Natural Resources Endowment, Institutional Quality and External Debt in Selected African Countries

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Abstract

This study examines the effects of natural resources endowment and institutional quality on external debt in selected nine African countries from 1996 to 2019. Two measures of institutional quality, control of corruption and government effectiveness, were used as measures of institutional quality while feasible generalized least square (FGLS) was used for the estimation. The findings suggest that natural resources rent leads to more external debts, but control of corruption and government effectiveness reduce it. However, moderating natural resource rent with control of corruption and government effectiveness does not entirely mitigate the positive effect of natural resources on external debt. It is therefore recommended that African governments should not rely solely on enhancing institutional quality as means to reducing foreign debt, but should embrace a more thorough and multifaceted strategy that involves enhancing debt management, economic diversification, fiscal discipline, and resource revenue management.

Keywords: FGLS, Natural Resources, Africa, External Debt, Institutional Quality

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INTRODUCTION

Africa has a wealth of natural resources, which makes it a major location for resource development and extraction worldwide. African nations' economies and economic paths are significantly shaped by these resources. According to Hendrix (2022), Guinea accounted for 55% of worldwide exports in 2020 and possesses 23% of the world's confirmed bauxite reserves. In 2020, the DRC was responsible for 48% of worldwide cobalt exports and 71% of global cobalt production. In 2020, Madagascar and Mozambique were third and sixth globally in terms of graphite production, making them significant producers. .

Ironically, the majority of African nations suffer from heavy debt burdens. According to African Export-Import Bank (Afreximbank, 2024),Africa's debt burden has increased dramatically in the last 15 years, and following the global financial crisis of 2008, the continent's total Debt-to-GDP ratio increased by 39.3 standing at 68.6 percent in 2023. Ironically, ten African resource-rich countries are responsible for roughly 67 percent of Africa's total external debt stock.These include Egypt (14.5 percent), South Africa (14.3 percent), Nigeria (8.4 percent), Morocco (5.9 percent), Mozambique (5.5 percent), Angola (5.3 percent), Kenya (3.7 percent), Tunisia (3.4 percent), Sudan (3.1 percent), and Ghana (3.0 percent)(Afreximbank, 2024)

This contradiction draws attention to the difficulties these countries have in managing their resources and governing their economies. The majority of African nations mostly depend on the export of commodities to fund their governments. Governments may have to borrow money to fund public projects and budgets as a result of income deficits caused by fluctuations in the price of commodities globally.

More significantly, the institutional weakness in most African countries has been cited as one of the causes of these debt issues (Alemu et al., 2023; Kemoe & Lartey, 2022; Ojeka et al., 2024). Ineffective institutions make it more difficult to manage resource revenues effectively, which breeds corruption, inefficiency, and unsustainable borrowing habits. Resource earnings are frequently diverted for personal benefit rather than national growth as a result of corrupt activities. Additionally, ineffective use of borrowed money and resource earnings results from inadequate oversight and accountability systems.

Also, according to Sibanda et al., (2024), institutional weakness limits technical expertise, and this lowers the effectiveness of resource contract negotiations and extraction project management. Corruption is made easier by weak institutions' inability to guarantee transparency in income flows and contracts related to resource extraction. Often at the price of fair resource distribution, politicians and elites take advantage of resource wealth for their own benefit (Frynas & Buur, 2020; Kuwali, 2024).

Although the effect of natural resources on economic growth has been extensively studied in the literature, little attention has been given to examining the relationship among natural resources, institutional quality, and the external debt. Understanding how institutional quality affects the relationship between natural resource and foreign debt is crucial because of the crucial role it plays in moderating economic outcomes. By exploring the relationship between natural resources, institutional quality, and external debt burden, this study seeks to fill this knowledge gap in the literature. The rest of the paper is organized as follows; the literature review is presented in section 2, the theoretical framework and methodology are described in section 3, section 4 is dedicated for the interpretation of the findings, while the main conclusions, and policy recommendations are outlined in Section 5.

LITERATURE REVIEW

Numerous studies have examined the relationship between external debt and resource endowment, offering important insights into how natural resources affect the dynamics of debt in resource-rich nations. The effect of natural resources on the amount of external debt in Sub-Saharan Africa is examined by Ampofo et al. (2021). The study concludes that as a result of ineffective institutional management and poor governance, resource-rich nations typically accrue more foreign debt. Nonetheless, the study concludes that the debt burden is sustainable when resource revenues are efficiently managed by transparent institutions. In a similar vein, Goes and Kaplan (2024) examine the relationship between foreign debt and natural resources in Latin America, emphasizing that although resource riches may lower borrowing costs, it might result in excessive external borrowing in nations with poor institutions. According to the findings, poor fiscal management makes debt worse, particularly when commodity prices are declining.

Gonzalez-Redin et al. (2018) investigate how the price volatility of natural resources affects external debt with a focus on the Latin American region. The study contends that in economies with weak financial systems and poor debt management ability, resource dependency increases the vulnerability to debt. In order to stabilize debt levels, they stress the necessity of sovereign wealth funds and efficient fiscal measures. Additionally, Mammadli et al. (2021) investigate how institutional quality mediates the relationship between foreign debt and resource wealth. The study concludes that nations with poor institutional frameworks are more prone to engage in unsustainable borrowing practices, which are frequently brought on by corruption and a lack of accountability in the way resource income are managed.

Melina et al. (2016) investigates the relationship between debt sustainability and natural resources wealth. They conclude that although resource-rich nations should be able to pay off more debt because of their exports, poor management and fluctuating resource prices can lead to fiscal instability and increased debt risks. Additionally, Muhanji and Ojah (2016) look into how natural resource rents affect African nations' foreign debt. The study contends that although resource richness can generate significant income for governments, poor management frequently results in an excessive dependence on external borrowing. The study also emphasize how important institutional quality is in mitigating the detrimental effects of resource riches on debt accumulation.

The effect of institutional quality on the connection between foreign debt and natural resource is also examined by Chen et al. (2024). According to their findings, reputable institutions can lessen the debt burden brought on by resource exploitation by making sure that resource revenues are used effectively to lower the needs for borrowing. On the other hand, the study concludes that bad governance makes debt issues worse, especially in nations that depend significantly on natural resources. Wang et al. (2023) examines how debt accumulation, institutional quality, and natural resources interact dynamically in emerging economies. They discover that although governments may be able to pay off debt if they have abundant resources, excessive borrowing is frequently caused by institutional flaws in resource governance. The report highlights that in order to use natural resources responsibly, governance mechanisms must be improved.

Okombi et al. (2021) looks into how Central Africa's fiscal policy and external debt are affected by natural resources. According to their findings, controlling the sustainability of debt is difficult in nations with plenty of resources but poor institutions. The study contends that in order to prevent excessive borrowing due to resource richness, transparent and accountable institutions are essential. Jones (2014) offers a historical examination of the connection between debt and resource endowment in African nations. The study comes to the conclusion that although natural resources might help with debt servicing, weak institutional frameworks frequently lead to excessive borrowing and financial mismanagement, especially when resource prices are volatile.

Also, Pratibha et al. (2024) concentrates on how natural resources influence the paths of Asian economies' external debt. According to the findings, nations with substantial natural resource endowments frequently accrue large amounts of external debt, especially when their institutions are of poor quality, which can result in fiscal mismanagement. The effect of natural resources on the dynamics of debt in resource-rich nations is examined by Raveh and Tsur (2020), who emphasize the significance of institutional reforms. The study contends that in resource-dependent nations, effective debt management and sovereign wealth fund arrangements are essential to preserving fiscal stability.

All the studies highlight how effective management of the connection between resource riches and external debt requires robust institutions, transparent governance, and sound fiscal policies. However, there is a significant knowledge gap on the particular dynamics and issues within the African setting because the majority of the studies have mostly concentrated on nations outside of Africa.

By focusing on the role of institutional quality in moderating the resource-debt relationship in Africa, this study contributes to the body of literature.

METHODOLOGY

Model Specification

For this study, two distinct models were used, each of which included the moderating impacts of institutional quality and natural resources on foreign debt in addition to the direct effects of these factors on external debt.One

measure of institutional quality was used in each model, making two measures of institutional quality that were used. These include government efficiency and corruption control.

Model One: Effects of Natural Resource Endowment and Institutional Quality (Control of Corruption) on External Debt
The model used for this objectives is given in equation 1

$$EXDEBT_{it} = \delta + \vartheta NATURA_{it} + w\text{LOGCOC}_{it} + v\text{NATURECOC}_{it} + \pi FINDEV_{it} + \rho\text{EXCHARAT}_{it} + \sigma DOMARKET_{it} + \epsilon_{it} \quad \ldots\ldots\ldots(1)$$

Where NATURA is the log of Natural resource rent, EXDEBT is the log of external debt, FINDEV is the log of financial development, LOGCOC is the log of Control of Corruption, DOMARKET is the domestic market, measured as the log of GDP,, EXHARAT is the log of exchange rate. NATURECOC is the moderated variable.

Model Two: Effects of Natural Resource Endowment and Institutional Quality (Government Effectiveness:) on External Debt
The model used for this objectives is given in equation 2

$$EXDEBT_{it} = \delta + \vartheta NATURA_{it} + w\text{LOGGOV}_{it} + v\text{NATUREGOV}_{it} + \pi FINDEV_{it} + \rho\text{EXCHARAT}_{it} + \sigma DOMARKET_{it} + \epsilon_{it} \quad \ldots\ldots\ldots(2)$$

Where LOGGOV is the log of Government Effectiveness index. NATUREGOV is the moderated variable. NATUREGOV = NATURE * LOGGOV. All variables are as previously defined.

Total natural resources rents (% of GDP) was used as the proxy for natural resources, Domestic credit to private sector by banks (% of GDP), was used as the proxy for financial development, External debt stocks, total (DOD, current US$), was used as External debt, GDP per capita (constant 2015 US$) was used as the domestic market size. Institutional quality was measured using two measures of institutional quality index. They are control of corruption and governance effectiveness

Data Source and Type

This study uses panel data which consists of time series version and cross-sectional version. The time series version range from 1996 to 2019, and were collected from the World Bank (2023). The cross sectional variant includes Nigeria, Gabon, Egypt, Chad, Cameron, Botswana, Sudan, and South Africa, and Algeria.

Estimation Technique

The analysis was conducted using the following methods: Pedroni panel co-integration test for the long-term relationship; Pesaran and Yamagata (2008) for the slope homogeneity test; Pesaran cross-sectional dependence test; Cross-Section Augmented Dickey–Fuller (CADF) Panel Unit Root test for the panel unit root test; and Variance Inflation Factor for testing for the multicollinearity problem in the models.

RESULTS AND DISCUSSION

Testing for Multicollinearity

Table 1 shows the results of the VIF and the tolerance factor (TF). As a general guideline, the VIF should not be greater than 10, and the tolerance factor should be greater than 0.1 (Senaviratna & Cooray, 2019). The result reveals that, across all the models, the lowest tolerance factor is 0.3, which is greater than 0.1, and the highest VIF is 9.5 which is from the moderated variable. Therefore, it is concluded that the models do not suffer from multicollinearity problem.

Table 1: The Results of the Multicollinearity Test

Variables	COC VIF	Model TF	GOV VIF	Model TF
NATURECOC	9.51	0.105102		
LOGCOC	6.26	0.159647		
NATURA	2.85	0.350342	2.57	0.388466
FINDEV	2.21	0.451700	2.27	0.441043
DOMMARKET	2.18	0.458851	1.84	0.544421
EXCHARAT	1.82	0.548020	1.71	0.586441
LOPOL				
NATUREPOL				
natureGOV			7.54	0.132668
logGOV			6.07	0.164797

Source: Computed by the Author Using Data from World Bank Indicators

Testing for Serial correlation

The Wooldridge test for auto-correlation was performed to determine whether there was auto-correlation problem in the models. Table 2 shows the result of the Wooldridge test. All the two models have probability values that are less than 5%, indicating that they are all significant at 1%. This shows that the null hypothesis of no auto-correlation is rejected. It is therefore concluded that the models suffer from the problem of serial correlation.

Table 2: Testing for Auto-correlation

COC Model		GOV Model	
F(1, 5)	P-value	**F(1, 5)**	P-value
100.355	0.0000	101.868	0.0000

Source: Computed by the Author Using Data from World Bank (2023)

Testing for Heteroskedasticity

The Modified Wald test for groupwise heteroskedasticity was used for heteroskedasticity test in each model. Table 3 shows that the null hypothesis that there is no heteroskedasticity is rejected in each model since the probability of the test in each model is less than 0.05. This leads to the conclusion that heteroskedasticity is an issue in all the models.

Table 3: Testing for Heteroskedasticity

COC Model		**GOV Model**	
Chi2 (9)	P-value	**Chi2 (9)**	P-value
568.46	0.0000	803.00	0.0000

Source: Computed by the Author Using Data from World Bank (2023)

Testing for slope heterogeneity

Pesaran and Yamagata (2008) slope heterogeneity test was used to test for the slope heterogeneity in each model. The null hypothesis that slope coefficients are homogeneous is rejected in each model because the probability value of the test in each model is less than 0.05, as shown in Table 4. The implication is that heterogeneity exists in all the models.

Table 4: Testing for slope heterogeneity

Variables	**COC Model**	**GOV Model**
Delta	9.590	9.795
P-value	0.0000	0.0000
Adj Delta	11.629	11.878
P-value	0.0000	0.0000

Source: Computed by the Author Using Data from World Bank (2023)

Testing for Cross-sectional Dependence (CD)

Cross-sectional dependence was examined using Pesaran's CD-test. The test is based on the null hypothesis of cross-sectional independence in the panel. Table 5 displays the results of the test. The results show that most of

the variables have probability values that are less than 0.05, which indicates that the significant. Therefore, it is concluded that cross-sectional dependence does exist. This suggests that the first generation unit root tests are inapplicable for the panel unit test in the models.

Table 5: Testing for Cross-sectional Dependence (CD)

Variables	COC Model		GOV Model	
	CD-test	p-value	CD-test	p-value
EXDEBT	+ 7.743	0.000	+ 7.743	0.000
NATURA	+ 16.909	0.000	+ 16.909	0.000
EXCHARAT	+ 13.934	0.000	+ 13.934	0.000
LOGCOC	+ .987	0.324		
NATURECOC	+ 1.921	0.055		
FINDEV	+ 9.382	0.000	+ 9.382	0.000
DOMMARKET	+ 15.181	0.000	+ 15.181	0.000
LOGGOV		+ -.419	0.675	
NATUREGOV		+ .468	0.640	

Source: Computed by the Author Using Data from World Bank (2023)

Panel Unit Root Test

This study used Cross-Section Augmented Dickey–Fuller(CADF) Panel Unit Root Test. Table 6 demonstrates that none of the variables are stationary when examined at the level form of the variables, as indicated by the values of probability that are greater than 5%. However, in the differenced form of the variables, the probability values are all less than 5%. This shows that they are all integrated of order one.

Table 6: Cross-Section Augmented Dickey–Fuller (CADF) Panel Unit Root Test

	At Level		First Difference		Remark
Variables	**T-bar**	**P-value**	**T-bar**	**P-value**	
EXDEBT	-0.862	0.997	-3.095	**0.000**	**I(1)**
NATURA	-1.520	0.771	-2.748	0.001	**I(1)**
EXCHARAT	-2.251	0.064	-2.683	0.002	**I(1)**
LOGCOC	-1.478	0.809	-2.430	0.019	**I(1)**
NATURECOC	-2.204	0.085	-3.745	0.000	**I(1)**
FINDEV	-1.905	0.327	-3.022	0.000	**I(1)**
DOMMARKET	-2.189	0.093	-2.720	0.001	**I(1)**
LOGGOV	-1.781	0.474	-4.234	0.000	**I(1)**
NATUREGOV	-2.010	0.220	-4.075	0.000	**I(1)**

Source: Computed by the Author Using Data from World Bank (2023)

Testing for Co-integration

Since all the variables are I (1), Pedroni Co-integration test was used to exermine if the variables are co-integrated. The Pedroni test reports three statistics. These are Augmented Dickey-Fuller, Phillips-Perron, and Modified Phillips-Perron. According to Table 7, all the models rejects the null hypothesis that there is no co-integration in the models in two out of three statistics. This suggests that the variables have a long run relationship.

Table 7: Testing for Co-integration

Variables	COC Model		GOV Model	
	Statistic	p-value	Statistic	p-value
Modified Phillips-Perron	4.2302	0.0000	4.5556	0.0000
Phillips-Perron	1.5858	0.0564	2.1385	0.0162
Augmented Dickey-Fuller	-9.4460	0.0000	1.5973	0.0551

Source: Computed by the Author Using Data from World Bank (2023)

Effects of Natural Resource Endowment and Institutional Quality on External Debt

Given the results of the preliminary tests, FGLS was used as the estimator. This is because FGLS is robust in the presence of serial correlation, heteroskedasticity, and cross sectional dependence. The results are presented in Table 8. In the two models, natural resources rent has a positive effect on external debt.This implies that the extraction of natural resources increases the amount of external debt burden.This supports the hypothesis that endowment of natural resources increases the burden of debt. One explanation for this would be that because debt servicing is dependent on resource revenues, fluctuation in resource prices can have a significant effect on a nation's capacity to pay its debts, creating debt cycles and financial distress.Also, excessive borrowing based on hopeful resource revenue forecasts and resource-backed loans can result in unmanageable debt levels, raising the risk of default and necessitating debt restructuring.

However, in the first model, a negative relationship exists between institutional quality, measured as control of corruption, and external debt. This implies that control of corruption can help reduce external debt. By supporting nations in managing public debts effectively through the decrease of borrowing costs, corruption control may help countries reduce their external debt. Similarly in the second model, a negative relationship exists between institutional quality, measured as government effectiveness, and external debt. This emphasizes the significance of efficient governance in

preserving fiscal sustainability. Overspending on external debt is less likely to occur in nations with more effective governance. Governments with good institutional quality often create and carry out disciplined fiscal and monetary policies.

However, when corruption control was used to moderate natural resources rent, the result indicates that the effect is positive on external debt. This implies that the natural resource effects outweighs the control of corruption effect on external debt. In other words, moderating natural resources with control of corruption does not reduce external debt. This shows that although initiatives to enhance governance (by lowering corruption) are crucial, they might not be enough to handle the intricacies of external debt accumulation in nations with abundant natural resources. The intended effect of lowering debt may not occur even though corruption control may lessen outright stealing or poor management if resource revenues are still used inefficiently toward unproductive projects or industries.

Also, when natural resources was moderated with government effectiveness, the result shows that it has a positive relationship with external debt. This also implies that despite their negative individual effects on external debt, the moderated effect is positive. Additionally, the conclusion implies that resource-rich nations continue to rely on external borrowing despite advances in government effectiveness. When governments are able to negotiate favourable terms or direct funds into productive projects, they may be more inclined to borrow more since they see foreign debt as a tool for development. The result is however not significant. The result is however not significant. The result of the control variables show that exchange rate devaluation reduces external debt. Also, a positive relationship was found between external debt and financial sector development. The result of the domestic market size is not significant on external debt.

However, in terms of the magnitude of the effects, the moderating natural resource with control of corruption or government effectiveness had lower effects on external debt than the individual effects of natural resources in two models. This suggests that institutional improvements partially mitigate the debt-increasing tendencies of resource wealth but do not entirely offset them.

Table 8: Results of the FGLS

Depend Variable:	Model One		Model Three	
EXDEBT	Coeff	P>z	Coeff	P>z
NATURA	.2620	0.006	.1743	0.050
EXCHARAT	-.1792	0.000	-.1529	0.001
LOGCOC	-.1452	0.000		
NATURECOC	.0474	0.001		
FINDEV	.5109	0.000	.5290	0.000
DOMMARKET	-.1046	0.367	-.1021	0.389
LOGGOV			-.1020	0.003
NATUREGOV			.0266	0.052
_CONS	22.623	0.000	22.60	0.000
Rho	7719	64.6	.7794	56.95
Prob > chi2	0.0000		0.0000	

Source: Computed by the Author Using Data from World Bank (2023)

SUMMARY AND CONCLUSION

This study was aimed to examine the nexus between natural resources endowment and institutional quality on external debt in selected African countries. The findings suggest that natural resources rent leads to more external debts, but control of corruption and government effectiveness reduce it. Also, moderating natural resource rent with control of corruption and government effectiveness reduces the magnitude of the effect of natural resources rent on external debt but it does not entirely mitigate it. The study concludes that, although strengthening institutions is crucial to lowering foreign debt, doing so alone will not be enough. It is therefore recommended that African governments should not rely solely on enhancing institutional quality as means to reducing foreign debt. To achieve sustainable growth and lessen dependency on external debt, African nations should embrace a more thorough and multifaceted strategy that involves enhancing debt management, economic diversification, fiscal discipline, and resource revenue management.

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