curse to different indicators, including democracy (Ross, 2001), armed conflict (Collier and Hoeffler, 2000) and education (Gylfason, 2001).

Gylfason (2001) is thus the first to empirically focus on the relationship between natural resources and education. The author shows that oil-producing countries tend to have low levels of education. His result appears robust to three indicators of education: public expenditure on education relative to national income, expected years of schooling for girls, and gross secondary-school enrolment. The author argues that the dependence on natural resources leads to the inadvertent or deliberate neglect of progress in human capital. Gylfason (2001) concludes that the nations who believe that natural capital is their greatest asset develop a false sense of security and become negligent about the accumulation of human capital.

Birdsall et al. (2001) corroborate Gylfason's results. The authors also suggest that the dependence on natural resources tends to break the virtuous circle between education, growth and inequality. For the authors, higher private returns on human capital lead to higher rates of private investment, including among the poorest. This leads to an increase in productivity and less inequality in the future. Birdsall et al. (2001) argue that in a country with natural resources, governments are tempted to deviate from the policies that create this virtuous circle. The Dutch disease effects of natural resources adversely affect areas of high labor intensity such as the agricultural sector in developing countries. This will tend to reduce returns in human capital in these sectors employing the poor. Ultimately, there will be less investment and therefore no increase in productivity or reduction of inequalities.[3]

The aforementioned papers discuss the negative relationship between natural resources and human capital. They do not account for the learners' type of qualification as an element of

[3] Stijns (2006) disputes these results. The author uses abundance in natural resources as a variable, and finds that natural resource abundance positively affects education levels.

the analysis. However, Murphy et al. (1991) pointed out that the fact that a country tends to have a greater population of students in law schools is not neutral for economic growth. The authors argue that this allocation of talent can be the cause of slow economic development in many countries in Africa and Latin America and can explain the development of East Asian countries. Indeed the reduction of entrepreneurs slows down technological progress and economic growth.

This paper investigates the determinants of the allocation of talent in developing countries, with a particular focus on the incentives faced by students in the oil-rich economies. Indeed, among the natural resources, oil seems to be the resource with the highest occurrence of the resource curse (Ross, 2004; Manzano and Rigobon, 2006). This singularity is primarily due to the importance of oil rents (Manzano and Rigobon, 2006). Therefore, it makes sense to ask whether the presence of such rents could lead students to choose courses that lead to rent-seeking activities.

While an extensive theoretical literature on the allocation of talent in resource-rich countries has flourished, little has been done in empirical literature. Among the theoretical literature, of Baland and Francois (2000) and Mehlum et al. (2006) have brought significant contributions. Baland and Francois (2000) are interested in the specialization of certain economies in rent-seeking rather than in productive activities in a context of a natural resource boom. The authors suggest that this orientation depends on the relative importance of the sector in productive activities before the boom. If productive activities are far more important than the rent-seeking activities, then the sector will succeed in capturing its own rent and there will be a dilution of rent-seeking activities, otherwise, the activities of rent-seeking will be more important. However, the authors examine only the boom period (positive external shock). Moreover, in Baland and Francois (2000), rents are derived from quantitative restrictions on imports as developed by Krueger (1974), which differs from the focus of this paper.

Mehlum et al. (2006) focus on the entrepreneurs' allocation between productive and unproductive activities. Their model studies the rent generated by natural resources. Indeed, it is well known that, on one hand the exploitation of natural resources increases the income of the country, and on the other hand it causes the displacement of private agents (including entrepreneurs) from the most productive sectors of the economy to the natural resource sector. It induces, for the occasion, rent-seeking behaviors. Agents will therefore make a tradeoff between using their resources for productive activities and using these resources to capture rents. The decision to move from one category of activity to the other will depend on the profitability of each sector. Mehlum et al. (2006) suggest that profitability will depend on the quality of the institutions in place. For the authors, if institutions are of good quality, production activities are more profitable than rent-seeking activities. Indeed, in the absence of good quality institutions, the opportunity cost of rent-seeking activities decreases. Consequently, entrepreneurs abandon the productive sectors to engage in rent-seeking activities. This diversion from the productive sector leads to a decline in productivity throughout the economy. This decrease in productivity leads to lower growth. Natural resources will therefore be a blessing or a curse depending on the quality of the home institutions (Mehlum et al., 2006).

These studies remain theoretical and predictions in terms of allocation of talent are not subject to empirical test. Our study aims to fill this gap.

3. A Model of complementary talents and rent seeking

This section presents a simple general model where talents can choose their allocations between two types of profession[4]. Both professions contribute to the production of the country

[4] The two professions in the model are called engineer and lawyer for simplicity, but in fact it represents one side professions in engineering, manufacturing and construction, and on the other side professions with a degree in social sciences, businesses and law. In fact it can represent any two types of professions which are complementary and where one profession has a better access to the rent than the other profession.

and are complementary. Besides this, one of the two professions is rent-seeking in the sense that part of its remuneration comes from an access to the rent, which depends on the quality of the institutions.

The total production of the country is given by:

$$Y = f(R, E, L)$$

Where R is the exogenous amount of natural resources of the country, E is the proportion of engineers, L is the proportion of lawyers, and $f(R, E, L)$ is a production function which, satisfies a positive and decreasing marginal productivity of each factor of production $f_x > 0$ and $f_{xx} < 0$ for any $x = 1,2,3$, complementarity between the factors of production $f_{xy} > 0$ for any $x, y = 1,2,3$ and $x \neq y$ and constant returns to scale $f(\gamma R, \gamma E, \gamma L) = \gamma f(R, E, L)$. Other factors of production such as capital and non-qualified labor can be included in the exogenous parameters of the production function; in this case, $f(R, E, L)$ is the value of the production after remuneration of all factors of production other than R, E and L.

The total population of engineers and Lawyers is normalized to one: $E + L = 1$

In the absence of rent-seeking, each talent is remunerated at its marginal productivity and the resource rent is equally spread among all talents[5].

$$w_E = f_2 + Rf_1 \quad (1)$$
$$w_L = f_3 + Rf_1 \quad (2)$$

Since the production function is CRS then $E\, w_E + L\, w_L = Rf_1 + Ef_2 + Lf_3 = Y$

It is now assumed that the lawyer has the capacity to capture a share r of the remuneration due to the entrepreneur (which is then equally divided among all lawyers). In a poorly governed country, r is higher, which increases the reward of the rent-seeking profession L at the expense of the engineers' payment.

$$w_E = (1 - r)(f_2 + Rf_1) \quad (3)$$

$$w_L = f_3 + Rf_1 + r\frac{1 - L}{L}(f_2 + Rf_1) \quad (4)$$

[5] It can be assumed as well that a fixed share $\propto$ of the resource rent is shared by the talents and the rest is spread among the rest of the population by replacing Rf_1 by $\propto Rf_1$. This has not implication on the conclusions of the model.

Notice that equation (1) and (2) represent special cases of equations (3) and (4) when $r = 0$. Each talent has the possibility to choose between becoming an engineer or a lawyer. Hence at the equilibrium both salaries are equal $w_E = w_L$. After simplification, this leads to the following equation:

$$\left(1 - \frac{r}{1-E}\right) f_2 = f_3 + 2r\, R f_1 \quad (5)$$

which can be rewritten

$$f_2 - f_3 = \frac{r}{1-E} f_2 + 2r\, R f_1 \quad (6)$$

Equation (6) explicitly shows that the marginal productivity of the lawyer is strictly lower than the marginal productivity of the engineer if and only if $r > 0$, and it is equal when $r = 0$.

The impact of an increase in natural resources on the proportion of engineers is given by the equation below.

$$\frac{dL}{dR} = \frac{f_{31} - \left(1 - \frac{r}{L}\right) f_{21} + 2r \frac{d(Rf_1)}{dR}}{(f_{23} - f_{22})\left(1 - \frac{r}{L}\right) + (f_{32} - f_{33}) + \frac{r}{L^2} f_2} \quad (7)$$

In the special case where $r = 0$, then $\frac{dL}{dR} = \frac{f_{31} - f_{21}}{(f_{23} - f_{22}) + (f_{32} - f_{33})}$ which is negative if and only if $f_{31} < f_{21}$ which implies that the complementarity between lawyers and natural resources is less than the complementarity between engineers and natural resources, which is likely if the oil extraction, and all sectors which are stimulated by the presence of the resources, requires a higher proportion of engineers than the rest of the economy. This is thus a "technological effect" since it results from the shape of the production function.

We make the reasonable assumption that $\frac{dRf_1}{dR} \equiv f_1 + R\left(f_{11} + (f_{13} - f_{12})\frac{dL}{dR}\right) > 0$, which simply implies that the resource rent Rf_1 increases when the natural resource R increases. Because the denominator of the RHS of equation (7) is always positive[6], the sign of $\frac{dL}{dR}$ is equal to the sign of the numerator of the RHS. Hence for any set of parameters, if $f_{31} < f_{21}$, then there exists a r^* such that $\frac{dL}{dR} < 0$ when $r < r^*$ and there exists an $r^{**} > r^*$

[6] $1 - \frac{r}{L}$ is necessarily positive because $r > L$ is not compatible with $w_E = w_L$.

such that $\frac{dL}{dR} > 0$ when $r > r^{**}$, where r^* and r^{**} are functions of L and of the exogenous parameters of the model[7].

The theoretical model brings a few insights. First it is not necessary to start with the assumptions that lawyers (and other professions with access to rent-seeking) are less productive, but it is in fact the existence of the rent, combined with the decreasing marginal productivity of each profession, which causes the marginal productivity of the lawyer to be lower than the one of the engineer. The possibility for the lawyer to acquire a rent creates a deviation from the optimal allocation of talents, providing an excess of lawyers, which is a source of inefficiency.

Some previous research (Murphy et al. 1991, Mehlum et al. 2006) looked at the effect of talents on long term growth, which goes beyond the scope of this paper. A theoretical investigation of the long term effect on growth can be feasible in a dynamic version of this model, where 'learning by doing' generates economic growth. In this case, it is expected that deviation from the optimal allocation of professions will lead to a relatively slower learning in engineering than in the rent seeking profession, which would harm economic growth.

This model shows that, in the absence of corruption, the complementarity between natural resources and engineers causes the proportion of lawyers to decrease with natural resources. Yet as the possibility for corruption increases, the impact of natural resources on the proportion of lawyers becomes positive as the benefits from the appropriation of the rent outweigh the previously described technological effect. Hence we expect to find that natural resources alone have a negative impact on the allocation of talents towards lawyers, but the multiplicative variable natural resources times corruption should have a positive impact on the proportion of lawyers relatively to the proportion of Engineers. These implications will be tested in the following empirical section.

[7] The proof comes from the fact that 1) $\frac{dL}{dR} < 0$ when $r = 0$ and $f_{31} < f_{21}$, 2) $\frac{dL}{dR} > 0$ when $r = L$, and 3) $\frac{dL}{dR}$ is a continuously differentiable function of r.

4. Empirical Analysis

4.1) Econometric model of the effect of oil rents on the allocation of talents, conditional on governance

This paper tests the hypothesis that the effect of oil rents on the allocation of talents toward rent seeking activities increases with bad governance. We follow Murphy et al. (1991) in their theoretical discussion on the determinants of the allocation of talent for the selection of the control variables. In this case, we can specify the following equation:

$$T_i = X_i'\beta + (\alpha + \delta\, INST_i)OIL_i + \gamma INST_i + d_j + \varepsilon_i \qquad (8)$$

with ε_i the residual term, d_j the regional dummies and *i* stands for the country.

The main hypotheses tested are: $\theta_1 = 0$, $\alpha < 0$, and $\delta > 0$.[8] In other terms, the effect of oil rents on the allocation of talents (T_i) is statistically null ($\theta_1 = 0$), but becomes statistically significant once this effect is conditioned upon the governance quality. Therefore, the marginal effect of oil rents $\left(\frac{\partial T_i}{\partial OIL_i} = \alpha + \delta \times INST_i\right)$ on the allocation of talents towards rent seeking activities (T_i) is more positive in badly governed countries ($INST_i$).

The dependent variable T_i indicates the talent allocation. It is measured as the difference between the share of students enrolled in training correlated with rent seeking activities (social sciences, business and law) and those enrolled in training correlated with productive activities (engineering, manufacturing and construction). More formally, we have:

$\boldsymbol{T_i}$ is defined as the enrolment in social sciences, business and law minus the enrolment in engineering, manufacturing and construction, and expressed as percentage of the total enrolment in tertiary education.

[8] identifies the effect of oil rents on the allocation of talents toward rent seeking activities in countries exhibiting an index of governance equal to 0 (this corresponds to the highest governance quality score) and it is therefore expected to be negative. This suggests that more talented people choose entrepreneurship activities in oil rich and well governed countries.

The definition adopted is similar to the one used by Mariani (2007) and is broader than the one adopted by Murphy et al. (1991). The latter retains Enrolment in law as a proxy for the choice of careers in rent-seeking activities, and Enrolment in engineering as a proxy for career choices in productive activities. Like Mariani (2007), who extends this definition, we consider enrolment in engineering and science as a proxy for productive activities, enrolment in the social sciences, business and law as a proxy for rent-seeking activities. All the dependent variables are drawn from the database of the Statistical Yearbook of UNESCO.

$\boldsymbol{OIL_i}$ represents the oil rents as percentage of country GDP. In the literature, various variables are used to measure the dependence on natural resources. The most common are the percentage of exports of natural resources in total exports, and the percentage of exports in GDP. Papers using either of these variables tend to confirm the hypothesis of the resource curse (Sachs and Warner, 1995; Leite and Weidmann, 1999). However, some studies using other measures, such as the level of production (Stijn, 2006) or the percentage of resource revenues in government revenues (Herb, 2005), have lead to a rejection of the existence of the curse of natural resources. However, as pointed out by Rosser (2006), these studies on the natural resource curse address the specific behaviors associated with agents in the presence of rents generated by the exploitation of natural resources. Therefore, it appears that a measure in terms of rents from the exploitation of natural resources is the most appropriate. This paper highlights the incentives in the student choices in the presence of oil revenue, and therefore the Oil rents variable appears relevant to this purpose. The variable Oil rents is derived from the World Bank Development Indicator online dataset.

$\boldsymbol{INST_i}$ is an indicator of the quality of governance. Institutional quality is an important element in the management of revenues from exploitation of natural resources in the resource curse literature (see, e.g., Sala-i-Martin and Subramanian; 2003; Melhum et al., 2006), but it is also an important element in the allocation of talents, as shown by Murphy et al. (1991), . In this paper we integrate the governance vulnerability index as a whole. Thus, in the first approach, we follow the implementation of institutional quality in the growth model (Melhum et al., 2006).

In the second approach, we break up the governance vulnerability index into its components. The rationale is that different institutional variables may show different effects on the allocation of talents. The governance variables are drawn from the Worldwide Governance Indicators (WGI) database of the World Bank. The Worldwide Governance Indicators (WGI) project has reported aggregate and individual governance indicators for 212 countries and territories since 1996.[9] Six dimensions of governance are reported: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, control of corruption.[10] More recently, the six indicators were defined as:

- *Voice and Accountability* – measuring the extent to which a country's citizens are able to participate in selecting their government; as well as freedom of expression, freedom of association, and a free media.

- *Political stability and Absence of Violence* – measuring perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including political violence or terrorism.

- *Government effectiveness* – measuring the quality of public services; the quality of the civil service and the degree of its independence from political pressures; the quality of policy

[9] Kaufmann, Kraay, and Mastruzzi (2009) construct a meta-indicator that aggregates a host of different measures, from firm, investor, and population surveys to expert and international organization assessments to come to their overall measurements of the quality of governance. Data are available at the Worldwide Governance Indicators (WGI) project website under the following address:
http://info.worldbank.org/governance/wgi/index.asp
For more details on the construction of the indices, refer to Kaufmann, Kraay and Mastruzzi (2009). "Governance Matters VIII: Aggregate and Individual Governance Indicators, 1996-2008". World Bank Policy Research Working Paper Series, 4978.

[10] It should be noted that these governance indicators are all based on data from expert assessments, polls of experts and surveys of government officials and businesses, and therefore capture perceptions of the government process rather than any formal aspects of the actual government structure in any given country. This creates the important problem that perceptions are shaped not just by the government environment, but also by many other aspects of the socio-economic environment, thereby creating its own set of endogeneity and reverse causality issues. There is a large literature critical of the World Governance Dataset (Arndt and Oman, 2006; Kurtz and Shrank, 2006; Kurtz and Shrank, 2007). Kaufmann, Kraay and Mastruzzi have categorized some of these critiques as concerns about the comparability of the indicators across countries and across time; concerns about bias in expert polls or in particular sources; and concerns about the independence of the different data sources and the consequences for the aggregate indicators. (Kaufmann, Kraay and Mastruzzi, 2006). More recently, Thomas (2010) dismisses the Worldwide Governance Indicators (WGI) as an 'elaborate and unsupported hypothesis' because of the failure to demonstrate the 'construct validity' of these indicators. A short answer to Thomas (2010) is provided by Kaufmann et al. (2010). The authors cast doubts on the practical consequences of failure to meet the criteria of construct validity and therefore minimize this critique.

formulation and implementation, and the credibility of the government's commitment to such policies.

- *Regulatory quality* – measuring the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

- *Rule of law* – measuring the extent to which Law Enforcement agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police and courts, as well as the likelihood of crime and violence.

- *Control of corruption* – measuring the extent to which public power is exercised for private gain (including both petty and grand forms of corruption), as well as "capture" of the state by elites and private interests.

To build the indicators of governance used in the econometric estimations, we reverse all the original indicators of governance quality by the following formula:

$$Inst_i = \frac{Inst_i - min(Inst)}{max(Inst) - min(Inst)}$$

where $min(Inst)$ and $max(Inst)$ represent the minimum and the maximum of each indicator of governance quality, respectively. This transformation ensures that $INST_i$ will have a range between 0 and 1. Hence $INST_i$ increases with the deterioration of the quality of governance. Moreover, this ensures the standardization of these variables into new indices which are therefore reasonably comparable. Given the fact that the indices are distributed over the same interval [0, 1], the coefficients of the interactive terms (oil rents crossed with the governance variable) will facilitate direct comparison across different equations.

We first use an indicator of the overall quality of governance which combines all the six separate dimensions into a single index. The principal component analysis method is used to achieve this. The aggregate index of governance is the first principal component of the vector of the six indicators of governance already constructed. Table A1 in Appendix A shows that the first principal component accounts for almost 81% of the overall variance. The table also presents the eigenvectors and the correlation between the synthetic indicator and

each variable. The resulting aggregated indicator of governance has been rescaled to be ranged between 0 and 1. Subsequently, the paper uses separately each indicator of governance quality to assess the impact of the oil rents on the allocation of talents conditional on the level of governance quality.

The vector **X** gathers the proxies of the determinants of talent allocation as suggested by Murphy et al. (1991). This includes the size of government, the degree of openness, the cost of registering property, and the access to credit by the private sector. The size of government, the degree of openness and the access to credit are from the World Development Indicators (2009). The cost of registering property is drawn from the World Bank's 'Doing Business'. To these variables, we added regional dummies (d_j) identifying the regional variability in the allocation of talents.

4.2) Preliminary evidence

Equation 8 is estimated by the OLS method with a full set of regional dummies. A cross-section of 69 countries is used with data averaged over the period 2000-2008. This period is retained so that we have the most data on our dependent variable (allocation of talents) and on governance quality. It is therefore deemed to constitute the largest possible sample of developing countries.

The results of the first estimations do not reject the hypothesis that the linear effect of oil rents on the allocation of talents is, statistically null. This holds independently of the choice of control variables and the dimension of the governance quality which is controlled for.[11]

Table 1 presents the results of the estimations of the model which allows for an effect of the oil rents on the allocation of talents that depends on the quality of institutions. In the first two columns (1 and 2) the dependent variable is T_i. The Governance vulnerability variable is the overall institutional quality variable obtained from the method of principal

[11] Results are not shown but available from the authors upon request.

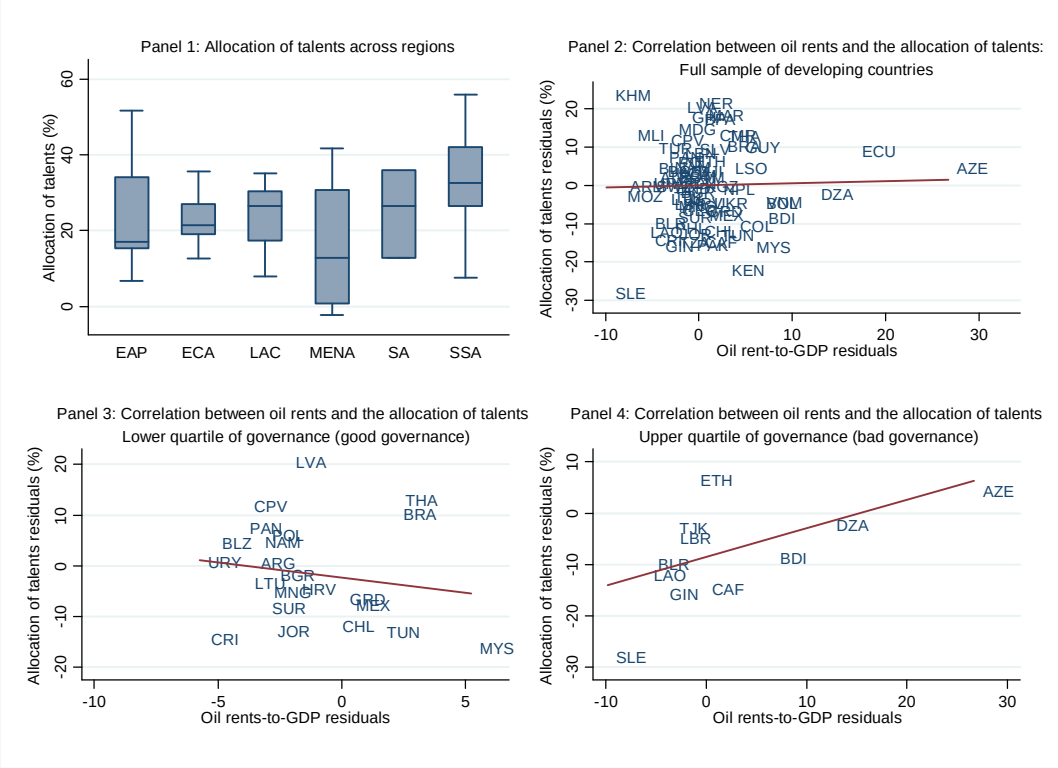
component analysis of the different variables of the WGI database. These components are Corruption, Rule of law, Regulatory quality, Government effectiveness, Political stability, and Voice & Accountability.

The negative sign and the significance of the coefficient associated with the variable Oil-rent-to-GDP in column 1, reflect a negative impact of oil rents on students' incentives towards orientation to rent-seeking activities when the country has good governance (Governance vulnerability equal to 0). Besides this, the significance of the positive coefficient of the multiplicative variable (Oil rent*Governance vulnerability) reflects the fact that the poorer the country's governance quality is (high Governance vulnerability), the more students will be encouraged to choose courses leading to law concentrators (training oriented to rent-seeking activities).

This result is not rejected in column 2, even when we use the Governance quality variable in the initial period (2000) instead of taking an average as in the previous case. Using the governance quality observed at the beginning of the period analysis would allow the reduction of a potential endogeneity bias associated with the coefficient of the variable oil rents. This is particularly relevant when the endogeneity issue arises from the reverse causality problem between the oil rents and the allocation of talents. The coefficient associated with the Oil rent-to-GDP variable is still negative and significant while the coefficient associated with the multiplicative variable (Oil rent * Initial governance vulnerability) is still positive and significant.

These first results are confirmed by the graphical analysis below (Figure 2). In box plots of Panel 1, the lower and upper hinges of each box show the 25th and 75th percentiles of the samples, the line in the box indicates the respective medians, and the end-points of whiskers mark next adjacent values. Panels 2, 3, and 4 plot the level of oil rents-to-GDP and the measure of the allocation of talents. The measure of the allocation of talents and the oil rents-to-GDP ratio in panels 2, 3, and 4 are residuals derived from regressions of these two variables, each regressed on the same set of control variables as in Table 1

Figure 1: Allocation of talents across regions, and correlation with oil rents



Notes: The allocation of talents variable is defined as the enrolment in social sciences, business and law minus the enrolment in engineering, manufacturing and construction, and expressed as percentage of the total enrolment in tertiary education. In panel 1, EAP: East Asia and Pacific, ECA: Europe and Central Asia, LAC: Latin America and Caribbean, MENA: Middle East and North Africa, SA: South Asia, SSA: Sub-Saharan Africa. In panels 2, 3, and 4 the adjusted measures of the allocation of talents and oil rents are purged from any collinearity with standard determinants of allocation of talents.
The governance index is the aggregation using the principal component analysis (see Table A1, Appendix A) of the six indicators of governance built by Kaufmann, Kraay, and Mastruzzi (2009): Corruption, Rule of law, Regulatory quality, Government effectiveness, Political stability, and Voice and accountability. The resulting governance index has been rescaled to be between 0 and 1 with higher value indicating a bad level of governance.
Source: Authors' calculations using UNESCO Statistical Yearbooks, World Development Indicators, and World Governance Indicators.

Figure 1 does not show a clear correlation between oil and the allocation of talents in the full sample (panel 2).Correlations of opposite signs depend on whether the quality of governance is good or bad (panel 3 and panel 4).

To summarize, the first results suggest that, in the presence of oil revenues, most students choose law training (oriented to rent-seeking) if - and only if - the governance quality of the country is poor. Otherwise (if the governance quality is good), they will be more tempted by engineering studies (oriented to productive activities).

5. Robustness checks

5.1) Testing an alternative dependent variable

Thus far, the results showed that the allocation of talents depends on the presence of oil revenues and the governance quality of the countries. However, having a dependent variable, taken as the difference between the enrolment in social sciences, business and law and the enrolment in engineering, manufacturing and construction, imposes a symmetrical impact of the explanatory variables on both sectors. After all, Murphy et al. (1991) note that certain items that affect the number of lawyers may act disproportionately on the population of engineers. We take this observation into account by changing the dependent variable in regressions 3 and 4 of Table 1. The dependent variable retained is the proportion of Enrolment in law defined as the enrolment in social sciences, business and law as percentage of the sum of the enrolment in social sciences, business and law and the enrolment in engineering, manufacturing and construction.

The expected econometric results are confirmed. In columns 3 and 4 of Table 1, the coefficient associated with the Oil rent variable is still negative and significant while the coefficient associated with the multiplicative variable remains positive and significant. This suggests that talented individuals are more allocated toward rent seeking activities in oil rich countries exhibiting a bad governance quality, while the opposite holds for those exhibiting a better governance quality score. In addition, we also note that the coefficient of the Cost of registering property variable is also positive and significant, showing that the higher the cost for property rights is, the more rent-seeking activities are present.

Table 1.Conditional effect of oil rents on the allocation of talents according to the level of an aggregated governance quality index: OLS with regional dummies.

Dependent variable:	**Difference between law & engineering**		**Proportion of the enrolment in law**	
	(1)	(2)	(3)	(4)
Oil rent-to-GDP	**-5.308****	**-2.711***	**-4.485*****	**-2.830****
	(-2.655)	**(-1.851)**	**(-2.842)**	**(-2.084)**
Oil rents * Governance vulnerability	**9.311*****		**7.635*****	
	(2.795)		**(2.967)**	
Oil rents * Initial governance vulnerability		**4.968****		**4.866****
		(2.057)		**(2.223)**
Governance vulnerability	-23.62		-4.842	
	(-1.297)		(-0.332)	
Initial governance vulnerability		-30.29**		-10.65
		(-2.044)		(-0.845)
Real GDP per capita growth	-1.277	-0.973	0.212	0.261
	(-1.011)	(-0.937)	(0.294)	(0.369)
Initial real GDP per capita	-1.822	-2.164	0.127	-0.689
	(-0.751)	(-1.049)	(0.0651)	(-0.379)
Trade openness	0.0505	0.0384	0.0447	0.0357
	(0.956)	(0.791)	(0.997)	(0.808)
Foreign direct investment-to-GDP	-0.480	-0.204	0.0415	0.138
	(-1.661)	(-0.759)	(0.164)	(0.554)
Government consumption-to-GDP	-0.386	-0.296	0.0430	0.0406
	(-1.341)	(-1.119)	(0.175)	(0.167)
Private credit-to-GDP	-0.0647	-0.1000	-0.0561	-0.0647
	(-0.654)	(-1.201)	(-0.734)	(-0.775)
Registering property cost	0.101*	0.0999***	0.110***	0.113***
	(1.969)	(2.677)	(2.878)	(2.994)
Protection of investors index	0.0749	-0.00353	0.0767	0.0350
	(0.555)	(-0.0306)	(0.864)	(0.392)
Constant	53.24*	59.63**	64.17***	73.69***
	(1.708)	(2.166)	(2.764)	(3.638)
Observations	69	69	69	69
R-squared	0.309	0.293	0.445	0.436

Notes: Robust *t*-statistics in parentheses. All the models include the full set of regional dummies. All the original series of governance drawn from the WGI dataset have been reverted so that high values refer to bad governance quality. The governance vulnerability used here is the aggregation of the WGI indices using the principal component analysis. The composite index is ranged between 0 and 1. *** p<0.01, ** p<0.05, * p<0.1

5.2) Breaking-down the aggregate index of governance quality

Previous results indicated that the effect of oil rents on the allocation of talents is conditional on the level of the overall governance quality. This result is confirmed by various measures of the dependent variable (allocation of talents). However, it does not give us any indication on which specific component of governance acts on the allocation of talent. One of them could well dominate the composite indicator, making it worthwhile therefore to break up this composite indicator and return to specific measures of quality of governance. The goal is to be as specific as possible in order to achieve the most appropriate recommendations. Table 2 shows the estimation results of various governance variables on talent allocation.[12] These variables include Corruption, Rule of law, Regulatory quality, Government ineffectiveness, Political instability and Unaccountability. The coefficients associated with oil rents remain negative. The coefficients associated with multiplicative variables (Oil rents * Governance indicators) are also positive as in the previous case. These coefficients are highly significant on four of these variables: Corruption, Rule of law, Regulatory quality and Government ineffectiveness. The significance of corruption and the regulatory quality appears to correspond to a theoretical prediction by Murphy et al. (1991). Indeed, in their theoretical analysis, the authors insisted on the definition of property rights and the possibility of easy access to rents as the main determinants of the allocation of talent. In this context, the significance of the multiplicative Oil rent * Corruption reflects the fact that the more corrupt a country is, the easier it is to dispose of the rents. Consequently, more students will be able to choose law training (oriented to rent-seeking). The significance of the multiplicative (Oil rents* Regulatory quality) suggests that when most property rights are poorly defined and defended in an oil country, most agents do not dare to start productive activities.

These results are not rejected when we retain as the dependent variable the ratio of enrolment in law as a percentage of the sum of the enrolment in both law and engineering (Table 3). They are also robust to the use of initial values of the governance variables (Table Table 4).

[12] The six indicators of governance quality are tested separately. Ideally, the six indicators would be used simultaneously in the models. We tried this but got unreliable results with no statistically significant coefficients. We interpreted this result by the high colinearity between each of the six dimensions of governance.

Table 2. Conditional effect of oil rents on the allocation of talents according to the levels of several dimensions of governance quality: OLS with regional dummies.

Dependent variable:	**Difference between law & engineering**					
	(1)	(2)	(3)	(4)	(5)	(6)
Oil rent-to-GDP	**-6.412*** **	**-6.836*** **	**-4.880*** **	**-4.908*** **	**-2.073**	**0.437**
	(-3.232)	**(-3.174)**	**(-3.032)**	**(-3.617)**	**(-1.425)**	**(0.457)**
Oil rents * Corruption	**8.867*** **					
	(3.290)					
Oil rents * Rule of law		**12.07*** **				
		(3.310)				
Oil rents * Regulatory quality			**9.716*** **			
			(3.215)			
Oil rents * Government effectiveness				**9.012*** **		
				(3.848)		
Oil rents * Political stability					**4.171**	
					(1.578)	
Oil rents * Accountability						**-0.195**
						(-0.124)
Corruption	-6.404					
	(-0.411)					
Rule of law		-22.80				
		(-1.243)				
Regulatory quality			-27.52			
			(-1.619)			
Government effectiveness				-19.34		
				(-0.907)		
Political stability					-24.70**	
					(-2.075)	
Accountability						-30.32***
						(-2.919)
Real GDP per capita growth	-1.382	-1.318	-0.790	-1.036	-1.254	-0.879
	(-1.024)	(-1.073)	(-0.639)	(-0.810)	(-0.962)	(-0.693)
Initial real GDP per capita	-0.202	-1.793	-1.251	-0.954	-2.516	-2.762
	(-0.0913)	(-0.787)	(-0.623)	(-0.370)	(-1.097)	(-1.403)
Trade openness	0.0623	0.0672	0.0481	0.0617	0.00244	0.0583
	(1.153)	(1.205)	(0.923)	(1.161)	(0.0418)	(1.060)
Foreign direct investment-to-GDP	-0.655**	-0.524*	-0.313	-0.466	-0.247	-0.419
	(-2.227)	(-1.892)	(-1.138)	(-1.651)	(-0.818)	(-1.577)
Government consumption-to-GDP	-0.373	-0.432	-0.266	-0.367	-0.354	-0.451
	(-1.193)	(-1.432)	(-0.998)	(-1.240)	(-1.304)	(-1.649)
Private credit-to-GDP	-0.0674	-0.0466	-0.0842	-0.0627	-0.0130	-0.0791
	(-0.721)	(-0.477)	(-0.871)	(-0.684)	(-0.124)	(-0.786)
Registering property cost	0.0912	0.102**	0.112**	0.109**	0.0874	0.0850
	(1.614)	(2.039)	(2.117)	(2.099)	(1.650)	(1.614)
Protection of investors index	0.154	0.0853	0.0656	0.116	0.00859	-0.0635
	(1.168)	(0.682)	(0.452)	(0.809)	(0.0610)	(-0.463)
Constant	31.64	51.80*	45.70*	40.56	60.57**	64.79**
	(1.113)	(1.744)	(1.720)	(1.173)	(2.143)	(2.581)
Observations	69	69	69	69	69	69
R-squared	0.299	0.327	0.301	0.317	0.283	0.308

Notes: Robust *t*-statistics in parentheses. All the models include the full set of regional dummies. All the original series of governance drawn from the WGI dataset have been reverted so that high values refer to bad governance quality. Governance measures are ranged between 0 and 1. *** p<0.01, ** p<0.05, * p<0.1

5.3) Testing other indicators of corruption

Because subjective, institutional variables are often subject to measurement errors (Acemoglu et al., 2001), although the use of various governance variables in this paper may lead to the conclusion that these measurement errors do not explain our results, we evaluate these results with alternative databases. For this evaluation, we replace the data from WGI to the ones from Transparency International and ICRG on corruption. We want to investigate whether taking other sources of data corruption will amend our results.[13]

Table 5 presents results using the new measures of corruption. Independently of the choice of the corruption variable, the results confirm those obtained previously. The coefficient associated with the oil rents is significant and negative while the variable Oil rents* Corruption exhibits a significant and positive coefficient. So, is the higher the corruption of a country, the easier it is to gain access to rents and therefore more students will choose law training (oriented to rent-seeking).

[13] Again, the governance variables are rescaled to be between 0 and 1, with higher values indicating a bad level of governance quality.

Table 3. Conditional effect of oil rents on the allocation of talents according to the levels of several dimensions of governance quality: Testing an alternative dependent variable. OLS with regional dummies.

Dependent variable:	**Proportion of the enrolment in law**					
	(1)	(2)	(3)	(4)	(5)	(6)
Oil rent-to-GDP	**-4.674*** **	**-4.633*** **	**-3.836** **	**-3.407*** **	**-1.645**	**-0.358**
	(-2.689)	**(-2.679)**	**(-2.508)**	**(-3.032)**	**(-1.491)**	**(-0.398)**
Oil rents * Corruption	**6.368*** **					
	(2.774)					
Oil rents * Rule of law		**8.054*** **				
		(2.796)				
Oil rents * Regulatory quality			**7.431** **			
			(2.653)			
Oil rents * Government effectiveness				**6.081*** **		
				(3.172)		
Oil rent * Political stability					**3.088**	
					(1.618)	
Oil rents * Accountability						**0.782**
						(0.559)
Corruption	0.556					
	(0.0442)					
Rule of law		-8.262				
		(-0.561)				
Regulatory quality			-6.700			
			(-0.407)			
Government effectiveness				0.834		
				(0.0466)		
Political stability					-10.03	
					(-1.102)	
Accountability						-14.87
						(-1.673)
Real GDP per capita growth	0.0703	0.213	0.483	0.438	0.324	0.371
	(0.0945)	(0.302)	(0.658)	(0.584)	(0.439)	(0.504)
Initial real GDP per capita	0.581	-0.358	0.230	0.935	-0.734	-1.124
	(0.341)	(-0.201)	(0.124)	(0.420)	(-0.414)	(-0.672)
Trade openness	0.0515	0.0530	0.0372	0.0490	0.0219	0.0422
	(1.165)	(1.141)	(0.851)	(1.101)	(0.458)	(0.880)
Foreign direct investment-to-GDP	-0.0481	0.0491	0.172	0.0453	0.218	0.134
	(-0.184)	(0.197)	(0.675)	(0.167)	(0.890)	(0.525)
Government consumption-to-GDP	0.0435	0.0108	0.0941	0.0625	0.0405	0.00871
	(0.174)	(0.0433)	(0.408)	(0.257)	(0.168)	(0.0359)
Private credit-to-GDP	-0.0731	-0.0503	-0.0682	-0.0500	-0.0384	-0.0863
	(-0.972)	(-0.628)	(-0.879)	(-0.678)	(-0.458)	(-1.052)
Registering property cost	0.105**	0.111***	0.115***	0.111***	0.107***	0.105***
	(2.647)	(2.857)	(2.936)	(2.702)	(2.876)	(2.729)
Protection of investors index	0.113	0.0615	0.0797	0.104	-0.00353	-0.0155
	(1.328)	(0.719)	(0.842)	(1.170)	(-0.0378)	(-0.155)
Constant	57.53***	69.18***	61.45**	52.75*	74.61***	79.83***
	(2.767)	(3.251)	(2.648)	(1.997)	(3.894)	(4.325)
Observations	69	69	69	69	69	69
R-squared	0.446	0.444	0.435	0.451	0.417	0.422

Notes: Robust *t*-statistics in parentheses. All the models include the full set of regional dummies. All the original series of governance drawn from the WGI dataset have been reverted so that high values refer to bad governance quality. The governance indices are ranged between 0 and 1. *** p<0.01, ** p<0.05, * p<0.1

Table 4. Conditional effect of oil rents on the allocation of talents according to the initial levels of several dimensions of governance quality: Testing an alternative dependent variable. OLS with regional dummies.

Dependent variable:	**Proportion of the enrolment in law**					
	(1)	(2)	(3)	(4)	(5)	(6)
Oil rent-to-GDP	**-4.631****	**-3.067***	**-2.391**	**-3.203*****	**-1.023**	**-0.669**
	(-2.661)	**(-1.784)**	**(-1.641)**	**(-3.131)**	**(-1.302)**	**(-0.611)**
Oil rents * Corruption	**6.448*****					
	(2.750)					
Oil rents * Rule of law		**4.788***				
		(1.910)				
Oil rents * Regulatory quality			**4.814***			
			(1.751)			
Oil rents * Government effectiveness				**5.700*****		
				(3.260)		
Oil rent * Political stability					**2.124**	
					(1.475)	
Oil rents * Accountability						**1.206**
						(0.760)
Corruption (initial values)	-2.288					
	(-0.173)					
Rule of law (initial values)		-15.75				
		(-1.122)				
Regulatory quality (initial values)			-12.03			
			(-0.908)			
Government effectiveness (initial values)				0.702		
				(0.0467)		
Political stability (initial values)					-8.709	
					(-1.204)	
Accountability (initial values)						-15.28*
						(-1.951)
Real GDP per capita growth	0.105	0.107	0.249	0.470	0.577	0.411
	(0.143)	(0.153)	(0.332)	(0.649)	(0.775)	(0.582)
Initial real GDP per capita	0.288	-1.303	-0.497	0.821	-0.476	-1.126
	(0.164)	(-0.718)	(-0.299)	(0.412)	(-0.295)	(-0.705)
Trade openness	0.0500	0.0417	0.0337	0.0422	0.0218	0.0375
	(1.124)	(0.927)	(0.780)	(0.962)	(0.461)	(0.784)
Foreign direct investment-to-GDP	-0.0341	0.146	0.164	0.0704	0.256	0.146
	(-0.116)	(0.600)	(0.640)	(0.268)	(0.999)	(0.587)
Government consumption-to-GDP	0.0386	-0.0132	0.0785	0.0749	0.0737	0.0540
	(0.150)	(-0.0520)	(0.339)	(0.300)	(0.317)	(0.224)
Private credit-to-GDP	-0.0678	-0.0734	-0.0815	-0.0401	-0.0508	-0.0935
	(-0.890)	(-0.870)	(-1.003)	(-0.522)	(-0.611)	(-1.142)
Registering property cost	0.108***	0.116***	0.114***	0.113***	0.110***	0.104***
	(2.750)	(3.027)	(2.961)	(2.742)	(2.939)	(2.831)
Protection of investors index	0.0953	0.0226	0.0407	0.0799	0.00136	0.00580
	(1.080)	(0.262)	(0.443)	(0.902)	(0.0146)	(0.0621)
Constant	61.78***	82.74***	71.92***	54.46**	69.64***	79.16***
	(2.830)	(3.868)	(3.804)	(2.412)	(4.296)	(4.933)
Observations	69	69	69	69	69	69
R-squared	0.445	0.437	0.428	0.450	0.412	0.431

Notes: Robust *t*-statistics in parentheses. All the models include the full set of regional dummies. All the original series of governance drawn from the WGI dataset have been reverted so that high values refer to bad governance quality. The governance indices are ranged between 0 and 1. *** p<0.01, ** p<0.05, * p<0.1

Table 5. Testing alternative variables of corruption.OLS with regional dummies.

Dependent variable:	**Difference between law & engineering**		**Proportion of the enrolment in law**	
	(1)	(2)	(3)	(4)
Oil rent-to-GDP	**-5.760*** **	**-0.902*** **	**-4.958*** **	**-0.496** **
	(-3.715)	**(-4.004)**	**(-3.421)**	**(-2.605)**
Oil rents * Corruption (*a*)	**6.879*** **		**5.826*** **	
	(3.641)		(3.512)	
Oil rents * Corruption (*b*)		**0.477*** **		**0.221** **
		(3.276)		**(2.023)**
Corruption (*a*)	-2.781		4.354	
	(-0.209)		(0.451)	
Corruption (*b*)		-3.092		-1.230
		(-1.160)		(-0.690)
Real GDP per capita growth	-1.066	-1.720	-0.108	0.234
	(-0.880)	(-1.640)	(-0.156)	(0.287)
Initial real GDP per capita	0.401	-0.500	0.113	-0.307
	(0.191)	(-0.239)	(0.0677)	(-0.193)
Trade openness	0.0557	-0.0298	0.0257	-0.0536
	(1.148)	(-0.661)	(0.628)	(-1.047)
Foreign direct investment-to-GDP	-0.461*	-0.130	-0.0283	0.110
	(-1.869)	(-0.581)	(-0.124)	(0.521)
Government consumption-to-GDP	-0.220	0.451	0.105	0.230
	(-0.783)	(1.660)	(0.451)	(1.027)
Private credit-to-GDP	-0.0539	-0.0204	-0.0269	-0.0168
	(-0.741)	(-0.221)	(-0.439)	(-0.207)
Registering property cost	0.104**	0.0901**	0.128***	0.112***
	(2.475)	(2.201)	(4.629)	(3.963)
Protection of investors index	0.102	-0.0233	0.116	0.0295
	(0.960)	(-0.166)	(1.540)	(0.288)
Constant	23.54	37.73*	60.04***	73.12***
	(0.819)	(1.779)	(3.167)	(4.349)
Observations	69	57	69	57
R-squared	0.272	0.371	0.425	0.482

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (*a*) Transparency International corruption measure; (*b*) ICRG corruption measure.

5.4) Results from simultaneous regressions

Because the students are simultaneously exposed to the decision between the two sectors (law and engineering), the models describing the dynamic of these two sectors can be linked via the correlation between the two error terms of the equations. In this context, the SURE method allows us to take this feature into account and provides estimates of the system of the two equations.[14] The two dependent variables are respectively: enrolment in law (column 1) and enrolment in engineering (column 2) in Table 6. The proportion of enrolment in engineering is defined as the enrolment in engineering, manufacturing and construction as percentage of the total enrolment in tertiary education. The enrolment ratio in law is defined as the enrolment in social sciences, business and law as percentage of the total enrolment in tertiary education.

[14] Regional dummies are included in each equation of the SURE model to control for the unobserved regional characteristics which can determine the allocation of talents.

Table 6. Results from simultaneous equations.

Estimation method :	**SURE**	
Dependent variable:	**Enrolement in Law**	**Enrolment in Engineering**
	(1)	(2)
Oil rent-to-GDP	**-3.170****	**1.875***
	(-2.014)	**(1.705)**
Oil rents * Corruption	**4.363****	**-2.489***
	(2.021)	(-1.662)
Corruption	14.52	9.404
	(1.546)	(1.511)
Real GDP per capita growth	-2.049**	-1.248**
	(-2.349)	(-2.195)
Initial real GDP per capita	1.984	-0.242
	(0.985)	(-0.186)
Trade openness		0.00240
		(0.103)
Foreign direct investment-to-GDP		0.552*
		(1.840)
Government consumption-to-GDP	-0.597*	
	(-1.660)	
Private credit-to-GDP		0.0256
		(0.619)
Registering property cost		-0.0522**
		(-2.147)
Protection of investors index		-0.00228
		(-0.0333)
Electricity distribution losses		-0.309***
		(-2.653)
Constant	37.72*	18.69
	(1.831)	(1.503)
Observations	50	50
R-squared	0.305	0.529

Robust t-statistics in parentheses. Regional dummies are included in each equation. *** p<0.01, ** p<0.05, * p<0.1.

Results of Table 6 highlight a positive effect of oil rents on the number of rent-seekers conditional on the extent of corruption: resource rich countries that suffer from governance problems exhibit more rent-seeker formation than the others. In contrast, there is a negative effect of oil rents on the proportion of engineers conditional on poor performance in terms of control of corruption. In other terms, resource rich countries that suffer from governance problems train less engineers than the ones with good governance.

To summarize the results, all the robustness checks do not invalidate the main finding of the present study, notably that oil rents increases the attractiveness of rent-seeking activities when governance quality is low and reduces it when governance quality is high.

6. Conclusion

This paper has provided econometric evidence on the interaction between oil rents and the allocation of talents in developing countries, going beyond its impact on aggregate level of human capital. We investigated the determinants of occupational choices in a population of students in law school and students of engineering. We found that the presence of oil revenues determines the allocation of talent, depending on the quality of governance. While oil rents in less corrupt countries tend to orient talents towards productive activities, oil rents in highly corrupt countries tend to orient talents towards rent-seeking activities.

These results provide another explanation of the resource curse. Indeed, a student population that has the possibility of easy access to rents owing to a favorable environment characterized by a high corruption, will move more easily to the training that are correlated with rent seeking activities. This crowds out engineering education, which stimulates innovation, the basis of higher productivity and long term economic growth.

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APPENDICES

Appendix A. Results of the principal component analysis.

Table A1: Aggregating governance variables: principal components analysis (first eigenvector, correlation)

Variables	Governance quality, Composite index
Control of corruption	0.425
	(0.937)
Rule of law	0.434
	(0.956)
Regulatory quality	0.406
	(0.893)
Government effectiveness	0.425
	(0.935)
Political stability	0.374
	(0.823)
Voice and Accountability	0.381
	(0.840)
Eigenvalue	4.85
Variance proportion	81%

Note: We report the first eigenvector resulting from the first principal component analysis of governance quality. The aggregate index of governance is obtained using the following formula: Inst = 0.425*K1 + 0.434*K2 + 0.406*K3 + 0.425*K4 + 0.374*K5 + 0.381*K6, where K1, K2, K3, K4, K5, and K6 represent *standardized* measures of Control of corruption, Rule of law, Regulatory quality, Government effectiveness, Political stability, and Political stability, respectively. In addition, the numbers in parentheses (below the different eigenvectors) represent the correlation of the first principal component with the corresponding governance variable. The governance quality variables have been rescaled so that high values indicate high level of bad governance.

Source: Authors' calculations using UNESCO Statistical Yearbooks, World Development Indicators, and World Governance Indicators

Appendix B. Descriptive statistics and list of countries

Table B1 : Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Difference between enrolments in law and engineering as percentage of total enrolment in the tertiary education	82	25.532	12.867	-2.259	55.991
Enrolment in law as percentage of enrolments in law and engineering	82	77.723	12.541	47.094	99.531
Enrolment in law as percentage of total enrolment in the tertiary education	86	35.876	11.099	5.149	58.148
Enrolment in engineering as percentage of total enrolment in the tertiary education	82	10.719	6.931	0.139	30.175
Oil rent-to-GDP ratio	132	5.891	14.321	0	90.784
Aggregated governance index	134	0.497	0.186	0	1
Corruption	134	0.605	0.189	0	1
Rule of law	134	0.502	0.188	0	1
Regulatory quality	134	0.489	0.179	0	1
Government effectiveness	134	0.503	0.181	0	1
Political stability	134	0.434	0.221	0	1
Voice and Accountability	134	0.473	0.245	0	1
Corruption (Transparency International)	132	0.714	0.188	0	1
Corruption (ICRG measure)	95	0.498	0.162	0	1
GDP growth	135	4.606	2.804	-5.643	15.905
log GDP per capita	132	6.888	1.121	4.439	8.948
Trade openness	130	84.183	37.058	0.670	200.456
FDI-to-GDP ratio	129	5.037	4.822	-6.599	25.736
Government sonsumption-to-GDP ratio	126	15.116	6.008	5.210	40.227
Private credit-to-GDP ratio	130	30.330	25.861	1.956	138.021
Registering property cost as percentage of property value	115	7.068	5.778	0.067	28.933
Strength of investor protection index (0-10)	118	4.707	1.337	0.7	8.7
Electric power transmission and distribution losses (% of output)	89	19.238	15.765	3.492	114.423

Source: Authors' calculations using UNESCO Statistical Yearbooks, World Development Indicators, and World Governance Indicators

Table B2 : List of countries (69)

Albania	Kyrgyz Rep.
Algeria	Lao PDR
Argentina	Latvia
Armenia	Lebanon
Azerbaijan	Lesotho
Bangladesh	Liberia
Belarus	Lithuania
Belize	Madagascar
Bolivia	Malaysia
Brazil	Mali
Bulgaria	Mexico
Burkina Faso	Mongolia
Burundi	Morocco
Cambodia	Mozambique
Cameroon	Namibia
Cape Verde	Nepal
Central African Rep.	Niger
Chile	Pakistan
Colombia	Panama
Costa Rica	Philippines
Croatia	Poland
Djibouti	Romania
Ecuador	Sierra Leone
El Salvador	Suriname
Ethiopia	Swaziland
Georgia	Tajikistan
Ghana	Tanzania
Grenada	Thailand
Guatemala	Tunisia
Guinea	Turkey
Guyana	Uganda
Honduras	Ukraine
Indonesia	Uruguay
Jordan	Vietnam
Kenya	