JOURNAL OF ECONOMIC DEVELOPMENT 1
Volume 41, Number 3, September 2016

THE DIFFERENT IMPACTS OF DIFFERENT TYPES OF NATURAL RESOURCES ON POLITICAL INSTITUTIONS IN DEVELOPING COUNTRIES

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Rents generated by natural resources are usually thought to weaken the quality of institutions, particularly in developing countries. Our hypothesis is that this effect may differ depending on the types of natural resources characterized by their different degree of appropriability. We test this hypothesis using panel data covering 90 developing countries for the period 1970-2010. We find that total rents weaken the quality of institutions. However, while oil rents have a significant negative effect, forest and mineral rents do not, after controlling for the other relevant determinants of institutional quality, institutional persistence, neighbor effect, and endogeneity of rents.

Keywords: Natural Resources, Rents, Political Institutions, Panel Data Models
JEL classification: P48, Q34, C23

1. INTRODUCTION

There is now a large consensus that the quality of institutions is a pillar of economic development, alongside other important determinants such as geography, human capital, and openness (Knack and Keefer, 1995; Mauro, 1995; La Porta *et al.*, 1999; Acemoglu *et al.*, 2005; Rodrik, 2005; Kanyama, 2014).[1] However, the determinants of the quality of institutions are still being debated. Acemoglu *et al.* (2005) argue that groups which win political power choose institutions that serve their interest, and that political power mainly depends on the distribution – or capture – of economic resources.[2] In this paper

* We would like to thank the anonymous referee and the editor for their valuable comments. This research was supported by the Agence Nationale de la Recherche of the French government through the program 'Investissements d'avenir' (ANR-10-LABX-14-01), through the IDGM+ initiative led by Ferdi (Fondation pour les Etudes et Recherches sur le Développement International). The usual disclaimers apply.

[1] Broadly defined, institutions are humanly devised constraints consisting of formal and informal rules that structure political, economic and social interactions (North, 1990).

[2] This is the "social conflict" view. The authors identify three other explanations for institutional changes: (i) "efficient institutions", where agents negotiate among themselves and choose efficient institutions for the whole society, (ii) "ideology" which underlines the importance of political leaders' beliefs, (iii) "incidental

we focus on natural resource endowment as a strong structural characteristic of economic resource distribution and institutional change in developing countries.

The literature broadly supports the idea that rents from natural resources are harmful to institutional quality in developing countries (see Frankel, 2010; Van der Ploeg, 2011 for recent reviews). Firstly, appropriation disputes explain why natural resources can encourage rent-seeking, corruption, or conflicts (Boschini *et al.*, 2007). Secondly, governments can also suffer from the so-called "rent effect" of natural resources through (i) taxation, (ii) spending, and (iii) group formation (Ross, 2001; Omgba, 2009). The taxation effect suggests that when governments derive sufficient revenues from natural resources, they tax their population less heavily. In turn, the population is less likely to demand accountability from, and representation in, the government, following the so-called principle of "no representation without taxation" (Tilly, 1975). The spending effect suggests that rents lead to patronage, which dampens latent pressures for democratization (Atkinson and Hamilton, 2003; Vicente, 2010). The group formation effect suggests that the government will use its largesse to prevent the formation of contestant groups (Mahdavy, 1970; Anderson, 1987; Ross 2001; Andersen and Aslaksen, 2013).

However, the concept of "rentier states" suggests that different types of natural resources could have different impacts on the quality of institutions. The idea is that natural resources differ in their ease of appropriation (or capturability of the rent), inducing a more or less unequal distribution of the rent. Thus, Bulte *et al.* (2005) distinguish between "point resources" and "diffuse resources". Point resources generate rents that can be more easily captured, and so are more harmful to the quality of institutions than diffuse resources. Similarly, Boschini *et al.* (2007) focus on the technical appropriability of a resource. They argue that resources such as diamonds or precious metals are easily transportable, storable and saleable, and are therefore more detrimental than agricultural products. Petermann *et al.* (2007) consider that rents from oil are more harmful than those derived from forests, because oil involves contracts of higher value and is more technology-intensive. Engerman and Sokoloff (1997) and Ross (2001) pointed out that oil rents are more likely to degrade institutional quality because they are easily captured by the central government (see also Robinson *et al.*, 2014). Conversely, mineral or agricultural rents may contribute to improving the quality of institutions because they can be captured by a larger share of the population.

We investigate whether rents generated by natural resources have a detrimental effect on institutions, by considering different types of natural resources characterized by their different degree of appropriability. Taking advantage of a large dataset covering developing countries, we use appropriate techniques for panel data (Fixed Effects model, GMM-System and 2SLS estimators) in order to take into account unobserved heterogeneities, endogeneity of rents, and institutional persistence. Panel data offer a solution to the endogeneity problem through the use of lagged values as instruments for

institutions" where historical events determined institutions that have persisted over time.

endogenous variables (Lederman and Maloney, 2006).

This paper is organized as follows. Section 2 presents the empirical model and data. Section 3 discusses the results of model estimations. Section 4 presents robustness checks, and Section 5 concludes by offering policy discussions.

2. EMPIRICAL STRATEGY AND DATA

The few previous studies which have focused on the direct relationship between natural resources and institutions suffer from a number of limitations[3]: (i) the distinction between point resources and diffuse resources is not done or done imperfectly; (ii) the measures for rents, usually based on the ratio of primary commodity exports to GDP, are imperfect; (iii) they use cross-sectional data that do not allow to properly take into account unobserved heterogeneities (Lederman and Maloney, 2006; Borge *et al.*, 2015). In this paper we attempt to resolve these shortcomings by using appropriate econometric techniques and measures for rents.

We use annual data covering the period from 1970 to 2010, for 90 developing countries (see country list in Table A1 in Appendix). Our baseline specification is as follows:

$$Inst_{it} = \alpha_i + \beta_t + \delta_0 Inst_{it-1} + \delta_1 Rent_{it-1} + \sum_{k=2}^{k} \delta_{kit} X_{it} + \varepsilon_{it}, \quad (1)$$

where $Inst_{it}$ is a measure of institutional quality in country i at time t. Inertia in institutions is modeled by lagged $Inst$ among the regressors. $Rent_{it}$ is a measure of natural resource rents (total, oil, mineral, and forest), X_{it} is a vector of control variables, α_i is a country dummy variable for country fixed effects, β_t is a time dummy variable which controls for common shocks (e.g. international context), and ε_{it} is an idiosyncratic errors term. The parameter of interest is δ_1 and is expected to be negative. $Rent_{it-1}$ is lagged by one period to model a delayed effect of a change in rents on institutions (Bhattacharyya and Hodler, 2010; Brückner and Ciccone, 2012).

However, the estimation of Equation 1 faces two main issues. Firstly the presence of the lagged dependent variable among the regressors. We take this into account by using the Generalized Method of Moments (GMM) procedure. Secondly, the probable endogeneity of Rent. Endogeneity might come from measurement errors in Rent series

[3] See for instance Bulte et al., 2005; Brunnschweiler, 2008; Brunnsschweiler and Bulte, 2008. Other empirical works explore institutions as a transmission channel or a state variable conditioning the link between natural resources and economic performances (Mehlum et al., 2006; Brunnschweiler, 2008; Bulte et al., 2005; Boschini et al., 2007), or rent-seeking activities (Torvik, 2002; Bhattacharyya and Hodler, 2010). In some ways the "political survival models" in which resource rents affect the duration in office of political leaders are closer to our theme (Caselli, 2006; Omgba, 2009; Cuaresma *et al.*, 2011; Andersen and Aslaksen, 2013).

(attenuation bias). These errors are also likely to be correlated with $Inst_{it-1}$ (attrition bias). Endogeneity might also come from the omission of significant factors in the vector X. Following Carmignani and Avom (2010), we address endogeneity by using both the instrumental variables estimator, with the hypothesis $\delta_0 = 0$, and dynamic panel estimates, relaxing the restriction, $\delta_0 = 0$, which allows us to take into account the persistence in institutions. In the dynamic panel model we use five year average data to eliminate short-term variability. According to Roodman (2006), the GMM-System estimator is only relevant if the cross-country dimension is greater than the time dimension, which is the case when using five-year average data.

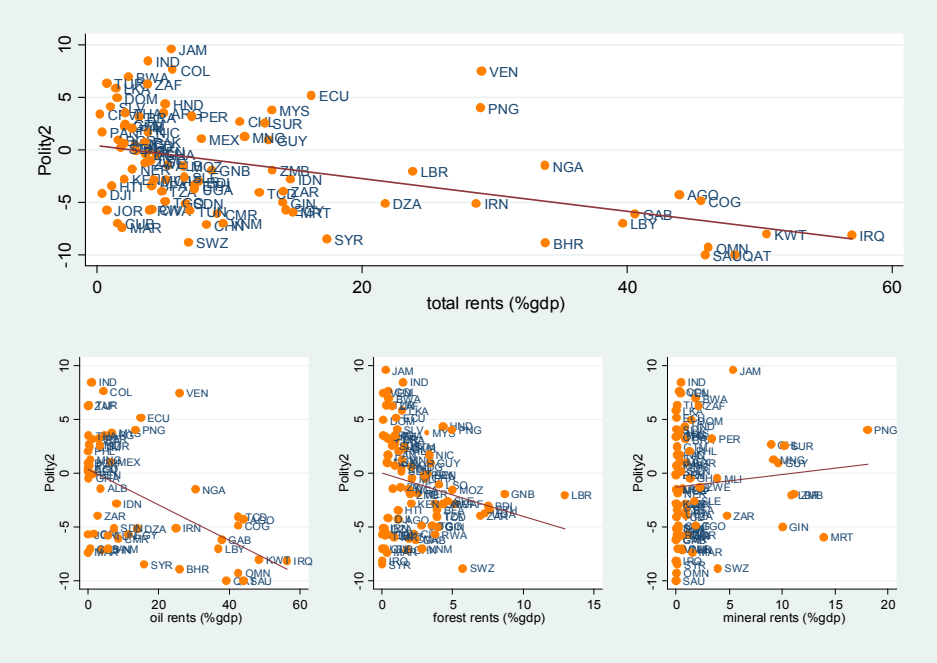

Figure 1. Polity2 and Rents in Percent of GDP

Data for natural resources rents are drawn from the World Development Indicators. According to the World Bank's definition, "natural resources rents are calculated as the difference between the price of a commodity and the average cost of producing it. This is done by estimating the world price of units of specific commodities and subtracting estimates of average unit costs of extraction or harvesting costs (including a normal return on capital). These unit rents are then multiplied by the physical quantities countries extract or harvest to determine the rents for each commodity as a share of

gross domestic product (GDP)".[4] We use this measure of rents for the following reasons: (i) it is a good proxy for revenues from natural resources that can be captured by the State, politicians, or social groups, (ii) the time and country coverage is broad, thus reducing selection bias, (iii) the use of exogenous world prices limits the endogeneity problem, (iv) this measure is widely used in the literature (e.g. Ross, 2006; Collier and Hoeffler, 2008; Bhattacharyya and Hodler, 2010). To test the different impact of different types of natural resources on institutional quality, we use data series for total rents, and oil, mineral and forest rents. Unfortunately, data on other raw materials rents are very limited. Figure 1 shows a scatter plots with rents-to-GDP ratio (and different types of rents-to-GDP ratio) on the X-axis and polity2 score on the Y-axis, and Figure 2 shows the evolution of total rents over the period 1970-2010 for our sample of countries.

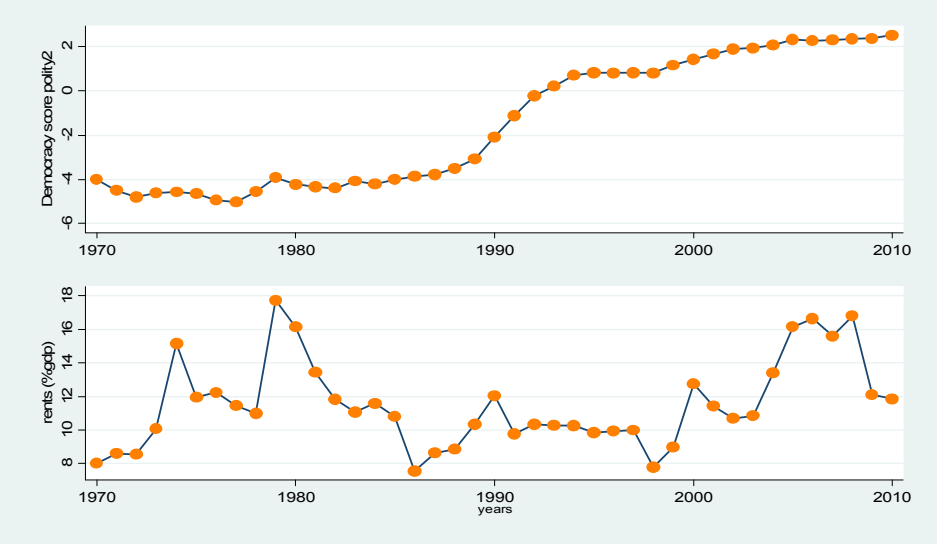

Figure 2. Average Rents and Polity2 Over Time, 90 Developing Countries

For the quality of institutions variable, we use the democracy score polity2 from the polityIV database (Marshall and Jaggers, 2002). The choice of this indicator was motivated by the following reasons: (i) it captures both de facto and de jure political power as discussed by Acemoglu *et al.* (2005)[5], (ii) it covers a large number of countries

[4] For more details, refer to Hamilton and Clemens (1999), Collier and Hoeffler (2008), or Bhattacharyya and Hodler (2010). Sources and methods are described in Jarvis et al. (2011).

[5] Acemoglu et al (2005) distinguish two types of political power. The first one is de jure political power whose legitimacy comes from political institutions (e.g. constitution). The second is de facto political power

over time (1800 to 2011), (iii) it is widely used in the literature (Glaeser *et al.*, 2004, Persson and Tabellini, 2006; Ross, 2006; Collier and Hoeffler, 2008; Bhattacharyya and Hodler, 2010). The polity2 score varies between -10 and +10, and increases with the quality of institutions. Figure 1 shows a high heterogeneity of institutional quality between countries. The average polity2 score, reported in Figure 2, increases over the period 1970-2010 with an acceleration at the beginning of the 1990s. This is consistent with global political events at that time, marked by the wave of democratization which followed the fall of the Berlin Wall in 1989, and in Africa, the La Baule Conference in 1990. Below we rescale the polity2 variable so that it ranges from 0 to 1, with higher values indicating better democratic institutions. We also use the Political Rights index (PR) from Freedom House as an alternative measure of institutional quality for robustness tests.

Table 1. Variance-covariance Matrix

	polity2	rent	oil	forest	Mineral	school	trade	rem	oda	inflation	gdpcapita	neighbor
polity2	1.00											
rent	-0.28* (0.00)	1.00										
oil	-0.38* (0.00)	0.97* (0.00)	1.00									
forest	-0.11* (0.00)	0.16* (0.00)	0.02 (0.49)	1.00								
mineral	0.06* (0.00)	0.22* (0.00)	-0.13* (0.00)	0.09* (0.00)	1.00							
school	0.22* (0.00)	0.13* (0.00)	0.13* (0.00)	-0.33* (0.00)	-0.07* (0.00)	1.00						
trade	-0.01 (0.64)	0.24* (0.00)	0.38* (0.00)	-0.03 (0.17)	0.28* (0.00)	0.16* (0.00)	1.00					
rem	0.03 (0.23)	-0.17* (0.00)	-0.23* (0.00)	-0.01 (0.54)	-0.01* (0.000)	0.07* (0.00)	0.33* (0.00)	1.00				
oda	-0.02 (0.28)	-0.08* (0.00)	0.03 (0.25)	0.55* (0.00)	0.11* (0.00)	-0.33* (0.00)	0.08* (0.00)	0.18* (0.00)	1.00			
inflation	0.01 (0.68)	0.01 (0.64)	-0.02 (0.41)	0.06* (0.01)	0.02 (0.30)	0.01 (0.99)	-0.03 (0.19)	-0.03 (0.12)	-0.01 (0.53)	1.00		
gdpcapita	-0.14* (0.00)	0.41* (0.00)	0.32* (0.00)	-0.36* (0.00)	-0.05* (0.03)	0.18* (0.00)	0.152* (0.00)	-0.113* (0.00)	-0.32* (0.00)	-0.021 (0.31)	1.00	
neighbor	0.53* (0.00)	-0.27* (0.00)	-0.36* (0.00)	-0.15* (0.00)	0.12* (0.00)	0.28* (0.00)	0.08* (0.00)	0.1322* (0.00)	-0.09* (0.00)	0.0329 (0.10)	-0.18* (0.00)	1.00

We use a set of control variables commonly used in the literature concerning the factors affecting institutions (see Table A2 in appendix for data description): inflation

that mainly relies on the distribution of economic resources between social groups, and which determines their ability to use and modify political institutions, even though social conflict. The group that exercises de facto political power is tempted to establish new political institutions in order to legitimize its power and maintain the capture of resources, thus introducing changes in institutions.

(Haggard and Kaufman, 1997); official development assistance (Svensson, 1999; Collier and Hoeffler, 2004); remittances (Abdih *et al*., 2008); GDP per capita (Barro, 1999; Przeworski *et al*., 2000; Epstein et al., 2006; Brückner *et al*., 2012); education - measured by the gross enrolment rate (Leite and Weidmann, 1999; Kanyama, 2014); openness (Leite and Weidmann, 1999; Brunnschweiler and Bulte, 2008). Geography and ethnic fragmentation, which are constant over time and country specific, are captured using country fixed effects.

We add a proxy for the institutional quality in neighbor countries which aims to capture a diffusion effect of institutions at the regional level (Barro, 1991; Ades and Chua, 1997; Kelejian *et al.*, 2013). This variable is computed as the mean of the polity2 scores of contiguous countries. The variance-covariance matrix in Table 1 shows that there is no obvious collinearity between the control variables.

3. EMPIRICAL RESULTS

3.1. The Effect of Total Rents on Institutional Quality

Table 2 reports the results of the estimates of Equation 1.[6] In Column 1, the OLS estimate shows a statistically significant negative effect of total rents on the polity2 score, suggesting that natural resources are associated with a poor quality of institutions. But this association may be driven by unobserved country characteristics. To tackle this issue, we use the fixed effects estimator in Columns 2 and 3, which controls for country characteristics that do not vary over time, and we add time varying common shocks in Column 3. The negative relationship remains but the magnitude of the impact coefficient falls by half, suggesting that there is a significant impact of country fixed effects on the quality of institutions. In Column 4 we use the Between estimator that uses only inter-country variability. The estimated coefficient for Rent is then statistically significant, and is higher than the one obtained with the fixed effects estimator. This seems to corroborate the results of Bhattacharyya and Hodler (2010) who showed that inter-country variability of institutions outweighs intra-country variability, due to the inertia of institutions.

Columns 5 to 7 address the endogeneity of Rent and the persistence of institutions. The 2SLS estimator in Column 5 is performed using two instrumental variables, which are expected to be exogenous and are expected to be significant factors in the exploitation of natural resources without affecting institutions directly: the ratio of international oil price to population size, and population density. The international oil price is an instrument for rents in Collier and Hoeffler (2008) and Bhattacharyya and Hodler (2010) considering the oil price to be exogenous and correlated to the price of

[6] We also performed estimates where all control variables are lagged by one period. The results remain unchanged and are available from the authors upon request.

other natural resources. We divide this variable by the population size to generate country variability. Results from the first stage equation are reported in Table 3. The validity of the instruments is verified using three statistics: (i) The Kleibergen-Paap rk F-statistic which is well above the critical values compiled by Stock and Yogo (2005), suggesting that the instruments are not weak, (ii) our model is identified because the p-value associated with the over-identification test is zero, (iii) the J-test of over-identifying restrictions has a p-value above 0.1 supporting the choice of instruments because they are not correlated with the error terms (Van der Ploeg and Poelhekke, 2010). In column (6), even if Stock and Yogo (2005)'s test previously rejected the instruments' weakness, we also perform the LIML estimator.

The Generalized Method of Moments (GMM) procedure addresses two concerns: (i) the presence of the lagged dependent variable among the regressors, and (ii) the correlation between fixed effects and explanatory variables. We use the two-step Arellano-Bond (1991) estimator, where the first-differenced lagged dependent variable is also instrumented with its past levels (Roodman, 2006). Here, we take care to correct heteroscedasticity (Windjmeier, 2005). The validity of the GMM estimates is verified since there is no first-order or second-order serial correlation in the residuals in the first-differences (AR (1) and AR (2) tests) and the instruments are exogenous (Hansen J-statistic).

In Columns 5 to 7, the instrumental variable estimators generate a higher score for the Rent coefficient than the other estimators, confirming the attenuation bias. A doubling (an increase of 100%) of total rents is associated with a significant decrease of 0.28 points in the polity2 score, as shown in Columns 5 and 6. The GMM-System results reveal the inertia in institutions. The size of the Rent coefficient is lower with the GMM-System than with the 2SLS estimator but remains significant, showing that results are robust to changes in the estimators and data frequency.

With regard to the other regressors, trade openness, gross primary enrollment, and inflation contribute to improvements in the quality of institutions in most estimates, which is consistent with the baseline hypothesis. Trade openness is likely to facilitate the transfer of institutional standards, and an educated population is more aware of its rights and is more capable of asking for better institutions (Leite and Weidmann, 1999; Bulte *et al.*, 2005; Kanyama, 2014). Higher inflation can be regarded as the failure by a leader, resulting in demands for institutional reforms (Aisen and Veiga, 2006). Moreover, the diffusion effect of neighboring countries' institutions is highly significant (except in the GMM). However, this phenomenon deserves a deeper analysis through, for instance, the use of spatial econometric models.

Table 2. Impact of Total Rents on the Quality of Institutions

Dependent variable: Polity2							
	(1) OLS	(2) FE	(3) FE	(4) Between	(5) 2SLS [c]	(6) LIML	(7) GMM [d]
Polity2 (-1)							0.799***
							(0.000)
log Rent	-0.053***	-0.025***	-0.022***	-0.060***	-0.276***	-0.282***	-0.035**
	(0.000)	(0.001)	(0.006)	(0.009)	(0.000)	(0.000)	(0.037)
Oda	0.003***	0.001	0.002*	0.005*	0.001	0.001	0.004**
	(0.005)	(0.364)	(0.080)	(0.090)	(0.656)	(0.661)	(0.024)
Rem	-0.003***	-0.007***	-0.007***	-0.004	-0.006***	-0.006***	-0.006**
	(0.000)	(0.000)	(0.000)	(0.278)	(0.000)	(0.000)	(0.046)
log school	0.073***	0.064**	-0.021	0.128	0.150***	0.152***	0.049
	(0.001)	(0.019)	(0.462)	(0.186)	(0.000)	(0.000)	(0.513)
log trade	-0.045***	0.145***	0.085***	-0.003	0.231***	0.232***	-0.004
	(0.001)	(0.000)	(0.000)	(0.960)	(0.000)	(0.000)	(0.962)
log inflation	0.100***	0.029	0.046**	0.183	0.067***	0.068***	-0.069
	(0.000)	(0.182)	(0.021)	(0.376)	(0.009)	(0.009)	(0.595)
log gdpcapita	0.021**	0.050***	-0.038**	0.019	-0.028	-0.029	-0.015
	(0.020)	(0.000)	(0.021)	(0.619)	(0.192)	(0.176)	(0.556)
Neighbor (-1)	0.418***	0.407***	0.118***	0.494***	0.353***	0.351***	0.279*
	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)	(0.066)
constant	0.048	-0.852***	0.225	-0.383			-0.062
	(0.776)	(0.000)	(0.270)	(0.351)			(0.879)
Adjusted R2	0.280	0.167	0.125	0.246			
Kleibergen-Paap rk/Wald F statistic[a]					39.11	39.114	
Stock-Yogo critical value					19.93	8.68	
AR(1), p-value							0.001
AR(2), p-value							0.660
Hansen J stat (p-value)					0.1864	0.1897	0.542
Overidentification test, (p-value)[b]					0.0000	0.0000	
Year dummies	yes	yes	no	no	no	no	yes
Observations	1898	1898	1898	1898	1892	1892	445
Countries	84	84	84	84	84	84	84

Notes: The dependent variable is polity2 score transformed so that it ranges from 0 to 1. [a]: Kleibergen-Paap statistic is the test for the presence of weak instruments. [b]: Overidentification test allows testing for whether the model is identified. [c]: Instruments are the ratio of international oil price to population size, and population density. [d]: Instruments are period dummies. The estimate in the last column is performed on five-year average data, reducing the sample size. p-values in brackets; * p<0.10, ** p<0.05, *** p<0.01.

Table 3. 2SLS First-stage Regression

Dependent variable	*log Rent*	*Number of obs*	1,892
		F (9, 1,476)	22.33
		Prob > F	0.000
Total (centered) SS	594.868	*Centered R2*	0.114
Total (uncentered) SS	594.868	*Uncentered R2*	0.114
Residual SS	527.008	*Root MSE*	0.541
	Coef.	t	P>|t|
log trade	0.360	6.15	0.000
oda	-0.002	-0.66	0.508
rem	0.006	2.15	0.032
log inflation	0.014	2.29	0.029
log gdpcapita	-0.303	-7.22	0.000
log school	0.483	5.83	0.000
lag neighbor	-0.094	0.86	0.392
Oil price	0.375	6.92	0.000
density	-0.003	-3.36	0.001
Included instruments	Log trade, oda, rem, log inflation, log gdpcapita, log school, lag neighbor, oil price, density		
F test of instruments			
F(2, 1,476)	39.11		
Prob > F	0.0000		

3.2. Effects of Different Resource Rents on Institutional Quality

Next we disaggregate total rents into 3 types of rents: forest, mineral and oil. The estimates are reported in Table 4.[7] Regressions 1 to 4 were carried out with the fixed effects estimator. In Column 1, the estimates show that oil rents exert a highly negative effect on the quality of institutions: an increase of 100% in oil rents is associated with a lower polity2 score of 0.15 points. However, forest and mineral rents have no significant impact, as shown in Columns 2 and 3. The same results emerge in Column 4 where all rents are simultaneously introduced into the same regression. This confirms the baseline hypothesis about the specificity of oil rents. Finally, in Columns 5 to 7, we use the GMM-System on 5-year data which allows us to take into account the inertia in institutions. As expected, the size of the oil rents parameter is higher than the one obtained with the fixed effects estimator.

Taken together, the results in Table 4 suggest that different rents have different effects on the quality of institutions. The negative association between total rents and

[7] All control variables are maintained but the estimated parameters are not reported in Table 4 to save space. Complete results are available from the authors upon request.

institutional quality seems to be driven by oil rents. These results are consistent with our baseline hypothesis, that in contrast to forest and mineral rents, oil rents are more easily appropriated by elites and are more likely to be a source of social conflicts thereby reducing the quality of institutions.

4. ROBUSTNESS TESTS

We performed several robustness tests to check whether our results are sensitive to sample selection and model specification. The results are summarized in Table 5. In Columns 1 to 8 we use the variable of Political Rights (PR) from the Freedom House database as an alternative proxy for institutions. This variable is based on an evaluation of three sub-categories of institutional features: (i) the electoral process, (ii) political pluralism and participation, (iii) functioning of the government; its range is between 0 and 7. We transform the PR index so that it ranges from 0 to 1, with higher values indicating better democratic institutions. The results remain broadly unchanged. In particular, total rents and oil rents are negatively associated with the PR index. However, the positive coefficient of forest rents becomes statistically significant with the fixed effects estimator, in Column 2, even though it loses its significance with the System-GMM estimator.

African countries and civil law countries have a lower quality of institutions than the other developing countries. It therefore seems reasonable to test whether the detrimental impact of rents on institutions are specific for these two groups of countries. The African continent is usually characterized by resource richness but poor economic and institutional performances (Mehlum et al., 2006). For this purpose, we use two dummy variables: "Africa" which equals 1 if the country is in Africa, 0 otherwise; and "Legal" which equals 1 if the country has a civil law legal tradition, 0 otherwise (Data from La Porta *et al.*, 1999, see Table A2). Columns 5 and 6 show that the coefficient of total rents remains negative and statistically significant, while the coefficients of the interaction terms (Rent × Africa and Rent × Legal) are not statistically significant. These results show that the effect of rents on institutions does not differ from the general case in African or "civil law" countries (see also Mehlum *et al.*, 2006).

In Column 7, we test for the existence of a simple nonlinear relationship between rents and the quality of institutions by including rents squared as an additional regressor. The coefficient of rents remains negative and statistically significant, while the coefficient of rents squared is not statistically different from zero, invalidating this form of nonlinear relationship.

Table 4. Impacts of different rents on the quality of institutions

Dependent variable: polity2							
	Fixed Effects				GMM-System		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Polity2 (-1)					0.704***	0.701***	0.744***
					(0.000)	(0.000)	(0.000)
log oil rent	-0.012**			-0.012**	-0.033***		
	(0.017)			(0.016)	(0.006)		
log forest rent		0.004		0.007		0.061	
		(0.772)		(0.614)		(0.245)	
log mineral rent			-0.001	0.001			0.008
			(0.661)	(0.681)			(0.547)
constant	0.122	0.132	0.160	0.093	-0.812	-1.159*	-0.931*
	(0.548)	(0.540)	(0.431)	(0.667)	(0.131)	(0.053)	(0.092)
Adjusted R2	0.331	0.329	0.329	0.331			
Control	all	all	all	all	all	all	all
Year dummies	yes	yes	yes	yes	yes	yes	yes
AR(1), p-value					0.0059	0.0159	0.0134
AR(2), p-value					0.626	0.761	0.778
Hansen p-value					0.445	0.178	0.373
Observations	1,898	1,898	1,898	1,898	445	445	445
Countries	84	84	84	84	84	84	84

Notes: The dependent variable is polity2 score transformed such that it ranges from 0 to 1. The GMM-System results are two-step estimates with heteroskedasticity-consistent standard errors (Windmeijer, 2005 correction). AR (1) and AR (2) are tests for null of no first-order and no second-order serial correlation in the first-differenced residuals. Hansen J-statistic tests the joint validity of instruments. p-values in parentheses * p<0.10, ** p<0.05, *** p<0.01.

Table 5. Robustness tests

Dependent variable	Political Rights								Polity2		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Fixed Effects				GMM-System				Fixed Effects		
PolRights (-1)					0.500*** (0.000)	0.517*** (0.000)	0.577*** (0.000)	0.567*** (0.000)			
log Rent	-0.0156* (0.060)				-0.083** (0.014)				-0.030** (0.010)	-0.036*** (0.002)	-0.023*** (0.005)
log oil rent		-0.0082** (0.027)				-0.045** (0.020)					
log forest rent			0.0271* (0.067)				0.0469 (0.350)				
log mineral rent				0.0012 (0.625)				0.0156 (0.218)			
*Rent*Africa*									0.0135 (0.353)		
*Rent*Legal*										0.0264* (0.072)	
Rent squared											0.00133 (0.573)
contant	0.173 (0.413)	0.526*** (0.000)	-0.0170 (0.939)	0.110 (0.602)	-1.445* (0.071)	-1.316* (0.074)	-1.687** (0.030)	-1.483** (0.014)	0.238 (0.244)	0.217 (0.291)	0.225 (0.270)
Adjusted R2	0.0731	0.100	0.0531	0.0571					0.332	0.334	0.332
control	all	all	all	all	all	all	all	all	all	all	all
Year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
AR(1), p-value					0.0070	0.0040	0.0027	0.0010			
AR(2), p-value					0.673	0.467	0.566	0.607			
Hansen, p-value					0.565	0.632	0.555	0.536			
Observations	1,902	1,902	1,902	1,902	447	447	447	447	1,898	1,898	,1898
Countries	85	85	85	85	85	85	85	85	84	84	84

Notes: Dependent variable used for regressions of columns (1) to (8) is Political rights from Freedom House. Those of columns (9) to (11) use the polity2 score as dependent variable. Regressions of columns (1) to (4) and (9) to (11) are carried out with the fixed effects estimator. Those of columns (5) to (8) are performed with GMM-System estimator. p-values in brackets; * p<0.10, ** p<0.05, *** p<0.01.

5. CONCLUSION

In this paper, we have investigated the impact of different rents on the quality of institutions using data covering the period 1970-2010 for 90 developing countries. To measure institutional quality we use the polity2 democracy score, and we distinguish total, oil, forest, and mineral rents. We find that total rents are negatively associated with

the quality of institutions, after controlling for the other relevant determinants of institutional quality, neighbor effect, persistence of institutions, and endogeneity of rents. However, while oil rents have significant negative effects on institutional quality, forest and mineral rents do not seem to affect institutions. This result holds when we control for time varying common shocks, legal origins, regional dummies, diffusion effects, an alternative measure of institutional quality, and a quadratic specification. Thus, our findings support the hypothesis that oil, unlike mining and forests, generates rents that are easily captured by elites, and leads to the weakening of institutional quality. This could be more thoroughly explored by the use of more detailed data on rents, particularly for mining (Mining has different types of products with different degrees of appropriability), when they are available.

Resource curse literature usually explains that resource richness generates bad performances when institutional quality is poor, suggesting that improving institutions must be – unconditionally – at the top of the agenda. Here we find that the task of improving institutions may face different challenges depending on the kind of resource: typically, oil-rich developing countries seem to be caught in a bad institution trap. For the other resource-rich countries, official development assistance, and a regional strategy (given the neighbor effects), seem to be able to play a key role, whatever the region or the legal origins.

APPENDIX

Table A1. List of countries

Albania	Djibouti	Lesotho	Qatar
Algeria	Dominican Republic	Liberia	Rwanda
Angola	Ecuador	Libya	Saudi Arabia
Argentina	Egypt	Madagascar	Senegal
Bahrain	El Salvador	Malawi	Sierra Leone
Bangladesh	Ethiopia	Malaysia	South Africa
Benin	Gabon	Mali	Sri Lanka
Botswana	Gambia	Mauritania	Sudan
Brazil	Ghana	Mexico	Suriname
Bulgaria	Guatemala	Mongolia	Swaziland
Burkina Faso	Guinea	Morocco	Syria
Burundi	Guinea-Bissau	Mozambique	Tanzania
Cameroon	Guyana	Namibia	Thailand
Cape Verde	Haiti	Nicaragua	Togo
Central Africa Rep	Honduras	Niger	Tunisia
Chad	India	Nigeria	Turkey
Chile	Indonesia	Oman	Uganda
China	Iran	Pakistan	Venezuela
Colombia	Iraq	Panama	Vietnam
Congo	Jamaica	Papua New Guinea	Zambia
Congo DR.	Jordan	Paraguay	Zimbabwe
Côte d'Ivoire	Kenya	Peru	
Cuba	Kuwait	Philippines	

Table A2. Data description and sources

Variable	Description	Source
polity2	Polity2 scores is defined as the difference between democracy and autocracy scores and it ranges from -10 to 10. It proxies the degree of democracy and measures institutional quality based on (i) the freedom of suffrage, (ii) operational constraints, (iii) balances on executives, and (iv) respect for other basic political rights and civil liberties. We have transformed it so that it ranges from 0 to 1 with higher values indicating better democratic institutions.	PolityIV http://www.systemicpeace.org/polity/polity4.htm
neighbor	Neighbor proxies the institutional quality of neighboring countries (measured by polity2 scores). $neighbor_{it} = (1/n) \sum_{j=1, j \neq i}^{n} inst_{jt}$ where n is the number of neighbor countries.	
PR	Political Rights index (pr) is a score that aggregates three institutional features: (i) Electoral process, (ii) Pluralism, (iii) Participation and functioning of government. Initially pr index varies between 1 and 7. Transformed such that it ranges from 0 to 1 with higher values indicating better democratic institutions.	Freedom House Index http://www.freedomhouse.org
rent	Rents are defined as the world market price minus the average extraction costs. Unit rents are multiplied by quantities and expressed as a percentage of GDP. "Rent" include all natural resources available in a country. In log.	Adjusted Net Savings Dataset, World Bank
oil	Log oil rents.	
mineral	Log mineral rents	
forest	Log forest rents	
Trade	The sum of exports and imports as a percentage of GDP. In log.	WDI
gdpcapita	GDP per capita PPP in current international $. In log.	http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators
inflation	Inflation as measured by the consumer price index annual percentage change. We have transformed it as follows: $inflation = \frac{(100+inflation\ rate)}{100}$. In log.	
school	Gross enrolment rate is the share of children of any age that are enrolled in primary school. In log.	
oda	Net official development assistance received as a percentage of GDP.	
density	Density is defined as the number of people per square kilometer.	
Africa	A dummy variable that equals 1 if the country is in Africa, 0 otherwise	
rem	Remittances received as a percentage of GDP.	CNUCED
oil_price	The world oil prices in current US dollars. Divided by population size to get inter-individual variability.	http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx?sRF_ActivePath=P,5,27&sRF_Expanded=,P,5,27
legal	A dummy variable that equals 1 if the country has a legal tradition of "Civil law", 0 otherwise. "Civil law" characterizes countries of continental Europe, their former colonies, and Latin America... where the sovereign strongly controls economic life. In contrast the English "Common law" is more based on the Parliament and judges. Legal origins are widely used in the literature on the determinants of institutional quality.	La Porta and al. (1999)

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Received Jun 3, 2015, Revised May 4, 2016, Accepted August 31, 2016.