EJE EUROPEAN JOURNAL OF ECONOMICS

ISSN: 2669-2384
VOLUME 2, ISSUE 1

Natural Resources Abundance and Macroeconomic Performance in Nigeria

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ABSTRACT

Since the "Dutch disease", more studies are establishing a negative relationship between natural resource abundance and a nation's economic performance that have termed a 'resource curse'. Nigeria being of such countries with abundant natural resources this study sought to examine the impact of natural resources abundance on the performance of selected macroeconomic development. Annual time series data from 1981-2021 about the variables were obtained from various sources like Central Bank of Nigeria statistical bulletin, National Bureau of Statistics and World Bank data base were used for the analysis. The Autoregressive Distributed Lag (ARDL) model was adopted. The results obtained indicate that natural resource abundance (in terms of crude oil and natural gas revenue, mineral rent, oil rent and solid mineral revenue) have: 1) mix and unfavourable effect on balance of payments in both short and long run; 2) a positive effect on income per head in the short run and long run, but with the short-run effect different from that of the long run; and 3) only long-run positive effect on unemployment rate, with crude oil and natural gas revenue having a negative effect. Thus, natural resources considered have significant effect on gross domestic product per capital but do not have the desired effect on balance of payments and unemployment rate. This led to the conclusion that Nigeria's abundant natural resource have only partial impart on macroeconomic performance. These findings will help to drive policy towards optimal natural resource utilization for enhanced macroeconomic performance as suggested.

Keywords: natural resources, balance of payments, per capita income, unemployment rate, macroeconomic performance

Cite this article as: Jato, T. P. J., & Ayaga, J. M. (2022). Natural Resources Abundance and Macroeconomic Performance in Nigeria. *European Journal of Economics*, *2*(1), 1-18. https://doi.org/10.33422/eje.v2i1.185

1. Introduction

The true wealth of a country comes majorly from its renewable and non-renewable natural resources as well as ecosystem services; as these are the bases for all forms capital formation. They aid in boosting tax revenue, income, and eradicating poverty. Natural resource-related industries create jobs and frequently serve as the foundation of the economies of disadvantaged regions (OECD, 2011). Furthermore, natural resources, which constitute the main source of income for the poorest people, makes up 25 percent of the overall wealth in low-income countries.

Nigeria is one of the countries that is endowed with abundant natural resources such as natural gas, arable land with iron ore, crude oil, tin, niobium, limestone, lead, coal, and zinc among others. The abundance of these resources reflects in the potentially exploitable amount of these natural resource which includes the already amount exploited and reserves proven to be economically exploitable. With the availability of these substantial resource endowment and

proceeds from their extraction, Nigeria stands a of great chance of acquiring national wealth which when properly used may improve macroeconomic performance of the nation.

Though not ranking among the top ten (10) countries of the world in terms abundance of natural resources, the relative abundance of natural resources in Nigeria and the monetary values already gained from their exploitation and the potential future gains has place the country on top in the African continent and above many other most countries certain high world ranks among comity of nations. For instance, Nigeria was among the largest producers of columbite, 6th largest producer of Tin, and with a proven crude oil and natural gas reserves of 37,050(million barrels) and 5,848(billion cu. m.), Nigeria is the 8th largest producer of crude oil and gas (OPEC, 2022). By the World Mining Congress (2021) statistics of 2019 total minerals production by country, Nigeria produced 2,365, 53,835, 9, 95,500, and 142,183,000 metric tons of Iron and Ferro-Alloys, Non-Ferrous Metals, Precious Metals, Industrial Minerals, and Mineral-Fuels, respectively and came world 20th with total production of 142,334709 metric tons of minerals.

Still x-raying the worth of Nigeria's natural resources, Aljazeera (2022) noted that, as of 2019, Nigeria produced 25% of Africa's petroleum, with Angola and Algeria following with 17% and 16% respectively. Also, Nigeria comes in 2nd position with $53bn mineral resources earnings per year to South Africa with $125bn. The country is rich in limestone deposits with an estimated amounts of 3 billion tons, iron ore deposits are in excess of about 10 billion tons, coal with a reserve of over 2.7 billion tons. This is in addition to the suitable and relatively stable climatic, water bodies, an about 31.3 percent of arable land, abundant maritime resources, and many other vital natural resources the country is endowed with.

One therefore expects that, given the abundance of natural resources in Nigeria, there should be a corresponding economic growth/development noticeable in the country's macro and socio-economic variables. However, available statistics does not speak favourable of the country in this regard. A look at the performance of three macroeconomic variables shown in Table 1, reveals this not-so-good performance of the country's economy.

Table 1.
Performance of some macroeconomic variables in Nigeria (2010-2021)

Year	Balance of payments (US$)	GDP per capita (US$)	Unemployment rate (%)
2010	13,111,276,866.05	2,280.44	7.6
2011	10,668,377,374.36	2,338.03	8.5
2012	17,374,274,674.83	2,372.46	12.6
2013	19,048,981,238.38	2,463.89	13.1
2014	906,535,877.21	2,550.47	8.5
2015	-15,438,642,533.97	2,549.72	13.6
2016	5,077,217,476.11	2,443.44	6.4
2017	12,689,340,192.54	2,399.73	20.42
2018	6,260,574,934.08	2,383.42	23.13
2019	-14,627,014,405.31	2,374.37	17.96
2020	-16,975,923,423.86	2,083.34	27.14
2021	3,680,327,873.30	2,085.68	33.31

Source: Compiled from World Bank (2022) and other sources.

Between 2010 to 2021, the balance of payments (BoP) has been fluctuation, hitting negative in 2015, 2019 and 2020. The per capita income is still hovers around a low figure of $2,000, with unemployment rate is getting worse. These do not correlate the abundance of natural resources. The World Bank (2018) had observed that Nigeria's wealth per capita is a fraction of what it is in Brazil and Malaysia; adding that these differences in wealth are closely correlated with

the much higher shares of human capital in total wealth in Latin America and the Caribbean and East Asia and Pacific region. The per capita produced capital of both South Africa and Nigeria, the World Bank (2018) said is below that of every major commodity exporter in all developing regions. World Poverty Clock data show that despite the abundant natural resources, Nigeria has overtaken India as home of the largest population living in extreme poverty with 87 million people living with less than US$1.90 per day, thus been dubbed as the "poverty head quarter of the world".

To show a little of the value of the country's resources, Aljazeera (2022) pointed out that, more than half of a mobile phone's components – including its electronics, display, battery and speakers – are made from mined and semi-processed materials, which Nigeria has in relative abundance. The source noted further that, in 2021, some 1.5 billion smartphones were sold around the world – up from 122 million units in 2007. This shows the great demand and value for Nigeria's natural resources and the growing potential.

Thus far presented is likely "Dutch disease" been experienced by the country with seemingly a negative relationship between natural resource abundance and a nation's output and prosperity that could be termed a 'resource curse'. The question yet to be adequately answered is what is the impact of the abundant natural resources in Nigeria to the nations' macroeconomic development? Seeking an answer to this question necessitated examining the impact of natural resources abundance on the performance of selected macroeconomic development in Nigeria within the period of 1980 and 2021.

2. Literature Review

2.1. Theoretical Review

From the angle of theory, early economists like Adam Smith and David Ricardo had based their respective theories – the *absolute cost advantage* and *comparative cost advantage* on relative abundance of resource a country holds, which should make it achieve the production of certain goods relatively easy as compared to another country that does not have such resources. The economic gains from such, the scholars, see as enormous to the country and others through trade. Generally, they predicted that such a country with relative abundance of resources to achieve absolute cost advantage or comparative cost advantage over others stands to attain economic development. The Heckscher-Ohlin *factor endowment* (or factor abundance) theory followed similar line of arguments put forth by Smith and Ricardo though with its variations. It hinged the basis for international trade (with underlining economic development prospects) on relative abundance of resources. Arthur Lewis' *general theory of development* had argued that economic development depends on a number of components such as materials, human, and institutional. Explain this, Okowa (1996) explicitly explained that the level of development of any society depends her abundant resources in the form of natural resource endowment, the capital stock, the labour force, economic institutions, government, knowledge, the will to economize amongst others. By this, a proper mix of these factors should lead to the development of an economy that possess them.

The resource curse theory (often referred to as the paradox of plenty), as associated with the work of economic geographer, Richard Auty in 1993, looks at the paradoxical impacts of a country's natural resource richness on its economic, social, or political well-being. It describes the inability of many resource-rich nations to completely capitalize on their natural resource richness and for their governments to successfully address requirements related to public welfare. Despite the expectation that better development outcomes would follow the discovery of natural resources, resource-rich nations frequently exhibit higher rates of authoritarianism

and conflict as well as worse rates of economic stability and growth than their less resource-rich counterparts. The reader explains political and economic views regarding why some resource-rich nations do not perform as well as anticipated.

A variant of other similar resource-economic development theories have traced the importance of availability and quantum of resources a country has in the development of such a country. By such propositions, Nigeria should have achieved a reasonable level of economic development to be classified among the comity of "developed countries" rather than its "developing countries" group it belongs to. Implicitly from these theories, therefore, is that, endowment of a country with resources is one thing, but more importantly is the use to which resources are put to.

2.2. Conceptual Framework

There has been continued debates as to how natural resources impact economic development. These increasing contradictory evidences have emerged, mostly, as a reaction to the early *resource curse* studies that showed a substantial negative correlation between natural resources and economic development. This has made the economic subject of how natural resources impact development to be continually a critical issue for policy as many nations, especially developing ones like Nigeria, are still largely dependent on volatile resource rents (Lashitew & Werker, 2020a). This has led to diverse views of on the directional effect of natural resources on economic development. As Lashitew and Werker (2020a) had noted, the possibility that multiple explanations could be accurate at the same time is a major factor in the lack of agreement regarding how resources effect development. Two most common ways as advanced in literature and fronted by Lashitew and Werker (2020a) are the direct and indirect ways as shown in Figure 1.

The route shows a direct positive or negative effect of natural resources on economic development. The positive effect is seen when natural resources create economic rents that can be applied to the provision of public goods and other productive uses. The negative effect sets in where uncertainties from declining and volatile terms of trade can undermine public finance and discourage long-term investment. This is evident in the recent global oil price fall which lead to fiscal crisis in major petroleum-producing countries like Nigeria, Saudi Arabia, and Russia. The balance between these offsetting impacts will determine whether the cumulative direct influence of resources on long-term development is favorable or negative.

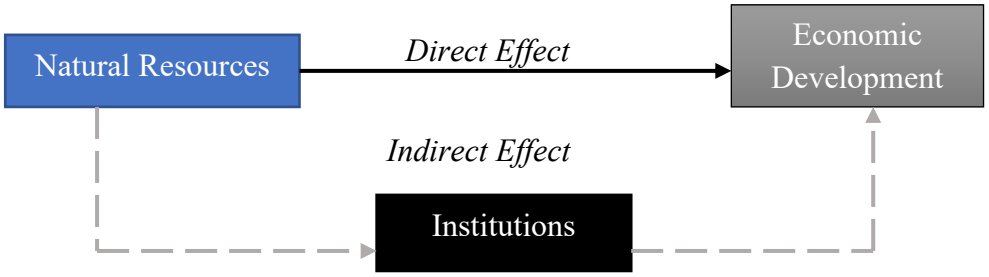

Figure 1. Conceptual framework
Source: Adopted from Lashitew & Werker (2020a).

The indirect impact of natural resources is exerted on economic development through possible influences of natural resources on institutional quality. This influence could be positive, thus, transmitting to economic development, and economic retardation when the institutions get negative effect from natural resources. Long-standing theories by political scientists and economists contend that resource richness promotes a rentier institutional culture, which

retards the growth of political and governance institutions. For instance, resource profits can be invested in security apparatuses and used for patronage spending to maintain political power. Furthermore, resource windfalls might make it harder for the government to hold itself accountable to its citizens and enterprises by separating revenue from spending. Governments won't be as motivated to enact pro-growth reforms if tax revenues aren't needed, and people won't be as motivated to call for better governance and accountability.

On the negative side, it is assumed that an abundance of or significant reliance on natural resources will affect some variables or process(es) that will tend to inhibit growth. Finding and mapping these intermediary variables and mechanisms is a significant problem for economic development theorists and empirical researchers in the subject. In this wise, OECD (2011) pointed out that due to the intrinsic relevance natural resources, government must institute right policies to manage these resources in such a way that they contribute to the long-term economic development of countries and not only short-term revenue generation. By so, the 'resource curse' can be transformed into an opportunity with the help of high-quality institutions now and in the future.

2.3. Empirical Review

Empirically, the beneficial link between resources and economic progress has been found. Though some studies found a positive impact of resources on economic development, several others have found a negative impact of resources abundance on economic development. According to Havranek, Horvath and Zeynalov (2016), no consensus answer has yet emerged, with approximately 40% of empirical papers finding a negative effect, 40% finding no effect, and 20% finding a positive effect.

Of those that found a positive impact include that by Chambers and Guo (2009), which established a positive relation between steady-state economic growth and natural-resource utilization and Portugal (2016) whose results also indicated that the natural resources have insignificantly influenced economic development in Africa, at least over the sample period considered. Equally, Lashitew, Ross and Werker (2020) found a positive impact of abundant resource on economic development when they discovered that countries more abundant resource were seen to performed better in accumulating public capital and human capital as compared to countries which are more resource-dependent as thy appear to perform worse on measures of human capital and intellectual capital. Jović, Maksimović and Jovović (2016) also found some form of positive effect when examined effect of natural resources rents on economic development.

Sach and Warner (1995) are among the first who found a negative impact of abound resources of a country on its economic development and cried out of about a possibility of such resources being a curse rather than blessings. In his attempted to examine the contribution of boron production to Turkey’s economic performance Okan (2008) also found that natural resources have not contributed to economic development. So also did others like Wen (2011); Anggraeni, Daniels and Davey (2017); and Amini (2018) established a ‘resource curse’ negative relationship between natural resources and economic development using different case studies and methods.

Another category of researchers found a mixed results. Belonging to this group are the sorks of Coulibaly (2013); Wizarat (2014); Aregbeyen and Kolawole (2015); Li and Xiao (2019); Sinha and Sengupta (2019); and Shabbir, Kousar and Kousar (2020), which found positive impact of natural either in the long run or a partial impact, and negative impact in the short run or in relation to some aspects of the economy.

Trailing the path of some of these studies, though with a broader view of resources and variation in methodological approach, the study examined the effect of natural resource abundance on the performance of macroeconomic variables in Nigeria.

3. Methods of Study

3.1. Model Specification

The model was be specified in line with the theoretical expectations that effective utilization of natural resources will enhance the performance macroeconomic variables. That is, the performance of macroeconomic variables is a function of natural resources. For the study, only three macroeconomic variables were considered. The functional model is formalized in three multiple regression models as follows:

$$BOP = f(COG, SMR, MRN, ORN) \quad (1)$$

$$GDP = f(COG, SMR, MRN, ORN) \quad (2)$$

$$UER = f(COG, SMR, MRN, ORN) \quad (3)$$

Consequently, the econometric forms of the models shall be stated as:

$$BOP = \alpha_0 + \alpha_1 COG_t + \alpha_2 SMR_t + \alpha_3 MRN_t + \alpha_4 ORN_t + \mu_t \quad (4)$$

$$GDPc = \delta_0 + \delta_1 COG_t + \delta_2 SMR_t + \delta_3 MRN_t + \delta_4 ORN_t + \varepsilon_t \quad (5)$$

$$UER = \gamma_0 + \gamma_1 COG_t + \gamma_2 SMR_t + \gamma_3 MRN_t + \gamma_4 ORN_t + e_t \quad (6)$$

The Autoregressive Distributed Lag (ARDL) model was adopted for the reasons of that the series may integrated of different orders or non-stationary, robustness of estimating small and relatively large observations, and forecasting and to disentangle long-run relationships (as series may be bound together due to equilibrium forces even though the individual time series might move considerably) from short-run dynamics. In order to put the variables on the same scale, the log-linear formulations of the ARDL long-run models will be estimated as follows:

$$\Delta lnBOP_t = \alpha_0 + \alpha_1 lnPVI_t + \alpha_2 lnCOG_t + \alpha_3 lnSMR_t + \alpha_4 lnMRN_t + \alpha_5 lnORN_t + \sum_{i=1}^{n} + \Delta\alpha_1 lnBOP_t - 1 + \sum_{i=1}^{n} \Delta\alpha_2 lnCOG_t - 1 + \sum_{i=1}^{n} \Delta\alpha_3 lnSMR_t - 1 + \sum_{i=1}^{n} \Delta\alpha_4 lnMRN_t - 1 + \sum_{i=1}^{n} \Delta\alpha_5 lnORN_t - 1 + \mu_t \quad (7)$$

$$\Delta lnGDP_t = \delta_0 + \delta_1 lnGDPc_t + \delta_2 lnCOG_t + \delta_3 lnSMR_t + \delta_4 lnMRN_t + \delta_5 lnORN_t + \sum_{i=1}^{n} + \Delta\delta_1 lnGDP_t - 1 + \sum_{i=1}^{n} \Delta\delta_2 lnCOG_t - 1 + \sum_{i=1}^{n} \Delta\delta_3 lnSMR_t - 1 + \sum_{i=1}^{n} \Delta\delta_4 lnMRN_t - 1 + \sum_{i=1}^{n} \Delta\delta_5 lnORN_t - 1 + \varepsilon_t \quad (8)$$

$$\Delta lnUER_t = \gamma_0 + \gamma_1 lnUER_t + \gamma_2 lnCOG_t + \gamma_3 lnSMR_t + \gamma_4 lnMRN_t + \gamma_5 lnORN_t + \sum_{i=1}^{n} + \Delta\gamma_1 lnUER_t - 1 + \sum_{i=1}^{n} \Delta\gamma_2 lnCOG_t - 1 + \sum_{i=1}^{n} \Delta\gamma_3 lnSMR_t - 1 + \sum_{i=1}^{n} \Delta\gamma_4 lnMRN_t - 1 + \sum_{i=1}^{n} \Delta\gamma_5 lnORN_t - 1 + e_t \quad (9)$$

Considering the short-run error correction models (ECM), the following were models are specified from the ARDL models.

$$\Delta lnBOP_t = \beta_0 + \beta_1 lnPVI_t + \beta_2 lnCOG_t + \beta_3 lnSMR_t + \beta_4 lnMRN_t + \beta_5 lnORN_t + \sum_{i=1}^{n} + \Delta\beta_1 lnBOP_t - 1 + \sum_{i=1}^{n} \Delta\beta_2 lnCOG_t - 1 + \sum_{i=1}^{n} \Delta\beta_3 lnSMR_t - 1 + \sum_{i=1}^{n} \Delta\beta_4 lnMRN_t - 1 + \sum_{i=1}^{n} \Delta\beta_5 lnORN_t - 1 + \Pi ECM + \mu_t \quad (10)$$

$$\Delta lnGDP_t = \partial_0 + \partial_1 lnGDP_t + \partial_2 lnCOG_t + \partial_3 lnSMR_t + \partial_4 lnMRN_t + \partial_5 lnORN_t + \sum_{i=1}^{n} + \Delta\partial_1 lnGDP_t - 1 + \sum_{i=1}^{n} \Delta\partial_2 lnCOG_t - 1 + \sum_{i=1}^{n} \Delta\partial_3 lnSMR_t - 1 + \sum_{i=1}^{n} \Delta\partial_4 lnMRN_t - 1 + \sum_{i=1}^{n} \Delta\partial_5 lnORN_t - 1 + \Pi ECM + \varepsilon_t \quad (11)$$

$$\Delta lnUER_t = \varphi_0 + \varphi_1 lnUER_t + \varphi_2 lnCOG_t + \varphi_3 lnSMR_t + \varphi_4 lnMRN_t + \varphi_5 lnORN_t + \sum_{i=1}^{n} + \Delta\varphi_1 lnUER_{t-1} + \sum_{i=1}^{n} \Delta\varphi_2 lnCOG_{t-1} + \sum_{i=1}^{n} \Delta\varphi_3 lnSMR_{t-1} + \sum_{i=1}^{n} \Delta\varphi_4 lnMRN_{t-1} + \sum_{i=1}^{n} \Delta\varphi_5 lnORN_{t-1} + \Pi ECM + e_t \quad (12)$$

where, α_0, δ_0, γ_0, β_0, ∂_0, and φ_0 are the intercepts of the respective long-run and short run models, α_1-α_5, δ_1-δ_5, and γ_1-γ_5, are long-run dynamic coefficients of the regressors, and β_1-β_5, ∂_1, ∂_5, and φ_1-φ_5 represent short-run dynamic coefficients of the regressors; Δ is the first difference operator, n depict maximum lag lengths, μ_t, ε_t, e_t are white noises, ECM is the error correction term lagged for one period, Π is error correction coefficients which measures the speed of adjustment and *ln* is natural logarithm.

3.2. Data

Annual time series data from 1981-2021 about the variables of the research obtained from various sources like Central Bank of Nigeria statistical bulletin, National Bureau of Statistics of various issues and World Bank data base were used for the analysis. Table 2 presents information on the study variables, their acronyms, measurements, and sources.

Table 2.
The study variables, acronyms, measurements, and sources

Variable	Acronyms	Measurement	Source
Dependent			
Balance of Payments	BOP	As measured by CBN	CBN (2022)
Gross Domestic Product	GDP	As measured by CBN	CBN (2022)
Unemployment rate	UER	The number of the economically dynamic inhabitants who are devoid of work but are available for and seeking for work	National Bureau of Statistics of various issues
Independent			
Crude oil and natural gas revenue	COG	The revenue generated from crude oil and gas	CBN (2022)
Solid mineral revenue	SMR	The revenue generated from solid minerals	CBN (2022)
Mineral rent	MRN	The difference between the value of production for a stock of minerals at world prices and their total costs of production	World Development Indicators (World Bank, 2022)
Oil rent	ORN	The difference between the value of crude oil production at world prices and the total costs of production	World Development Indicators (World Bank, 2022)

3.3. Pre-Estimation Test

3.3.1. Unit root test

The Augmented Dickey-Fuller (ADF) unit root test proposed by (Dickey & Fuller, 1979) was used to test the stationarity of time series due to the likely tendency of macroeconomic time series to possess unit root. The ADF was chosen over the conventionally Dickey-Fuller (DF) unit root test since it takes into consideration the problem of serial autocorrelation. The DF unit root test model, with a constant and trend factor, is of the form:

$$\Delta y_t = \alpha y_{t-1} + x_t'\delta + \epsilon_t \quad (13)$$

where $\alpha = \rho - 1$.

This is based on the following hypotheses:

H_0: $\alpha = 0$ (14)
H_1: $\alpha < 0$

The ADF test, however, moves further to constructs a parametric correction for higher-order correlation with the presumptuous that the *y* series follows an AR(*p*) process with addition to the right-hand side of the DF test regression *p* lagged difference terms of the dependent variable. This becomes:

$$\Delta y_t = \alpha y_{t-1} + x_t'\delta + \beta_1 \Delta y_{t-1} + \beta_2 \Delta y_{t-2} + \cdots + \beta_p \Delta y_{t-p} + \upsilon_t \quad (15)$$

The null hypothesis of a unit root was tested against the alternative hypothesis of no unit at 5 percent level of significance.

3.3.2. Co-integration test

Co-integration test proceeded the unit root test. It was performed using the bounds test approach to check for long-run relationship among variables. This is based on the premise a linear combination of two or more I(1) series may be stationary [i.e., I(0)], and they are said to be cointegrated. A cointegrating equation defined by such a linear combination has with cointegrating vector of weights which illustrates the long-run relationship between the variables. Such a cointegrating equation is of the form:

$$y_t = x_t'\beta + D_{1t}'\gamma_1 + u_{1t} \quad (16)$$

The co-integration test tests the null hypothesis of no long-run relationship against the alternative hypothesis that a long-run relationship exists. Using the associated Wald test or f-test of the bounds test, the decision is that Co-integration test (H_o) be rejected if the calculated F-statistic exceeds the upper critical bounds at 5 percent level; or accept H_o (i.e., the series are not co-integrated) if the calculated F-statistic is less than the lower critical bound. Where the computed F-ratio lies between the lower and upper critical bounds, the test is regarded as inconclusive.

3.4. Post Estimation Tests

The diagnostic tests were carried out to ascertain the statistical criteria and reliability of the estimated model for good policy recommendation. Particularly, the serial correlation test (using Durbin Watson test), normality test (using Jarque-Bera), stability test (via CUSUM), and heteroschedasicity test were applied. The Wald test to help determine if the estimates of the regressors (explanatory variables) are significant and difference from zero was also performed.

4. Results and Discussion

4.1. Descriptive Statistics

Descriptively, the statistics in Table 3 give an overview of the behaviour of the variables employed in the estimation.

Table 3.
Descriptive Statistics Results

	BOP	COG	GDPC	MRN	ORN	SMR	UER
Mean	19.89325	6650.662	1772.512	0.005014	12.13668	46.14125	8.795000
Median	13.38500	6591.325	1586.049	0.001208	11.78277	36.06000	7.550000
Maximum	72.84000	9294.050	2550.470	0.027965	26.42849	106.1900	19.70000
Minimum	3.460000	4052.980	1317.360	0.000000	1.447166	17.08000	3.200000
Std. Dev.	17.07135	1454.077	439.7887	0.007588	6.157954	27.72919	3.677300
Skewness	1.605383	0.085747	0.534935	1.602047	0.242132	0.875420	0.845274
Kurtosis	4.594593	2.080242	1.681672	4.341838	2.418691	2.407805	3.227340
Jarque-Bera	21.41958	1.458942	4.804350	20.11124	0.954055	5.693556	4.849388
Probability	0.000022	0.482164	0.090521	0.000043	0.620626	0.058031	0.088505
Sum	795.7300	266026.5	70900.49	0.200549	485.4673	1845.650	351.8000
Sum Sq. Dev.	11365.81	82459215	7543151.	0.002246	1478.895	29987.42	527.3790
Observations	41	41	41	41	41	41	41

Source: Authors' Computation, using E-views (2022)

An examination of the result above shows the mean values of the variables - BOP, COG, GDPc, MRN, ORN, SMR, and UER are 19.89325, 6650.662, 1772.512, 0.005014, 12.13668, 46.14125, and 8.795000 respectively. The median values of the series are 13.38500, 6591.325, 1586.049, 0.001208, 11.78277, 36.06000, and 7.550000, respectively for BOP, COG, GDPc, MRN, ORN, SMR, and UER variables. It should be noted that the median is a robust measure of the centre of the distribution that is less sensitive to outliers than the mean. The maximum values of each of the series in the sample are 72.84000, 9294.050, 2550.470, 0.027965, 26.42849, 106.1900, and 19.70000 respectively for BOP, COG, GDPc, MRN, ORN, SMR, and UER with 3.460000, 4052.980, 1317.360, 0.000000, 1.447166, 17.08000, and 3.200000 as the corresponding minimum values. The standard deviations, which are a measure of dispersion spread in each of the series, are 17.07135 for BOP, 1454.077 for COG, 439.7887 for GDPc, 0.007588 for MRN, 6.157954 for ORN, 27.72919 for SMR, and 3.677300 for UER.

Again, one important observation in this table is that the skewness (a measure of asymmetry) of the distribution of series around its mean, are positive for all the variables, which means that the distribution has a long right tail. The Kurtosis statistic that measures the peakedness or flatness of the distribution of each of the series revealed that the values for most of the variables are greater than 3 on the average, meaning that the distribution is highly peaked (i.e., Leptokurtic) relative to normal.

4.2. Stationarity Test

The results of the Augmented Dickey-Fuller (ADF) test for stationarity conducted on the data is as presented in Table 4. The results revealed that some of the variables (GDPc, SMR, and UER) are stationary at levels (i.e., that is integrated of difference one [I(0)] at 5% and 10% significance level); while others (COG, MRN, ORN, and BOP) attained stationarity at first difference, that is integrated of difference one [I(1)] at 5% and 10% significance level. This meant the rejection of the null hypothesis that a unit root exists in the series. The implication is that these variables have the mean reverting ability such that any perturbation to the series will fade out with passage of time.

Table 4.
Stationarity Test

Variable	ADF Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Prob.	Order of Integration
BOP	-6.33	-3.62	-2.94	-2.61	0.0000	I(1)
COG	-6.26	-3.62	-2.94	-2.61	0.0000	I(1)
GDPC	-10.63	-3.62	-2.94	-2.61	0.0000	I(0)
MRN	-9.72	-3.62	-2.94	-2.61	0.0000	I(1)
ORN	-8.27	-3.62	-2.94	-2.61	0.0000	I(1)
SMR	-10.65	-3.62	-2.94	-2.61	0.0000	I(0)
UER	-8.81	-3.62	-2.94	-2.61	0.0000	I(0)

Source: Authors' Computation, using E-views (2022).

The outcome of the stationarity test set the stage for employing the Bounds Test for Cointegration analysis and the ARDL technique.

4.3. Cointegration Tests

The study set out to examine the relationship modelled by the functions stated earlier in equations (4) to (12). Recalling that tests for stationarity had been reported and the variables have a mixed order of integration, we proceeded to perform the Bounds Test for Cointegration to investigate the presence of a long-run relationship and the results are presented as Tables 5, 6, and 7.

The bounds test performed to determine if long-run relationship exists among BOP and its explanators (COG, MRN, ORN, and SMR) tested the null hypothesis of no long-run relationship between the variables against the alternative hypothesis of long-run relationship. The result of the test (see Table 5) based on the F-stat. (as explained earlier) led to the rejection of the null hypothesis (H_o); since the calculated F-statistic exceeds the upper critical bound at 5 percent level of significance. There is thus evidence from the data that a long-run cointegration exist between BOP and its explanators.

Table 5.
Bounds Test for Co-integration for Model 1

Test Statistic	Value	K
F-statistic	3.698368	4
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Source: Authors' Computation, using E-views (2022).

Bounds test was also conducted to examine the co-integration between GDPc and its explanatory variables of COG, MRN, ORN, and SMR and the result is as in Table 6. The null hypothesis was rejected as the F-stat. calculated (102.6646) far exceeds the upper critical bound (3.49) at all the levels of significance. It is, therefore, concluded that there is a long-run relationship between GDPc and MRN, ORN, and SMR.

Table 6.
Bounds Test for Co-integration for Model 2

Test Statistic	**Value**	**K**
F-statistic	102.6646	4
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Source: Authors' Computation, using E-views (2022).

In likewise manner, a long-run relationship was tested among the independent variables in the UER model and the explanators of COG, MRN, ORN, and SMR. The null hypothesis assuming a no long-run relationship between the variables was also rejected and the alternate hypothesis of long-run relationship accepted. This is based on the result of the test as presented in Table 7. which shows the F-stat. calculated exceeding the upper critical bound at all levels of significance. This led to the conclusion that there exists a long-run cointegration between UER and COG, MRN, ORN, and SMR.

Table 7.
Bounds Test for Co-integration for Model 3

Test Statistic	**Value**	**K**
F-statistic	54.01414	4
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Source: Authors' Computation, using E-views (2022).

4.4. The ARDL Results

4.4.1. Long-run estimates of ARDL

The next stage of analysis involved the use of ARDL model to examine the details in the relationships. Tables 8, 9 and 10 hold the results for the long-run results and the short-run results are presented in Tables 11, 12 and 13.

Table 8.
Long-Run Coefficients of the ARDL Model 1

Variables	**Coefficient**	**Standard Error**	**t-statistic**	**Prob.**
Dependent Variable: Balance of payments (BOP)				
COG	-0.009877	0.007318	-1.349790	0.1872
MRN	-1605.808	1841.317	-0.872098	0.3901
ORN	6.473882	3.926946	1.648579	0.1097
SMR	0.506932	0.651516	0.778081	0.4426
C	-7.196963	46.55916	-0.154577	0.8782

Source: Authors' Computation, using E-views (2022).

The results of the regression show that:

*BOP = -7.1970 -0.0099*COG -1605.8083*MRN + 6.4739*ORN + 0.5069*SMR*

From the estimates, COG and MRN exerted a negative influence on BOP, implying that a positive change in COG and MRN will result to a fall in balance of payments (BOP). On the other hand, ORN and SMR showed a positive influence on BOP, indicating that an increase in ORN and SMR will result in a rise in BOP. However, all the coefficients are not significant. This means that whatever effect COG, MRN, ORN, SMR have on BOP is not meaningful. This non-significance points to the fact that the long-run influence of the natural resources on balance of payments is negligible.

Table 9.
Long-Run Coefficients of the ARDL Model 2

Variables	Coefficient	Standard Error	t-statistic	Prob.
Dependent Variable: GDP per capita (GDPc)				
COG	0.104936	0.012541	8.367355	0.0000
MRN	7513.009	3969.308	1.892776	0.0675
ORN	-0.451186	3.581252	-0.125986	0.9005
SMR	12.56366	1.221449	10.28586	0.0000
C	463.8565	97.85081	4.740447	0.0000

Source: Authors' Computation, using E-views (2022).

The estimated GDPc relationship is:

*GDPc = 463.8565 + 0.1049*COG + 7513.0086*MRN -0.4512*ORN + 12.5637*SMR*

The result reveals that, COG, MRN, and SMR positively influence GDPc, implying that a positive change in COG, MRN and SMR will result to increase in GDP per capita (GDPc). On the contrary, ORN showed a negative effect on GDPc, indicating that an increase in ORN will result in a decline in GDPc. Judging the significance of these effects, only the coefficients of COG and SMR appeared to be significant. Those of MRN and ORN showed no meaningful effect on GDPc.

Table 10.
Long-Run Coefficients of the ARDL Model 3

Variables	Coefficient	Standard Error	t-statistic	Prob.
Dependent Variable: Unemployment Rate (UER)				
COG	-0.000148	0.000228	-0.649035	0.5208
MRN	20.25085	58.62988	0.345402	0.7320
ORN	0.192478	0.068641	2.804106	0.0084
SMR	0.122683	0.021668	5.661928	0.0000
C	1.706021	1.795654	0.950083	0.3490

Source: Authors' Computation, using E-views (2022).

The estimated long-run relationship between the UER and its variables is of the nature:

*UER = 1.7060 -0.0001*COG + 20.2509*MRN + 0.1925*ORN + 0.1227*SMR*

Other than COG, all the other variables have a positive effect on UER. This means that a positive change in MRN, ORN, and SMR will rather result in a rise in unemployment rate (UER). Only COG is seen to have had negative effect on UER, indicating that an increase in COG will result in a decline in UER. In terms of the significance of coefficients, only the coefficients of ORN and SMR appeared to be significant. Those of COG and MRN showed no meaningful effect on UER.

4.4.2. Short-run estimates of ARDL

Further, the short-run parameters were estimated through the error correction model in relation to the long-run parameters estimates. This is in line with the stated hypothesis of no cointegration which is associated with the vector error correction model earlier stated. The results of the short-run dynamics associated with the ARDL models given in their parsimonious ECM form are reported below.

Table 11.
Short-Run Coefficients of the ARDL Model 1

Variables	Coefficient	Standard Error	t-statistic	Prob.
Dependent Variable: Balance of payments (BOP)				
D(MRN)	219.4104	300.3109	0.730611	0.4707
D(ORN)	0.468959	0.319722	1.466770	0.1528
D(SMR)	-0.121408	0.077150	-1.573673	0.1261
CointEq(-1)*	-0.302860	0.059523	-5.088082	0.0000
R-squared	0.513350			
Adj. R-squared	0.471638			
F-statistic	3.698368			

Source: Authors' Computation, using E-views (2022).

Table 12.
Short-Run Coefficients of the ARDL Model 2

Variables	Coefficient	Standard Error	t-statistic	Prob.
Dependent Variable: GDP per capita (GDPc)				
D(COG)	0.014369	0.116315	0.123531	0.9026
D(COG(-1))	0.408598	0.109051	3.746836	0.0009
D(MRN)	4086.220	2463.909	1.658429	0.1092
D(ORN)	3.959570	2.554822	1.549842	0.1333
D(ORN(-1))	-6.690467	2.211703	-3.025030	0.0055
D(SMR)	13.86311	0.608236	22.79232	0.0000
CointEq(-1)*	-0.343511	0.148112	-9.070936	0.0000
R-squared	0.980425			
Adj. R-squared	0.976636			
F-statistic	11.50177			

Source: Authors' Computation, using E-views (2022).

Table 13.
Short-Run Coefficients of the ARDL Model 3

Variables	Coefficient	Standard Error	t-statistic	Prob.
Dependent Variable: Unemployment Rate (UER)				
D(UER(-1))	-0.349210	0.060771	-5.746282	0.0000
D(UER(-2))	-0.271614	0.053259	-5.099855	0.0000
CointEq(-1)*	-0.681917	0.042810	-15.92883	0.0000
R-squared	0.940124			
Adj. R-squared	0.936602			
F-statistic	36.06912			

Source: Authors' Computation, using E-views (2022).

For the short-run estimations, the thing of importance is the coefficient of the ECM (-1) which showed the speed of adjustment from short-run to the long-run for the relationship among the variables. The results in Tables 11, 12, and 13 shows that error correction models are statistically significant with negative signs as expected. Explicitly, the coefficient of the lagged

error correction for model 1 is (-0.302860) is negative and statistically significant. The magnitude of the coefficient implies that 30 percent of the disequilibrium caused by the previous year's shock converges back to the long-run equilibrium in the current year in model 1. In the same vein, the error correction for models 2 and 3 conform to existence of a stable long-run relationship and cointegrated relationship among the variables. Precisely, the coefficients of the lagged of ECM for the model 2 and 3 are (-0.343511) and (-0.681917) respectively. This suggests fast adjustment process among the variables. Nearly, 34 and 68 percent of the disequilibrium of the previous shocks adjust back to the long-run equilibrium in the current year.

Further examination of the short-run model for (BOP) shows that only changes in MRN, ORN, and SMR can account for the changes in BOP in the short run. Of these, only SMR has negative relationship but like the others is not significant (having ρ-values of > .05). The implication of this is that a 1% increase in the values of MRN and ORN lead to increase in BOP in the short run, while a 1% increase in SMR leads to decline in BOP. The results are not completely in conformity with theoretical expectation, as it was expected that COG, MRN, ORN, and SMR should have positive and significant effect on BOP.

In the case of GDPc, the current values of COG, MRN ORN, and SMR, and the previous values of COG(-1) and ORN(-1) have been found to collectively explain the changes in GDPc. However, ORN(-1) has a significant negative effect on GDPc. The other variables show positive effect, but only COG(-1) and SMR are significant in their effects (with ρ-values of < .05). These greatly conform with the expectations of the study as a 1% rise in these variables is expected, all things being equal, to raise per capita GDP in the country.

With regards to UER, only its first and second previous years values are able to account for changes in it. This means that, in the short run, none of the explanatory variables, in their current or previous values, can account for changes in UER. This implies further, defiling all expectations, that the abundance of natural resources in Nigeria have no effect on UER.

4.5. Post Estimation Test

The estimated ARDL model is tested for heteroscedasticity, serial correlation, functional form misspecification, parameter stability and normality. The results from these tests are shown in Table 14.

Table 14.
Residual Diagnostic based test on component of ARDL models

Equations	**Model 1**	**Model 2**	**Model 3**
Autocorreletion test			
LM-statistic	3.422691	2.457960	1.129159
*p-v*alue	0.1806	0.2926	0.5686
Normality Test			
Jarque-bera	1.293662	0.185064	1.259479
P-value	0.523703	0.911620	0.532731
ARCH Test			
LM-statistic	0.089709	2.031386	0.034255
p-value	0.7645	0.1541	0.8532
Wald Test			
F-statistic	8.869355	13.99686	3.721025
p-value	0.0001	0.0000	0.0146

Source: Authors' Computation, using E-views (2022).

The coefficients of LM estimated statistically conforms to absence of serial correlation in the relationships. Similarly, the probability value of the heteroscedasticity test show that the variance is not time dependent and so, it is homoscedasticity for all outcome of the estimated equations. Also, the stability test (using CUSUM test) and the Wald test reveal that the parameter estimates of the regressors (explanatory variables) are stable and significant and difference from zero. In all, the results revealed that the estimated models, in their functional forms, are adequately specified and robust for policy analysis.

4.6. Discussion of Findings

For the assessment of the effect of crude oil and natural gas revenue, mineral rent, oil rent and solid mineral revenue on balance of payments in Nigeria, both the short- and long-run results show a mix and unfavourable effect of natural resource abundance (in terms of crude oil and natural gas revenue, mineral rent, oil rent and solid mineral revenue) on macroeconomic performance, in terms of balance of payments. Natural resource abundance has not just been shown to have both positive and negative effects on balance of payments, but insignificant effects. This implies that, the revenues generated from these resources have not meaningfully led to favourable balance of payments in Nigeria, and by extension, on macroeconomic performance. This insignificant or no effect of these resources on favourable balance of payments in the country could be attributed to inadequate pro-poor policy targeting leading to high imports which makes the net funds realized from these natural resources negative. Obviously, this should not come as a surprise bearing in mind the poor state of real sector production of the economy that has been characterized by poor industrial base, inadequate import substitution and export promotion production. The implication of this is that, in both the short- and long-run, imports will continue to rise above exports in the face of the abundant natural resources giving rise to negative net-exports. This finding is agreement with most authors like Sach and Warner (1995); Okan (2008); Wen (2011); Anggraeni, Daniels and Davey (2017); and Amini (2018) who established a negative relationship between natural resources and economic development. It therefore suffices to say that the abundance of natural resource in Nigeria has not led to favourable balance of payments and by extension, and of effect on macroeconomic performance in Nigeria.

In terms of the effect of natural resource abundance on GDP per capita, the results of the estimations of the second relationship show that, natural resources (in the form of COG, MRN, ORN, and SMR) have effect on GDPc in the short run and long run. Though the short-run effect seems to have differed from those of the long run, as shown above, generally the natural resources have a positive effect on income per head. The implication been that a rise in successive units of the natural resources will result to a positive increase GDP per capita (GDPc). These greatly conform with the expectations of the study of a significant raise in per capita GDP of the country for a 1% rise in the value of these natural resources is expected, all things being equal. This finding turned up to be in consonance with those of Chambers and Guo (2009); Portugal (2016); Lashitew, Ross and Werker (2020); and Jović, Maksimović and Jovović (2016) who also found some form of positive effect of natural resources on the economy. Given the identified positive effect, natural resources are then good policy variables through which per capita GDP can be raised. This, however, differs from the reality due to income inequality of in the country, but when be a rise in the value of these natural resources will definitely lead to a rise GDP per head in principle.

There is a mix effect of natural resource abundance on unemployment rate. Whereas, the short-run results show no effect of the natural resources on unemployment rate, long-run estimates indicate a positive effect of some of these (MRN, ORN, and SMR) on unemployment rate, with

COG having a negative effect. Of these, only the effect of ORN and SMR appeared to be significant, with those of COG and MRN not meaningful. Inferred from these results is that, while the abundance of natural resources in Nigeria have not been able to reduce unemployment rate, there are potentials that in the long run, *ceteris paribus*, it will. As such, natural resource abundance promises to meaningfully enhance macroeconomic performance in the long run. The abysmal short-run effect of these resources on reducing unemployment rate is not unexpected, given the pro-poor policy targeting, corruption and misappropriation that has characterized the natural resource sector in Nigeria. The implication of this is that, in both the short and long run, unemployment rate will continue to rise in the face of the abundant natural resources and the revenue derive from them as long as the resources are not effectively utilized. This finding agrees with authors like Coulibaly (2013); Wizarat (2014); Aregbeyen and Kolawole (2015); Li and Xiao (2019); Sinha and Sengupta (2019); and Shabbir, Kousar and Kousar (2020), which found a mix effect of natural resources on the economy in their different studies, but also in line with the findings of Sach and Warner (1995); Okan (2008); Wen (2011); Anggraeni, Daniels and Davey (2017); and Amini (2018) of a negative effect of abundant resources on economic development. It therefore, suffices to say that the abundance of natural resource in Nigeria has not led to unemployment rate reduction and by extension, no effect of natural resources on macroeconomic performance in Nigerian.

5. Conclusion/Policy Recommendations

The study empirically examined the effect of natural resource abundance on macroeconomic performance in Nigeria between 1980 and 2021 using data from secondary sources and employing relevant statistical and econometric techniques of analysis. The results of the study revealed that the aspects of natural resources considered have significant effect on gross domestic product per capital but do not have the desired effect on balance of payments and unemployment rate in Nigeria within the period of study. It is therefore, concluded that the abundance of natural resource has only partial impart on macroeconomic performance in Nigeria

As a way to improve the effect of natural resources on balance of payments in Nigeria, policy makers should target import substitution to reduce excess outflow resources above the gains from the natural resources. Such gains should be channeled to areas with high propensity for industrial development such as promotion/development small and medium enterprises, investments infrastructure and real sector needs.

Measures that will ensure equitable distribution of national income so as to actually increase per capita gross domestic product should be adopted. Such measures as: raise income of the poor; progressive tax system (where those who earn more income pay a larger amount of tax); educational grants, subsidies and low-interest loans; welfare and income support for low-income earners; compensation for low-income earners from national income; and wealth taxes.

The revenue from natural resources should also be channeled to reformation critical sectors like agricultural sector, which is the second largest employer of labor in Nigeria. These, if effectively done, will bring about the effect of the abundant natural resources on unemployment. Equally, if the revenue from the natural resources could be used to create a stable and safe, business-friendly environment, unemployment will be greatly tackled.

References

Aljazeera (2022). Mapping Africa's natural resources. https://www.aljazeera.com/news/2018/2/20/mapping-africas-natural-resources.

Amini, A. (2018). Studying the effect of abundance of natural resources on economic growth. European Journal of Sustainable Development 7(1), 201-208. https://doi.org/10.14207/ejsd.2018.v7n1p201

Anggraeni, P., Daniels, P. & Davey, P. (2017). The contribution of natural resources on economic welfare in Indonesia. The Indonesian Journal of Development Planning, 1(3). 210-223. https://doi.org/10.36574/jpp.v1i3.20

Chambers, D. & Guo, J. (2009). Natural resources and economic growth: some theory and evidence. *Annals of Economics and Finance*, 10(2), 367–389.

Coulibaly, I. (2013). Long term economic impact of the natural resources and human capital on the growth rate. *Southern Illinois University Carbondale Research Papers*. Paper 399. http://opensiuc.lib.siu.edu/gs_rp/399

Eregha, P. & Mesagan, E. (2020). Oil resources, deficit financing and per capita GDP growth in selected oil-rich African nations: A dynamic heterogeneous panel approach. African Governance and Development Institute, Working Paper, No. WP/20/104. https://doi.org/10.1016/j.resourpol.2020.101615

Havranek T., Horvath R., & Zeynalov A. (2016). Natural resources and economic growth: A meta-analysis. Institute of Economic Studies (IES) Working Paper 03/2016. IES Faculty of Social Sciences. Charles University, Prague. https://doi.org/10.1016/j.worlddev.2016.07.016

Jović, S., Maksimović, G. & Jovović, D. (2016). Appraisal of natural resources rents and economic development, Resources Policy, 50, 289-291 https://doi.org/10.1016/j.resourpol.2016.10.012

Ju Li, J. & Xiao, D. (2019). Natural resources and economic development in the Western Regions of China. *Earth and Environmental Science*, 237, 052001. https://doi.org/10.1088/1755-1315/237/5/052001

Lashitew, A. A. & Werker, E. (2020a). Are natural resources a curse, a blessing, or a double-edged sword? https://www.brookings.edu/blog/future-development/2020/07/16/are-natural-resources-a-curse-a-blessing-or-a-double-edged-sword/

Lashitew, A. A. & Werker, E. (2020b). Do natural resources help or hinder development? Resource abundance, dependence, and the role of institutions. *Resource and Energy Economics*, 61. https://doi.org/10.1016/j.reseneeco.2020.101183

Lashitew, A. A., Ross, M. L. & Werker, E. (2020). What drives successful economic diversification in resource-rich countries? *The World Bank Research Observer*, 36(2), 164–196. https://doi.org/10.1093/wbro/lkaa001

Nasir, M. A. & Redmond, T. S. (2020). Role of Natural Resource Abundance, International Trade and Financial Development in the Economic Development of Selected Countries. *Resources Policy*, 66, https://doi.org/10.1016/j.resourpol.2020.101591

OECD (2011). The economic significance of natural resources: key points for reformers in eastern Europe, Caucasus and Central Asia.

Okan, M (2008). The role of natural resources in economic development: Turkey's Boron experience. A Thesis for the Degree of Master of Arts. The Institute of Economics and Social Sciences, Bilkent University.

OPEC (2022). OPEC Share of World Crude Oil Reserves. *Annual Statistical Bulletin* https://www.opec.org/opec_web/en/data_graphs/330.htm.

Portugal, K. J. L. L. (2016). The impact of natural resources on economic development in Africa. Master of Development Policy Thesis Submitted to School of Public Policy and Management, KDI.

Sach, J. D. & Warner, A. M. (1995). Natural resource abundance and economic growth. Working paper 5398. National Bureau of Economic Research, Cambridge. https://doi.org/10.3386/w5398

Shabbir, A., Kousar, S. & Kousar, F. (2020). The role of natural resources in economic growth: new evidence from Pakistan. *Journal of Economics, Finance and Administrative Science*, 25(50), 221-238. https://doi.org/10.1108/JEFAS-03-2019-0044

Sinha, A. & Sengupta, T. (2019). Impact of natural resource rents on human development: What is the role of globalization in Asia Pacific countries? *Resources Policy*, 63, https://doi.org/10.1016/j.resourpol.2019.101413

Wen, Z. (2011). An empirical study of the linkage between resources development and economic development - Taken Shanxi Province as example. Energy Procedia 5, 1394–1398, https://doi.org/10.1016/j.egypro.2011.03.241

Wizarat, S. (2014). Are resource abundant countries afflicted by the resource curse? *International Journal of Development and Conflict*, 4, 24–39.

World Bank (2018). Reinvigorating growth in resource-rich Sub-Saharan Africa. The World Bank Group.

World Mining Congress (2021). World Mining Data 2021. Volume 36. Federal Ministry of Agriculture, Regions and Tourism, Vienna. https://www.world-mining-data.info/wmd/downloads/PDF/WMD2021.pdf