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Does dependence on natural resource rents reduce the quality of institutions in Africa?

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Abstract - This study analyzes the effect of dependence on natural resources on the quality of institutions in Africa. Three composite indices (economic, institutional, and political governance) and the World Bank's six governance indicators are used. Based on a sample of 26 African countries whose contribution of natural resources to GDP is at least 8% over the period 2000-2020, we estimate a panel data model using the two-stage least squares method (IV-2SLS). The results show that total rents from natural resources negatively affect the overall institutional quality index, the economic, institutional, and political governance indices, and the six governance indicators. These results remain robust when alternative measures of institutional quality are used, such as the Polity2 democracy score, respect for property rights, and the index of economic freedom. The results suggest the need for improved governance of natural resources. In particular, to set up online platforms to report corruption cases and ensure stronger guarantees for property rights and transparency in the management of rents derived from natural resources.

JEL Classification 013, P48, Q34, 055

Key-words Natural resource rents Institutional quality IV-2SLS method Africa

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INTRODUCTION

Through the resource curse hypothesis, economic literature shows that dependence on natural resources hinders economic development as a whole (Auty, 1993; Sachs and Warner, 1997; Karl, 1997). One of the transmission mechanisms of the resource curse is poor institutional quality (Tornell and Lane, 1999; Torvik, 2002; Mehlum et al., 2006). A low level of institutional quality encourages rent-seeking, while a high level of institutional quality favors production activities (Mehlum et al., 2006).

According to the rentier state theory, countries that derive most of their income from natural resources have fragile and inefficient political institutions (Mahdavy, 1970). Indeed, dependence on natural resources increases the risk of armed conflict (Ross, 2004; Collier and Hoeffler, 2005), impedes the democratic process (Jensen and Wantchekon, 2004; Ross, 2015), generates corruption (Fleming et al., 2015), deteriorates property rights (Hodler, 2006) and creates rentier behavior (Tornell and Lane, 1999). For example, cases of rebellions financed by natural resources have been highlighted in Angola, Sierra Leone, Liberia, and the Democratic Republic of Congo (Hellendorff, 2012). Generally speaking, three effects underpin this theory: the rent effect, the repression effect, and the modernization effect (Ross, 2001).

Empirically, the literature studying the effect of natural resources on institutional quality has produced controversial results. Indeed, several authors have shown that rents derived from natural resources weaken institutional quality (Philippot, 2011; Goujon and Mabali, 2016; Asiamah et al., 2022; Khoshnoodi et al., 2022). Thus, natural resources strengthen authoritarian regimes (Jensen and Watchenkon, 2004), hinder the evolution of economic freedom (Khoshnoodi et al., 2022), and encourage political elites to enrich themselves (Vicente, 2010). Sometimes, control over the management of natural resources is at the heart of political struggle and can lead to civil conflict (Collier and Hoeffler, 2000). In contrast, Brunnschweiler (2008) and Alexeev and Conrad (2009) argue that natural resources have a positive effect on institutional quality. On the other hand, another group of authors highlights the non-linear effect of natural resource rents on institutional quality (Couttenier, 2012; Houle, 2018; Helgath, 2021).

World Bank statistics for the period 2000-2020 show that some African countries are more dependent on natural resources, with an average contribution to gross domestic product (GDP) of 42% in Libya, 40% in Congo, 36.6% in Equatorial Guinea, 34.1% in Angola, 29.3% in Gabon, 24% in Algeria, 22.5% in the Democratic Republic of Congo (DRC), 22.4% in Burundi and 21.1% in Chad. On the other hand, others derive less than 3% of their GDP from natural resource rents. This share averaged 0.03% in Mauritius, 0.12% in Seychelles, 0.6% in Djibouti, 1.95% in Namibia, 1.7% in Comoros, 2.6% in Morocco, 3% in Kenya over the same period (World Development Indicators, 2024).

In addition, African countries dependent on natural resources are characterized by weak institutions (Atangana Ondoa, 2019). For example, over the period 2000-2020, the average institutional quality indices for the countries in the sample are -0.866 for corruption control, -0.948 for government effectiveness, -0.822 for political stability and absence of violence, -0.882 for regulatory quality, -0.886 for rule of law and -0.835 for citizen voice and accountability. These indices, which range from -2.5 to 2.5 and reflect the poor quality of institutions, are lower than those recorded in resource-poor African countries (Worldwide Governance Indicators, 2024).

Based on these data, the idea that dependence on natural resources is detrimental to institutional quality is a pertinent question. In this context, this research aims to analyze the effect of natural resource rents on institutional quality in Africa. The contribution of this research to the literature is threefold. Firstly, our analysis focuses only on a sample of African countries whose contribution of natural resources as a percentage of GDP averages at least 8% over the period 2000 to 2020, in contrast to previous work that has focused on sub-Saharan Africa (Helgath, 2021; Asiamah et al., 2022), developed and developing countries (Philippot, 2011; Tsani, 2013). Secondly, previous work has dealt with the effect of natural resources on the World Bank's six governance indicators only (Asiamah et al., 2022). The particularity of the present research is the use of several institutional quality indicators. Indeed, we use World Bank governance indicators to construct composite indices (economic, institutional, and political governance). In addition to the three indices, this research integrates the six World Bank governance indicators, as well as the democracy score Polity2, property rights, and economic freedom, to analyze the differential effect. Finally, this research is distinguished by its methodological approach, taking into account the endogeneity of natural resource rents and possible reverse causality. For this reason, we apply two-stage least squares (IV-2SLS).

The rest of the article is organized as follows. Section 1 provides an overview of the existing literature. Section 2 describes the methodology adopted. Section 3 presents and discusses the results.

1. THE EFFECT OF NATURAL RESOURCES ON INSTITUTIONAL QUALITY: A REVIEW OF THE LITERATURE

A review of economic theory shows that natural resources can affect the quality of institutions through at least three mechanisms: the rent effect, the repression effect, and the modernization effect (Ross, 2001). The rent effect explains why countries that derive a significant proportion of their income from natural resource rents apply a low rate of taxation to the population, in return for which the government shirks its responsibility to be accountable (Isham et al., 2005), encourages clientelism and corruption. The repressive effect has a negative impact on the quality of institutions, particularly democracy. Natural resource rents are often used to repress those who oppose the government, thereby limiting political and civil rights. The modernization effect, whereby governments in resource-rich countries hinder the social and cultural changes that should lead to improvements in institutional quality. In addition, rent-seeking models stipulate that increased revenues from natural resources promote inefficient public policies and encourage corruption (Torvik, 2002; Vicente, 2010).

Empirically, several studies support the natural resource curse hypothesis, i.e. that rents from natural resources are linked to institutional failures. Indeed, some studies highlight the curse of natural resources through the level of corruption. For

example, Arezki and Brückner (2011) model a panel of 30 oil-exporting countries over the period 1992-2005 and find that rising oil rents have a significant positive impact on corruption. Vicente (2010) analyzes the role of natural resources on the level of corruption. The author finds that oil discoveries in Sao Tome and Principe are behind the rise in corruption in the country. Shadabi and Adkisson (2021) on a sample of 125 countries over the period 2012-2016, find that natural resource rents implicitly generate corruption.

Some authors are interested in the effects of natural resources on political instability through armed conflict and terrorism. Indeed, Ajide et al. (2020) analyze the effects of natural resources on political regimes and terrorism in Africa. Applying a negative binomial regression estimator to a sample of 49 African countries over the period 1980-2012, the authors show that natural resource rents have unconditional effects on political instability. Atangana Ondoa (2019) through panel data modeling over the period 1992-2016, and using the two-stage least squares (2SLS) method, found that natural resource rents generate civil conflict leading to political instability in Africa. Similarly, Collier and Hoeffler (2012) suggest that countries with a high dependence on natural resources present a high risk of armed conflict and terrorism.

The exploitation of natural resources hinders the democratic process. Indeed, Jensen and Wantchekon (2004) in their study of political regimes in Africa, use cross-sectional data estimated by generalized least squares (GLS) and ordinary least squares (OLS) to show that over the period 1970-1995, resource dependence led to more authoritarian regimes. Asongu and Odhiambo (2022) examined a sample of 44 sub-Saharan African countries over the period 1996-2016 using Tobit regression. The results show a negative relationship between political governance (voice and accountability and political stability), institutional governance (rule of law and control of corruption), and natural resource rents. Bergougui and Murshed (2020) analyze the effect of oil rents on democracy using a sample of 100 developing countries over the period 1935-2014. The results show that oil rents lead to a decline in democracy in resource-dependent North African countries. Anyanwu and Erhijakpor (2014) examine the relationship between oil rents and democracy in a sample of 52 African countries between 1955 and 2008. They find that oil wealth has a negative influence on democracy in Africa.

Isham et al (2005) and Sala-i-Martin and Subramanian (2008) show that natural resource rents limit civil liberties and weaken the rule of law. Kodila-Tedika (2016), using data from 41 sub-Saharan African countries over the period 1999-2007, found, using probit regression, that natural resource rents weaken states by reducing government effectiveness in Africa.

Goujon and Mabali (2016) examined a sample of 90 developing countries over the period 1970-2010. Using the instrumental variables method, they found that natural resource rents deteriorate the quality of institutions, in particular the Polity2 democracy score. Khoshnoodi et al. (2022) use data from 112 countries over the period 2000-2018, to show using a probit model that natural resources hinder institutional reforms, in particular economic freedom. Hodler (2006) found that dependence on natural resources weakens property rights in countries.

Asiamah et al. (2022), based on a sample of 39 sub-Saharan African countries over the period 2005-2019, use the GMM estimator to show that dependence on natural resources deteriorates institutional quality in sub-Saharan Africa. Institutional quality is captured by corruption control, government effectiveness, political stability, regulatory quality, rule of law, and citizen voice and accountability.

The literature review shows that most work has focused on the effect of natural resources on individual indicators of institutional quality. This research aims to enrich the literature by taking into account three composite indices of institutional quality.

2. METHODOLOGICAL STRATEGY

2.1. Specification of the econometric model

To analyze the effect of natural resource dependence on institutional quality in Africa, our empirical model is inspired by those of Philippot (2011), who studied the effect of natural resources on institutional quality, and Ongo Nkoa et al. (2024), who analyzed the influence of natural resources on fragilities. In their analyses, these authors use natural resource rents as the variable of interest. We follow this approach and use total rents from natural resources. In addition, our analysis takes into account composite indices, as well as individual indicators of institutional quality. Thus, we formulate the following model:

Institutional_quality_i = $\alpha_i + \beta Natural_Resources_i + \delta X_i + \varepsilon_i$

Institutional_quality^{*i*} measures institutional quality, taking into account composite indices as well as individual indicators of institutional quality; *Natural_Resources*^{*i*} captures total rents from natural resources; *X*^{*i*} is a set of control variables including education, trade openness, urbanization rate, employment, and inflation; ε_i represents the error term and i specifies the country.

The dependent variable is institutional quality, which includes composite indices and individual indicators of institutional quality. The composite index of institutional quality is calculated from the World Bank's six governance indicators (Kaufmann et al., 2011). These indicators are corruption control, government effectiveness, political stability and absence of violence, regulatory quality, rule of law, and citizen voice and accountability. Following Asongu and Odhiambo (2021) and Diallo and Ouoba (2023), we construct three aggregate indices: economic, institutional, and political governance. Political governance is the simple average of the indicators of political stability and absence of violence, and citizen voice and accountability. Next, indicators of regulatory quality and government efficiency describe economic governance. Finally, institutional governance is obtained by a simple average of the indicators of rule of law and control of corruption. The composite index of institutional quality avoids problems of multicollinearity due to the use of individual indicators in the same regression (Diallo and Ouoba, 2023). The composite index also makes it possible to assess the overall effect of natural resource rents on institutional quality.

The composite index of institutional quality is constructed using principal component analysis (PCA), as suggested by Acheampong et al. (2021) and Diallo and Ouoba (2023). PCA facilitates analysis by grouping data into smaller sets and eliminates problems of multicollinearity between variables. The new variables thus obtained are called principal components and are expressed as linear combinations of the original variables. The results of principal component analysis are presented in Table A3 in Appendix.

Subsequently, to facilitate the interpretation of the econometric results, the composite indices and individual indicators of institutional quality are transformed using the min-max method so that they lie between 0 and 1. Thus, a value close to 0 implies very low institutional quality and a value close to 1 is synonymous with very good institutional quality.

The variable of interest is represented by natural resource rents. These are the total rents derived from natural resources as a percentage of GDP. They include oil, mining, forestry, natural gas, and coal rents. In line with recent literature, this variable is used as a measure of dependence on natural resources (Ouoba, 2020; Asiamah et al., 2022; Awoa Awoa and Atangana Ondoa, 2023; Ongo Nkoa et al., 2024). Indeed, the natural resource curse hypothesis states that dependence on natural resources undermines institutional quality by weakening the normal functioning of democracy (Ross, 2001), and increasing the likelihood of armed conflict in Africa (Hugon, 2009).

In terms of control variables, education is measured by the gross enrolment ratio in primary education, with reference to the work of Goudjon and Mabali (2016) and Grabowski and Self (2020). Indeed, education acts through a skilled and available workforce that can propose new ideas for improving institutional quality. Trade openness is measured by the sum of exports and imports of goods and services in relation to GDP. Trade openness facilitates the transfer of quality institutional arrangements (Goujon and Mabali, 2016). Employment is captured by industrial sector employment in total employment. For Asiamah et al. (2022), employment improves citizens' level of trust in institutions.

2.2. Data

This research covers a sample of 26 African countries whose contribution of natural resources to gross domestic product averages at least 8% over the period 2000-2020. The analysis is based on panel data. The data are annual and cover the period 2000 to 2020. The analysis period corresponds, on the one hand, to the surge in commodity prices on the international market, and on the other hand, to a fall in prices following the crises of 2008 (subprime crisis) and 2015 (oil crisis). Data on the

dependent variable are taken from the World Bank's Governance Indicators database. The variables of interest and control are taken from the World Development Indicators database. The list of countries, the definition, and the sources of the variables used are presented in Tables A1 and A2 in Appendix, respectively.

Figure 1 shows the average evolution of institutional quality indices in resource-rich and resource-poor countries in Africa over the period 2000-2020. Their values range from -2.5, implying poor institutional quality, to 2.5, reflecting good institutional quality. The institutional quality index in resource-rich countries is below that of resource-poor countries. It averaged -0.873 in resource-rich countries versus -0.447 in resource-poor countries between 2000 and 2020. This trend shows that resource-dependent African countries have low-quality institutions. These countries are generally characterized by authoritarian regimes, political instability, reduced civil liberties, and ineffective public policies (Collier and Hoeffler, 2005; Robinson et al., 2006; Sala-i-Martin and Subramanian, 2008).

Figure 1. Average change in institutional quality in resource-rich and resource-poor countries in Africa, 2000-2020



Source: Author.

Figure 2 presents the relations between total natural resource rents and institutional quality in the sample countries over the period 2000-2020. The figure shows a rather negative relationship between total natural resource rents and indicators such as "corruption control", "government effectiveness", "regulatory quality", "rule of law", and "citizen voice and accountability" and apparently a slightly weaker correlation with political stability.

Descriptive statistics for the variables, VIF test values, and correlation matrices are presented respectively in Tables A4, A5, A6, and A7 in Appendix.



Figure 2. Correlation between resource rents and institutional quality













Source: Author.

2.3. Preliminary tests

2.3.1. Cross-sectional dependency test

The aim is to verify the interdependence between the individuals in the panel. To do this, this research uses the tests of Pesaran (2004), Frees (1995), and Friedman (1937). The null hypothesis postulates the independence of the individuals in the panel. Under this null hypothesis, the Pesaran (2004) test statistic is asymptotically distributed according to a standard normal distribution N (0,1). The Friedman (1937) test under the null hypothesis follows asymptotically in N a chi-square with T-1 degrees of freedom. The Frees (2004) test uses an N (0, 1) normal approximation for T>10. The results of these tests are presented in Table 1. The results of these three tests do not allow us to reject the null hypothesis of independence between individuals, as the probabilities of the statistics are all greater than 0.05.

Table 1. Resul	is of the cro	ss-sectional uepe	nuency tests
Test	Statistics	Critical value	p-value
Pesaran	-0.944		0.3454
Frees	4.740	0.1231 (10%)	
		0.1611 (5%)	
		0.2338 (1%)	
Friedman	12.669		0.9803
C 4 1			

 Table 1. Results of the cross-sectional dependency tests

Source: Author.

2.3.2. Unit root test

The dependency test shows that the individuals in the panel are independent. Thus, the use of first-generation unit root tests is appropriate for testing the stationarity of the series. To this end, the Levin et al. (2002) test is used to determine the order of integration of the variables. This test is based on the inter-individual independence of residuals (Mignon and Hurlin, 2005). In this test, the null

hypothesis is the presence of a unit root. The results of the Levin et al. (2002) test are summarized in Table 2. The results show that the statistics calculated are lower than the associated theoretical statistic (-1.64) at the 1% threshold. This implies the rejection of the null hypothesis, so all our variables are stationary in level, i.e. I (0) at the 1% threshold.

Variables	LLC	Order of integration
Institutional quality index	-3.4537***	I (0)
Total natural resources rents	-5.2223***	I (0)
Education	-4.3321***	I (0)
Trade openness	-3.8275***	I (0)
Employment	-2.5596***	I (0)

Table 2. Results of unit root test

Note: (***), (**), (*) = significant at the (1%), (5%) and (10%) level respectively. Source: Author.

2.3.3. Estimation method

The results of the stationarity test show that all variables are stationary in level, so the cointegration test is no longer necessary. Consequently, a general strategy is to use the ordinary least squares (OLS) method to estimate the empirical model, assuming that all independent variables are exogenous to the dependent variable. However, the variable used to capture natural resource dependence is considered endogenous in the literature (Brunnschweiler and Bulte, 2008; Goujon and Mabali, 2016, Ouoba, 2016). Indeed, the low level of institutional quality explains the dependence on natural resources of certain economies (Brunnschweiler and Bulte, 2006). The ordinary least squares method provides biased results (Deffo et al., 2020). The double least squares method (IV-2SLS) is appropriate for correcting endogeneity problems (Goujon and Mabali, 2016; Ouoba, 2016; Ongo Nkoa et al., 2024). This method consists of substituting the presumed endogenous variable with instrumental variables in a regression.

The literature describes three sources of endogeneity: simultaneity or double causality, omission, and variable measurement error (Navatte, 2016). Simultaneity means that the direction of the relationship between institutional quality and natural resource rents is not unique. According to Tsani (2013), institutional quality influences natural resource rents just as natural resources also affect institutional quality. Indeed, thanks to natural resource rents, countries have sufficient revenues to undertake institutional reforms, which improves the quality of existing institutions (Brunnschweiler and Bulte, 2008). Secondly, the omission of variables implies the possibility of not taking certain relevant variables into account when estimating models. Finally, institutions are based on subjective assessments and evaluations by experts during surveys, which can make it difficult to measure institutional indicators accurately.

To correct for the endogeneity problem, we use as instruments of natural resource dependence the lagged value of three periods of total natural resource rents and the terms of trade considered as the ratio between the export price index and the import price index. Indeed, countries dependent on natural resources are generally exposed to fluctuations in the terms of trade (Ongo Nkoa et al., 2024). Terms of trade are an instrument of total natural resource rents in Amiri et al. (2018). For the validity of an instrument, Wooldridge (2016) postulates two conditions. First, it must be correlated with the endogenous explanatory variables, i.e. total natural resource rents. This is the condition that justifies the instrument's relevance. Secondly, it must be uncorrelated with the error terms, hence the exogeneity condition. The term natural resource rents refers to the total rents derived from natural resources, which include oil, mining, forestry, gas, and coal rents.

Subsequently, the Kleibergen-Paap rk and Cragg-Donald statistics and the Hansen test are used to check instrument suitability and model adequacy. Thus, the Kleibergen-Paap rk statistic is used to test whether the instruments are weakly related to total natural resource rents, the Cragg-Donald statistic is used to test whether the instruments are weakly identified, and the Hansen test checks whether the instruments are related to error terms.

3. RESULTS AND DISCUSSION

3.1. Baseline results

Tables 3 and 4 present the results of the effect of total natural resource rents on institutional quality using the instrumental variable double least squares (IV-2SLS) method. The validity of the estimation results of the different models is verified by the following tests. First, the Kleibergen-Paap test checks whether the equations are identified. The results show that the associated probabilities are all less than 5% (Tables 3 and 4), so the instruments (the lagged value of total natural resource rents and the terms of trade) are perceptible and the equations are well identified. Next, the Cragg-Donald test checks whether the instruments are weakly correlated with the endogenous variables. The Cragg-Donald statistics are above the critical Stock and Yogo values at the 10% threshold (Tables 3 and 4). Consequently, the instruments are not weak. Finally, the probabilities associated with the Hansen test are greater than 10% for all estimates (Tables 3 and 4), meaning that the instruments are valid in the different estimates performed.

According to Table 3, total natural resource rents have a negative and significant effect on the overall institutional quality index at the 1% threshold. Thus, an increase in natural resource rents of one percentage point leads to a decrease in institutional quality of 0.0107 points. This result is consistent with the resource curse theory, which postulates that dependence on natural resources tends to weaken institutional quality (Karl, 1997; Sachs and Warner, 1997; Leite and Weidmann, 1999; Sala-i-Martin and Subramanian, 2008). Indeed, natural resources degrade institutional quality through increased levels of corruption (Leite and Weidmann, 1999), civil wars (Collier and Hoeffler, 2005), weakening of the democratic process (Ross, 2001), weakening of the rule of law (Norman, 2009) and weakening of bureaucratic capacity (Ross, 2004). This result corroborates those obtained by Asiamah et al. (2022).

Variables	Institutional	Economic	Institutional	Political
	quality	governance	governance	governance
	index	index	index	index
Total natural resources rents	-0.0107***	-0.0114***	-0.0107***	-0.00795***
	(0.00139)	(0.00143)	(0.00129)	(0.00137)
Education	0.00186***	0.00197***	0.00189***	0.00138**
	(0.000576)	(0.000606)	(0.000556)	(0.000566)
Trade openness (log)	0.133***	0.105***	0.0977***	0.169***
	(0.0201)	(0.0157)	(0.0170)	(0.0266)
Employment (log)	0.0892***	0.0568***	0.132***	0.0611***
	(0.0189)	(0.0189)	(0.0191)	(0.0197)
Constant	-0.318***	-0.0230	-0.328***	-0.398***
	(0.0951)	(0.0806)	(0.0923)	(0.109)
Observations	468	468	468	468
R-squared	0.183	0.129	0.199	0.204
Kleibergen-Paap rk	54.286	54.286	54.286	54.286
Kleibergen-Paap rk (p-value)	0.0000	0.0000	0.0000	0.0000
Cragg-Donald F statistic	208.180	208.180	208.180	208.180
Stock-Yogo CV (10 %)	19.93	19.93	19.93	19.93
Hansen J statistics	0.084	0.163	1.233	0.419
Hansen J p-value	0.7724	0.6863	0.2668	0.5174

 Table 3. Total natural resources rents and institutional quality (estimation method: IV-2SLS)

Note: Robust standard errors are shown in brackets. *** p<0.01, ** p<0.05, * p<0.1. Source: Author.

In addition, total resource rents have a negative and significant effect on economic governance at the 1% threshold. Thus, when natural resource rents increase by one percentage point, economic governance deteriorates by 0.0114 points. The economic governance index takes into account indicators of regulatory quality and government efficiency. Indeed, in the presence of natural resources, governments prefer to use the rents generated by natural resources for their spending, to the detriment of taxation. This reduces the incentive to develop a solid tax administration. Moreover, the presence of natural resources is not conducive to the formulation of sound economic policies, as resource rents are a major source of revenue for the budget. Resource rents are also associated with a high degree of clientelism in public administration. Consequently, natural resources negatively affect economic governance through the poor quality of public policies, public services and the inefficiency of administrative staff. These results confirm those obtained by Asongu and Kodila-Tedika (2016).

Similarly, resource rents have a significant negative impact on institutional governance at the 1% level. Thus, a one percentage point increase in total resource rents reduces the quality of institutional governance by 0.0107 points. This result confirms the institutional explanation of the resource curse, according to which natural resources degrade institutional governance by weakening the rule of law and increasing corruption (Isham et al., 2005; Zallé, 2022). Moreover, the presence of natural resources explains Tornell and Lane's (1999) voracity effect, according to which the institutional deficit in the context of natural resource exploitation leads to economic rent-seeking behavior. This result is consistent with those obtained by Collier and Venables (2010).

Resource rents have a negative and significant effect on political governance at the 1% threshold. An increase in total resource rents of one percentage point

weakens political governance by 0.00795 points. According to the rentier state theory, resource rents slow down the democratic process. The presence of natural resources is also at the root of many armed conflicts and terrorism. Consequently, natural resource rents have a negative influence on political governance. These findings confirm those of Ross (2015) and Ongo Nkoa et al. (2024).

The results also show that education has a positive and statistically significant effect on institutional quality at the 1% and 5% thresholds. The accumulation of human capital contributes to the improvement of institutional quality. This result corroborates those obtained by Goujon and Mabali (2016), Grabowski and Self (2020) and Asiamah et al. (2022), who argue that education strengthens the quality of institutions.

The results in Table 3 show a positive and significant influence of trade openness on institutional quality at the 1% level in all specifications. Trade openness facilitates the sharing of experience and the transfer of good practices in institutional reforms (Goujon and Mabali, 2016). This result supports the findings of Islam and Montenegro (2002) and Grabowski and Self (2020), according to which participation in international trade is beneficial in terms of improving institutional quality.

Employment has a positive and significant effect on institutional quality at the 1% threshold in Table 3. Employment improves living conditions, contribute to tax payments, reduces crime and strengthens citizens' trust in the country's laws, thus positively influencing the rule of law and government effectiveness (Asiamah et al., 2022).

In addition, we analyze the effect of total natural resource rents on corruption control, government effectiveness, political stability and absence of violence, regulatory quality, rule of law, and citizen voice and accountability. This allows us to determine differential effects and identify which institutional indicators are most affected by natural resources in Africa. The results are summarized in Table 4. These indicators have been transformed using the min-max method so that they take values in the range 0 to 1. Thus, higher values imply a better level of institutional quality.

The results in column 2 of Table 4 show that total resource rents have a significant negative influence on corruption control at the 1% level. An increase in natural resource rents of one percentage point leads to an increase in the level of corruption of 0.0112 points. This result can be explained by the fact that the exploitation of natural resources encourages corruption through the enrichment of managers. Corruption in resource-dependent countries also manifests itself in the use of resource rents by incumbent governments to buy support in order to retain political power. Natural resources can also stimulate corruption in public administration. For example, when exploiting natural resources, investors may resort to bribing certain officials in order to obtain permits. This result confirms those obtained by Mwa Ndjokou and Tsopmo (2017) and Asiamah et al. (2022), who find that African countries dependent on natural resources are the most corrupt.

Resource rents have a negative and statistically significant effect on government efficiency at the 1% threshold (column 3). A one-percentage-point increase in total resource rents is associated with a 0.0102 point drop in government efficiency. This result can be explained by the high degree of clientelism in public administration, which leads to lower bureaucratic efficiency. For example, rising resource rents encourage governments to expand the public sector in order to provide jobs for unproductive supporters of power (Robinson et al., 2006). This can hamper the quality of government personnel and lead to government inefficiency. This result is consistent with that obtained by Asiamah et al. (2022), who note the use of public services for political purposes.

 Table 4. Total natural resources rents and institutional indicators (estimation method: IV-2SLS)

Variables	CC	GE	PS	RQ	RL	VA
Total natural	-0.0112***	-0.0102***	-0.00342**	-0.0119***	-0.0100***	-0.0127***
resources rents	(0.00129)	(0.00148)	(0.00169)	(0.00143)	(0.00133)	(0.00154)
Education	0.00182***	0.00197***	0.00118*	0.00189***	0.00192***	0.00146**
	(0.000549)	(0.000645)	(0.000638)	(0.000581)	(0.000581)	(0.000596)
Trade openness	0.114***	0.0877***	0.167***	0.115***	0.0808***	0.144***
(log)	(0.0172)	(0.0171)	(0.0319)	(0.0149)	(0.0168)	(0.0205)
Employment	0.135***	0.0816***	0.0697***	0.0341*	0.128***	0.0362*
(log)	(0.0195)	(0.0202)	(0.0203)	(0.0178)	(0.0188)	(0.0219)
Constant	-0.388***	-0.0735	-0.426***	0.0535	-0.252***	-0.186*
	(0.0933)	(0.0886)	(0.119)	(0.0749)	(0.0917)	(0.105)
Observations	468	468	468	468	468	468
R-squared	0.206	0.128	0.228	0.129	0.186	0.192
Kleibergen-Paap rk	54.286	54.286	54.286	54.286	54.286	54.286
Kleibergen-Paap rk	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
(p-value)						
Cragg-Donald	208.180	208.180	208.180	208.180	208.180	208.180
F statistic						
Stock-Yogo CV	19.93	19.93	19.93	19.93	19.93	19.93
(10%)						
Hansen J statistics	0.982	0.198	0.148	0.119	1.440	0.548
Hansen J p-value	0.3217	0.6562	0.7005	0.7303	0.2302	0.4593

Note: Robust standard errors are shown in brackets. *** p<0.01, ** $p<0.0\overline{5}$, * p<0.1.

CC: control of corruption, *GE:* government effectiveness, *PS:* political stability, *RQ:* quality of regulation, *RL:* rule of law, *VA:* voice and accountability.

Source: Author.

The effect of natural resource rents on political stability is negative and significant at the 5% level (column 4). An increase in total natural resource rents of one percentage point leads to a rather weak effect of political instability of 0.0034 points. The negative effect is explained by the fact that natural resources are a source of armed conflict, terrorism, and crime, all of which fuel political instability. Moreover, the political struggle for control over natural resources leads to civil violence, which in turn leads to political instability (Acemoglu et al., 2012). This result confirms that found by Asiamah et al. (2022), who note that African countries dependent on natural resources record several "coups d'état", sources of political instability.

The effect of natural resource rents on regulatory quality is negative and significant at the 1% level (column 5). Thus, a one percentage point increase in total resource rents reduces regulatory quality by 0.0119 points. This means that the presence of natural resources reduces the incentive to implement policies favorable to economic development. What's more, thanks to natural resource rents, countries grant subsidies and tax breaks that hinder the smooth running of the economy. According to Asiamah et al (2022), resource-dependent countries fail to adopt policies and regulations that stimulate the private sector.

Resource rents have a significant negative impact on the rule of law at the 1% threshold (column 6). An increase in total resource rents of one percentage point degrades the rule of law by 0.010 points. This result implies that in countries dependent on natural resources, the judicial system is not always independent, and citizens do not trust the laws, which negatively influences the application of the rule of law. Moreover, the exploitation of natural resources can lead to violence and call into question respect for property rights (Tsani, 2013). This result is in line with the findings of Asiamah et al. (2022) that countries dependent on natural resources have a weaker rule of law.

The effect of natural resource rents on citizen voice and responsibility is negative and significant at the 1% level (column 7). An increase in total resource rents of one percentage point reduces political and individual rights by 0.0127 points. This relatively high coefficient means that resource-dependent countries are generally characterized by authoritarian governments that restrict citizens' civil and political rights. Governments also use resource rents to limit the demand for public accountability to citizens in exchange for low tax rates. Resource rents are also used to repress opponents of power, thereby curtailing democratic rights. The presence of natural resources limits democracy and undermines political rights (Bhattacharyya and Hodler, 2010). This result also confirms that obtained by Asiamah et al. (2022).

3.2. Robustness test

To test the robustness of our results, we use the democracy score Polity2, respect for property rights, and economic freedom as alternative measures of institutional quality. These indicators are directly involved in natural resource management (Acemoglu et al., 2002; Khoshnoodi et al., 2022). Estimation is performed using the method of Driscoll and Kraay (1998), as this strategy allows us to take into account potential endogeneity problems in the different models, given that parameter estimation only considers variables that have a single lag (Cerra and Saxena, 2008; Ouoba, 2017; Diallo and Ouoba, 2024).

Table 5 presents the results of the effect of total natural resource rents on the democracy score Polity2, respect for property rights, and economic freedom. The results indicate a negative and statistically significant effect of total natural resource rents on these three indicators at the 1% threshold. Thus, an increase in natural resource resource rents of one percentage point negatively influences the Polity2 democracy

score, property rights, and economic freedom by 0.00707 points; 0.395 points, and 0.00574 points, respectively. This result is in line with those of Couttenier (2012), Goujon and Mabali (2016), and Khoshnoodi et al. (2022). The results show that the coefficients of natural resource rents on property rights and economic freedom are larger than the others. This is because the presence of natural resources compromises respect for property rights and reduces economic freedom. Indeed, agents who wish to monopolize natural resources first limit property rights (Couttenier, 2012). Thus, the results show that property rights and economic freedom are most affected by natural resource rents.

Polity2	Property Rights	Economic freedom						
-0.00707***	-0.395***	-0.00574***						
(0.000610)	(0.0448)	(0.000882)						
0.00185***	0.0918***	0.00134***						
(0.000628)	(0.0209)	(0.000219)						
0.0376**	3.176*	0.0400**						
(0.0159)	(1.627)	(0.0161)						
0.00514***	0.328***	0.0221						
(0.00135)	(0.0637)	(0.0265)						
-0.0349	11.16	0.518***						
(0.121)	(6.761)	(0.109)						
546	546	546						
0.188	0.138	0.182						
562.98***	26.99***	21.21***						
26	26	26						
	Polity2 -0.00707*** (0.000610) 0.00185*** (0.000628) 0.0376** (0.0159) 0.00514*** (0.00135) -0.0349 (0.121) 546 0.188 562.98*** 26	Polity2Property Rights-0.00707***-0.395***(0.000610)(0.0448)0.00185***0.0918***(0.000628)(0.0209)0.0376**3.176*(0.0159)(1.627)0.00514***0.328***(0.00135)(0.0637)-0.034911.16(0.121)(6.761)5465460.1880.138562.98***26.99***2626						

Table 5. Total natural resources rents and institutional quality (Driscoll-Kraay estimates)

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: Author.

Furthermore, the results in Table 5 show that education, trade openness and employment have overall positive and significant effects on alternative indicators of institutional quality, with the exception of employment whose coefficient is insignificant on economic freedom.

CONCLUSION

This research evaluates the effect of total resource rents on institutional quality. To do this, we use annual data from 26 African countries whose share of total resource rents in GDP averages at least 8% over the period 2000-2020. Considering institutional quality indices on the one hand and individual indicators of institutional quality on the other, our models are estimated by applying the two-stage least squares estimation technique (IV-2SLS). The results show that total rents from natural resources deteriorate institutional quality. These results are confirmed when we use composite indices, as well as individual indicators of institutional quality. In addition, our results are robust to other indicators of institutional quality and an alternative estimation method. Consequently, our results validate the natural resource curse hypothesis, according to which resource-dependent countries have lower-quality institutions.

In terms of policy implications, the results suggest that resource-dependent African countries should improve natural resource governance. For example, by building the capacity of oversight bodies, civil society, and online platforms for reporting corruption. Public authorities should also guarantee property and political rights, as well as transparency in the management of natural resource rents.

REFERENCES

- Acemoglu, D., Golosov, M., Tsyvinski, A., Yared, P., 2012, A dynamic theory of resource wars. *Quarterly Journal of Economics*, 127, 1, 283–331.
- Acemoglu, D., Johnson, S. and Robinson, J. A., 2002, An African Success Story: Botswana. CEPR Discussion Papers 3219.
- Acheampong, A. O., Dzator, J., Savage, D. A., 2021, Renewable energy, CO2 emissions and economic growth in sub-Saharan Africa: Does institutional quality matter? *Journal of Policy Modeling*, 43, 5, 1070–1093.
- Ajide, K.B., Adenuga, J.I., Raheem, I.D., 2020, Natural resource rents, political regimes, and terrorism in Africa. *International Economics*, 162, 50–66.
- Alexeev, M., Conrad, R., 2009, The Elusive Curse of Oil. *The Review of Economics and Statistics*, 91, 3, 586-598.
- Amiri, H., Samadian, F., Yahoo, M., Jamali, S. J., 2018, Natural resource abundance, institutional quality, and manufacturing development: Evidence from resource-rich countries. *Resources Policy*, 62, 550-560.
- Anyanwu, J. C., Erhijakpor, A. E. O., 2014, Does oil Wealth affect democracy in Africa? *African Development Review*, 26, 1, 15-37.
- Arezki, R., Brückner, M., 2011, Oil rents, corruption, and state stability: Evidence from panel data regressions. *European Economic Review*, 55, 7, 955-963.
- Asiamah, O., Agyei, K. S., Bossman, A., Agyei, E. A., Asucam, J., Arku-Asare, M., 2022, Natural resource dependence and institutional quality: Evidence from Sub-Saharan Africa. *Resources Policy*, 79, 1-14.
- **Asongu, S., Kodila-Tedika, O.,** 2016, State fragility, rent seeking and lobbying: evidence from African data. *International Journal of Social Economics*, 40, 10, 1016-1030.
- Asongu. S. A., Odhiambo, M. N., 2021, The paradox of governance and natural resource rents in Sub-Saharan Africa. AGDI Working Paper, No. WP/22/020, African Governance and Development Institute (AGDI), Yaoundé.
- Atangana Ondoa, H., 2019, Natural Resources Curse: A Reality in Africa. *Resources Policy*, 63, 101406.
- Auty, R., 1993, Sustaining Development in Mineral Economies: The Resource Curse Thesis. Routledge, London.
- Awoa Awoa, P., Atangana Ondoa, H., 2023, Natural resources and productivity growth in developing countries, *The Journal of International Trade & Economic Development*.
- Bergougui, B., Murshed, S. M., 2020, New evidence on the oil-democracy nexus utilising the Varieties of Democracy data. *Resources Policy*, 69, 101905.
- Bhattacharyya, S., Hodler, R., 2010, Natural resources, democracy, and corruption. *European Economic Review*, 54, 4, 608-621.
- Brunnschweiler, C. N., 2008, Cursing the blessings? Natural resource abundance, institutions, and economic growth. *World Development*, 36, 3, 399-419.

- Brunnschweiler, C. N., Bulte, E. H., 2006, The Resource Curse Revisited and Revised. CER-ETH -Center of Economic Research at ETH Zurich, Working Paper.
- Brunnschweiler, C. N., Bulte, E. H., 2008, 2008. The resource curse revisited and revised: a tale of paradoxes and red herrings. *Journal of Environmental Economics and Management*, 55, 3, 248–264.
- Cerra, V., Saxena, C., 2008, Growth dynamics: the myth of economic recovery. *American Economic Review*, 98, 1, 439–457.
- **Collier, P., Hoeffler, A.**, 2012, High-value Natural Resources, Development, and Conflict: Channels of Causation, vol. 1, Strengthening Post-conflict Peacebuilding through Natural Resource Management.
- Collier, P., Hoeffler, A., 2000, Greed and grievance in civil war. World Bank Policy Research, 2355.
- **Collier, P., Hoeffler, A.**, 2005, Resource rents, governance and conflict. *Journal of Conflict Resolution*, 49, 4.
- **Collier, P., Venables, A.J.,** 2010, Natural Resources and State Fragility. European University Institute, Florence Robert Schuman Centre For Advanced Studies. European Report On Development.
- **Cotet, A.M. & Tsui, K.K.**, 2013, Oil and Conflict : what does the cross-country evidence really show *?, American Economic Journal: Macroeconomics*, 5, 49-80.
- **Couttenier, M.**, 2012, L'effet conditionnel des ressources naturelles sur les institutions. *Revue économique*, 1, 63, 27-49.
- Deffo, G., Leroy, S., Houmpe, A., Donald., Yemkwa, D., Hermann, G., 2020, Contribution of Human Capital in transmitting the effects of the abundance of natural resources to the economic development of CEMAC countries. MPRA Paper No. 104492.
- **Diallo, S., Ouoba, Y.**, 2024, Effect of energy policies on industrial development in sub-Saharan African countries. *International Journal of Technology Management & Sustainable Development*, 23, 1,105–22.
- **Diallo, S., Ouoba, Y.**, 2023, Effect of renewable energy on economic growth in sub-Saharan Africa: Role of institutional quality. *Sustainable Development*, 1–16.
- Driscoll, J.C., Kraay, A.C., 1998, Consistent covariance matrix estimation with spatially dependent panel data. *The Review of Economics and Statistics*, 80, 549–560.
- Fleming, D.A., Measham, T.G., Paredes, D., 2015, Understanding the resource curse (or blessing) across national and regional scales: theory, empirical challenges, and an application. *Australian Journal of Agricultural and Resource Economics*, 59, 624–639.
- Frees, E. W., 1995, Assessing cross-sectional correlation in panel data. *Journal of Econometrics*, 69, 2, 393–414.
- **Friedman, M.,** 1937, The use of ranks to avoid the assumption of normality implicit in the analysis of variance. *Journal of the American Statistical Association*, 32, 200, 675–701.
- **Goujon, M., Mabali, A.**, 2016, The different impacts of different types of natural resources on political institutions in developing countries. *Journal of Economic Development*, 41, 3, 1-20.
- **Grabowski, R., Self, S.,** 2020, Determinants of governance institutional quality in sub-Saharan. *Applied Economics*, 53, 18, 2066-2079.
- **Helgath, B.**, 2021, Oil rent and the quality of institutions in Sub-Saharan African countries: Evidence using the dynamic panel threshold model. *Review of Socio-Economic Perspectives*, 6, 3, 19-29.
- **Hellendorff, B.,** 2012, Ressources naturelles, conflits et construction de la paix en Afrique de l'Afrique. Bruxelles: Groupe de recherche et d'information sur la paix et la sécurité (GRIP).
- Henry, A., 2019, Transmission channels of the resource curse in Africa: A time perspective. *Economic Modelling*, 82, 13-20.
- Hodler, R., 2006, The Curse of Natural Resources in Fractionalized Countries. *European Economic Review*, 50, 6, 1367-86.

- Houle, C., 2018, A two-step theory and test of the oil curse: the conditional effect of oil on democratization. *Democratization*, 25, 3, 404–421.
- Hugon, P., 2009, Le rôle des ressources naturelles dans les conflits armés africains. *Herodote*, 134, 3, 63-79.
- Isham, J., Woolcock, M., Pritchett, L., Busb, G., 2005, The Varieties of Resource Experience: Natural Resource Export Structures and the Political Economy of Economic Growth. *World Bank Economic Review*, 19, 2, 141–74.
- Islam, R., Montenegro, C., 2002, What Determines the Quality of Institutions? *World Bank Policy Research Paper* 2764.
- Jensen, N., Wantchekon, L., 2004, Resource wealth and political regimes in Africa. *Comparative Political Studies*, 37, 7, 816–841.
- Karl, T., 1997, *The Paradox of Plenty: Oil Booms and Petro-States*. University of California Press, Berkeley.
- Kaufmann, D., Kraay, A., & Mastruzzi, M., 2011, The worldwide governance indicators: Methodology and analytical issues 1. *Hague Journal on the Rule of Law*, 3, 2, 220–246.
- Khoshnoodi, A., Farouji, M.D., Haan de, J., 2022, The effect of natural resources rents on institutional and policy reform: New evidence. *Resources Policy*, 78, 102856.
- Leite, C., Weidmann, J., 1999, Does Mother Nature Corrupt- Natural Resources Corruption, and Economic Growth. IMF Working Paper, 34.
- Levin, A., Lin, C. F., Chu, C. S., 2002, Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, 108, 1, 1–24.
- Mahdavy, H., 1970, The patterns and problems of economic development in rentier states: the case of Iran. In Cook M.A. (Ed.), *Studies in Economic History of the Middle East*, Oxford University Press, London, 427-467.
- Mehlum, H., Moene, K., Torvik, R., 2006, Institutions and the resources curse. *The Economic Journal*, 116, 508, 1-20.
- Mignon, V., Hurlin, C., 2005, Une synthèse des tests de racine unitaire sur données de panel. *Economie & prévision*, 3169-171, 253–294.
- Mwa Ndjokou, I.M.M., Tsopmo, C.P., 2017, The effects on economic growth of natural resources in Sub-Saharan Africa: Does the quality of institutions matters? *Economics Bulletin*, 37, 1, 248-263.
- Navatte, P., 2016, Comment lutter contre l'endogénéité dans les études empiriques de « Corporate Finance » ? Working Paper, Research Gate.
- **Norman, C. S.,** 2009, Rule of law and the resource curse: abundance versus intensity. *Environnemental and Resource Economics*, 43, 2, 183-207.
- **Ongo Nkoa, B. E., Song, J., Minkoue Bikoula, B.,** 2024, Natural resource rents in developing countries: Is the positive influence on the fragilities real? *Resources Policy*, 89, 104541.
- Ouoba, Y., 2016, Natural resources: Funds and economic performance of resource-rich countries. *Resources Policy*, 50, 108-116.
- Ouoba, Y., 2017, Artisanal versus industrial mining: impacts on poverty in regions of Burkina Faso. Mineral Economics, 30, 3, 181-191.
- **Ouoba, Y.,** 2020, Natural resources fund types and capital accumulation: A comparative analysis. *Resources Policy*, 66, 101635.
- **Pesaran, M.**, 2004, General diagnostic tests for cross-section dependence in panels. Cambridge Working Papers in Economics, 435.
- Philippot, L.-M., 2011, Rente naturelle et institutions. Les ressources naturelles : Une malédiction institutionnelle. halshs-00553629.
- Robinson, J. A., Torvik, R., Thierry, V., 2006, Political Foundations of the Resource Curse. *Journal* of Development Economics, 79, 2, 447–68.

Ross, M.L., 2015, What have we learned about the resource curse? *Annual Review of Political Science*, 18, 1, 239–259.

Ross, M. L., 2001, Does oil hinder democracy? World Polit, 53, 3, 325-61.

- Ross, M. L., 2004, What do we know about natural resources and civil war? *Journal of Peace Research*, 41, 3, 337–56.
- Sachs, J.D., Warner, A.M., 1997, Natural resource abundance and economic growth. *Harvard Institute for International Development*, 50.
- Sala-i-Martin, X., Subramanian, A., 2008, Addressing the natural resource curse: an illustration from Nigeria. In Collier P., Soludo C.C. (Governor), Pattillo C., *Economic Policy Options for a Prosperous Nigeria*. Palgrave Macmillan, London, 61–92.
- Shadabi, L., Adkisson, R. V., 2021, Natural Resources, Governance, and Corruption. Journal of Economic Issues, 55, 1, 246-263.

Tornell, A., Lane, P., 1999, The Voracity Effect. American Economic Review, 89, 1, 22-46.

- Torvik, R., 2002, Natural resources, Rent seeking and welfare. *Journal of Development Economics*, 67, 455-470.
- Tsani, S., 2013, Natural resources, governance, and institutional quality: the role of resource funds. *Resources Policy*, 38, 181–195.
- Vicente, P., 2010, Does oil corrupt? Evidence from a natural experiment in West Africa. *Journal of Development Economics*, 92, 1, 28-38.
- Wooldridge, J. M., 2016, Introductory econometrics: A modern approach (6th ed.). Cengage Learning.
- Zallé, O., 2022, Natural Resource Dependence, Corruption, and Tax Revenue Mobilization. *Journal* of Economic Integration, 37, 2, 316-336.

APPENDIX

Table A1. List of Countries

Algeria	Ghana
Angola	Guinea
Burkina Faso	Guinea-Bissau
Burundi	Libya
Cabo Verde	Mauritania
Centra African Republic	Mozambique
Chad	Niger
Congo, Demo. Rep.	Nigeria
Congo, Rep.	Sierra Leone
Egypt	Sudan
Equatorial Guinea	Togo
Ethiopia	Ugandan
Gabon	Zambia

Variables	Definition	Sources
Institutional Quality Index	The institutional quality index measured using the World Bank's six governance indicators, namely citizen voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption, is constructed using principal component analysis.	WGI
Economic Governance Index	The simple average of indicators of regulatory quality and government effectiveness.	WGI
Institutional Governance Index	The simple average of the indicators of rule of law and control of corruption.	WGI
Political Governance Index	The simple average of the indicators of political stability and absence of violence, and citizen voice and accountability.	WGI
Control of corruption	Control of corruption reflects perceptions of the extent to which public power is exercised for private gain. Estimate of governance (ranges from approximately - 2.5 (weak) to 2.5 (strong) governance performance).	WGI
Governance effectiveness	Governance effectiveness reflects perceptions of the quality of public services, civil service and the degree of its independence from political pressures	WGI
Political stability	Political stability and absence of violence/terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism	WGI
Regulatory quality	Regulatory quality reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development	WGI
Rule of law	Rule of law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society	WGI
Voice and accountability	Voice and accountability reflect perceptions of the extent to which a country's citizens can participate in selecting their government, as well as freedom of speech and association and an independent media.	WGI
Polity2	Polity2 scores is defined as the difference between democracy and autocracy scores and it ranges from -10 (total autocracy) to +10 (total democracy).	PolityIV
Property Rights	Measures respect for property rights.	Heritage
Economic freedom	It is an overall score that considers twelve measures.	Foundation
Total natural resources rents	Total natural resource rents as a percentage of GDP. Sum of oil, natural gas, coal, mineral and forest rents.	WDI
Terms of trade	Ratio of the export price index to the import price index.	WDI
Education	Gross primary school enrolment.	WDI
Trade openness	Sum of exports and imports over the GDP.	WDI

Table A2. Data sources and description

Component	Eigenvalue	Proportion	Cumulative			
1	4.7116	0.7853	0.7853			
2	0.5467	0.0911	0.8764			
3	0.3533	0.0589	0.9352			
4	0.2606	0.0434	0.9787			
5	0.0941	0.0157	0.9944			
6	0.0338	0.0056	1			
Indicators	CC	GE	PS	RQ	RL	VA
KMO Index Average KMO	0.7924	0.7681	0.9451	0.8043	0.7636	0.9483
index		0.8167				

Table A3. Results of the principal component analysis (PCA)

Source: Author.

	_		-		
Variables	Obs.	Mean	Std. Dev.	Min	Max
Institutional quality index	546	0.426	0.204	0	1
Economic governance index	546	0.527	0.199	0	1
Institutional governance index	546	0.379	0.206	0	1
Political governance index	546	0.426	0.207	0	1
Control of corruption	546	0.375	0.208	0	1
government effectiveness	546	0.486	0.211	0	1
Political stability	546	0.478	0.224	0	1
Quality of regulation	546	0.574	0.190	0	1
Rule of law	546	0.391	0.207	0	1
Voice and accountability	546	0.391	0.213	0	1
Total natural resources rents	546	18.587	12.766	2.439	88.592
Education	546	96.350	20.363	32.356	143.725
Trade openness	546	4.068	0.621	-0.279	5.055
Employment	546	2.380	0.600	0.813	3.446

Table A4. Descriptive statistics

Variables	VIF	1/VIF
Trade openness	1.34	0.744
Total natural resources rents	1.31	0.766
Education	1.1	0.910
Employment	1.06	0.945
Mean VIF	1.2	

Table A5. Multicollinearity diagnostics

Source: Author.

Table A6. Correlation matrix of institutional quality indicators

	1	2	3	4	5	6
1. Control of Corruption	1					
2. Government Effectiveness	0.826	1				
3. Political stability	0.643	0.621	1			
4. Regulatory Quality	0.785	0.902	0.527	1		
5. Rule of Law	0.945	0.897	0.649	0.810	1	
6. Voice and Accountability	0.738	0.704	0.528	0.733	0.729	1
Course: Author						_

Source: Author.

	1	2	3	4	5
1. Institutional quality index	1				
2. Total natural resources rents	-0.198	1			
3. Education	0.190	0.210	1		
4. Trade openness	0.225	0.462	0.284	1	
5. Employment	0.224	0.209	0.100	0.186	1

Table A7. Correlation matrix of variables

La dépendance aux ressources naturelles réduit-elle la qualité des institutions en Afrique ?

Résumé - Cet article analyse l'effet de la dépendance à l'égard des ressources naturelles sur la qualité des institutions en Afrique. Trois indices composites (gouvernance économique, institutionnelle et politique), ainsi que les six indicateurs de gouvernance de la Banque mondiale sont utilisés. À partir d'un échantillon de 26 pays africains dont la contribution des ressources naturelles au PIB est d'au moins 8 % sur la période 2000-2020, nous estimons un modèle en données de panel par la méthode des moindres carrés en deux étapes (IV-2SLS). Les résultats montrent que les rentes totales tirées des ressources naturelles affectent négativement l'indice global de qualité institutionnelle, les indices de gouvernance économique, institutionnelle et politique, ainsi que les six indicateurs de gouvernance. Les résultats sont robustes lorsqu'on utilise le score de démocratie Polity2, le respect des droits de propriété et la liberté économique, comme mesures alternatives de la qualité institutionnelle. Les résultats suggèrent d'améliorer de manière générale la gouvernance des ressources naturelles. En particulier, mettre en ligne des plateformes pour dénoncer les cas de corruption, assurer une meilleure garantie des droits de propriété et la transparence dans la gestion des rentes des ressources naturelles.

Mots-Clés Rentes des ressources naturelles Qualité institutionnelle Modèle IV-2SLS Afrique