Agricultural Exports, Natural Resource Rent and Economic Growth: Empirical Evidence from Nigeria and Ghana

Odike Abraham Ijuo
Department of Economics, Federal University of Lafia, Lafia, Nasarawa State, Nigeria.

Blessing Mngunengen Vehe
Department of Economics, Federal University of Lafia, Lafia, Nasarawa State, Nigeria.

Ilemona Adofu, PhD
Department of Economics, Federal University of Lafia, Lafia, Nasarawa State, Nigeria.

Jonathan Obadia Gimba, PhD
Department of Economics, Federal University of Lafia, Lafia, Nasarawa State, Nigeria.

***Corresponding author:**
Odike Abraham Ijuo
Department of Economics, Federal University of Lafia, Lafia, Nasarawa State, Nigeria.

Abstract
The study examined the impact of agricultural exports and natural resource rent on the growth of Nigerian economy for the period, 1986-2022 using ARDL model. The study was anchored on resources curse hypothesis and endogenous growth theory. The study found out that agricultural exports have significant positive impact on the growth of the economies of Nigeria and Ghana. The study also revealed that natural resource rent significantly retards economic growth in the short run. The study therefore recommends that existing government policies and programs regarding agricultural exports such as agricultural exports diversification and export promotion strategy should be sustained while at the same time strengthening the quality of education provided to their citizenry as it has the potency of creating right thinking and increasing efficiency that will stimulate economic growth.

Keywords: Agricultural Exports, Natural Resource Rent, Economic Growth.

1. Introduction

In line with the macroeconomic objective of achieving economic growth which every economy in the world pursues, Nigeria and Ghana have been towing similar path to ensure that the growth of their economies is sustainable. In this direction, trade or more directly, exports of agricultural products and natural resources have been identified by the classical economists as growth catalysts. To this end, these economies have been formulating and implementing various policies directed at achieving this goal.

Again, Nigerian and Ghana are economies in West Africa that have common political and economic trajectory. Nigeria had her independence in 1960 and Ghana in 1957 from the British government. These countries have experienced some sort of political and economic instability overtime believed to be as a result of abundance of natural resources they possess. Aljarallah (2020) affirm this when he put that countries that have abundance natural resource are characterized with frequent political, economic and social tussle metamorphosing into increase level of corruption and embezzlement and hence resource curse. Accordingly, there seem to be an element of resource curse in Nigeria and Ghana with the backward state of these economies in the face of its enormous natural resources. This reiterates the need to contribute to the existing debate-whether natural resource endowment is a blessing or a curse. Although, agricultural exports (trade), trade openness and capital (physical and human), technological innovations are identified as determinants of economic growth (Gimba et al., 2021; Andohol & Ijuo, 2020; Omran, 2015). However, the collective influence of agricultural exports and natural resource abundance on economic growth is excluded.

In this direction, several empirical studies (Rahim et al., 2021; Satti et al., 2013; Shabbir, 2021; Aljarallah & Angus, 2020; Ahmed et al., 2016; Badeeb et al., 2017; Cockx & Francken, 2016; Moradbeigi & Law, 2017; Shao & Yang, 2014) confirmed the existence of natural resources curse hypothesis while others (Hamdi & Sbia, 2013; James, 2015; Ji et al., 2014; Michaels, 2011; Oyinlola et al., 2015; Yuxiang & Chen, 2011) rejected it and some, with mix findings (Ampofo et al. (2020), Haseeb et al. (2021). Thus, to the best of the researcher, no study has been carried out along this line. Against this backdrop, this study is conducted to examine the impact of agricultural exports and natural resource rent on economic growth in Nigeria and Ghana within panel data framework. The remainder of the paper is organized into section two-covering literature review, section three-methodology, section four-results and discussion, and lastly, section five which covers conclusion and recommendation.

2. Literature Review

2.1 Conceptual Issues

Key concepts in this study are agricultural exports, natural resource rent and economic growth. The term export itself refers to shipping or moving of goods and services out of the jurisdiction of a country (Ijuo & Andohol, 2020). This means that export is a function of international trade, whereby goods produced in one country are shipped to another

country in exchange for value, adding to the producing or selling nation's gross output. Therefore, agricultural exports can be conceptualized as the selling of agricultural products to other nations or markets of the world in exchange for value. Natural resource rent on the other hand refers to the sum of oil rents, natural gas rents, coal rents (hard or soft), mineral rents and forest rents (Canh, 2020). In this study, it is taken as sum of all natural resource rents as a percentage of gross domestic product.

Dewett & Navalur (2015) described economic growth as a continuous increase in the net national product in a given period of time. Akin (1998) however defines economic growth in two perspectives. One, as the expansion of a nation's output as measured by real gross domestic output (GDP) regardless of whether output per-capita increases or not. He called this scenario, extensive economic growth. And two, as a situation in which there exist an increase in output per-person (or expansion in the availability of goods and services per-capita) called intensive economic growth. Ijuo & Andohol (2020) supports this later definition as he posits that, economic growth is the process which leads to sustained increase in the output of goods and services per head.

2.2 Theoretical Review

This research work will be anchored on Resource Curse Hypothesis and Endogenous Growth Model. The resource curse hypothesis explains the paradox of poverty in the midst of plenty in resource rich economies such that natural resources which are expected to be a blessing turns out to be a curse due to its crowding out effect on the other sector(s) of the economy (Corden, 1984; Corden & Neary, 1982). It establishes that indirect link exists between exchange rates and non-oil (agricultural) exports, such that appreciation of real exchange rate as a result of a booming resource sector (direct link), causes a decline in exports of non-oil (agricultural exports).

Endogenous Growth Model on the other hand is a theory brought to limelight by the works of Arrow (1962), Uzawa (1965) & Sidrauski (1967) (Ijuo & Andohol, 2020). The theory holds that economic growth is a function of endogenous factors and not external forces (Romer, 1994). It thus endogenized technical progress and incorporated human capital into the aggregate production function. In other words, the model takes into account the need for both capital and labor as determinants of output or growth and also includes technological advances in the production function, which facilitates agricultural productivity and hence, exports. It also implies that policies, which embrace openness, competition, change and innovation, will promote growth.

Accordingly, a number of studies carried out in relation to this study are briefly been reviewed. Rahim et al. (2021) conducted a panel study on the effect of natural resources and financial development on the growth of economies of Next Eleven countries between 1990 and 2019, using dynamic ARDL within endogenous growth model to test resource curse hypothesis. The study supported the projection of resource curse hypothesis among these resource-rich economies, causing negative effects on economic growth. Similarly, studies of Shabbir (2021), Aljarallah and Angus (2020), Badeeb et al. (2017), Moradbeigi & Law (2017), Eregha and Mesagan (2016), Ahmed et al. (2016), Cockx & Francken (2016), Shao and Yang (2014) and Satti et al. (2013) confirmed the potency of resource curse hypothesis on economic growth while others (Haseeb et al., 2021, Oyinlola et al., 2015; James, 2015; Ji et al., 2014; Hamdi & Sbia, 2013; Michaels, 2011; Yuxiang & Chen, 2011, found no evidence in support of the hypothesis. Ampofo et al. (2020) however, found mix results in a panel study with some country exhibiting the projection of resource curse hypothesis and others, not. Ijuo and Andohol (2020) found that agricultural export stimulates economic growth while also rejecting the assumption of common homogeneity among the selected countries studied.

3. Methodology

Variable Description and Data Sources

This is presented in table 1.

Table 1: **Variable Description and Data Source**

Variable	Acronym	Description	Measurement/Proxies	Data Source
Agricultural Exports	AXP	Agricultural Exports	Agricultural raw materials exports (% of merchandise exports)	WDI
Natural Resource	NAR	Total Natural Resources Rent	Total natural resources rents (% of GDP)	WDI
Trade Openness	OPE	Trade Openness	Sum of exports and imports divided by GDP	WDI

Gross Domestic Product	GDP	Gross Domestic Product	GDP (constant 2015 US$)	WDI
Technical Efficiency	SCHEN	School Enrollment	School enrollment, primary (% gross)	WDI

Note: Dataset covers 1986 to 2021. WDI represents World Development Indicators.

Model Specification

Drawing from the theoretical review, the reduced form of the model is specified as

GDP=f (AXP, NAR, SCHEN, KAP, OPENS)…….……1

All the variables (except trade openness which is a constructed index) are transformed to natural log in order to rule-out the differences in the units of measurements of the variables, correct for heteroscedasticity and as well, enable interpretation of the estimated coefficients as elasticity. The model therefore becomes;

LnGDP=f (lnAXP, lnNAR, lnSCHEN, lnKAP, OPENS) ……..2

The econometric form of the model is specified as;

$LnGDPit = \beta_0 + \beta_1 lnAXP_{it} + \beta_2 lnNAR_{it} + \beta_3 lnSCHEN_{it} + \beta_4 lnKAP_{it+} \beta_5 OPENS_{it} + \varepsilon_{it}$……..…3

Economic a priori requires that β's >0 except for β_5 which could be > or < 0.

Econometric Procedure

Relevant pre-estimation tests (Multicollinearity test, Cross-Section Dependence (CD) test, unit root test) were conducted to confirm the reliability and appropriateness of the model employed for the study. Multicollinearity diagnostic test helps to check if the variables are highly correlated, hence if multicollinearity exist or not. CD-test helps to determine if cross section dependence exist or not and was found not to have existed in the residual of the dataset, giving room for the first-generation unit root tests carried out. Consequently, panel Autoregressive Distributed Lag (ARDL) otherwise called Pool Mean Group (PMG) test was conducted to determine the parameter estimates. With the adoption of ARDL model, cointegration test was excluded given that the model already accounts for long-run relationship. Finally, post estimation tests (AR Root test and normality test) were conducted to ascertain the stability of the parameter estimates.

4. Results and Discussion

Multicollinearity Diagnostic

This is reported in table 2. The finding shows a negative correlation between economic growth (lnGDP) and agricultural exports, but positive relationship exists between GDP and the rest of the variables. By the rule of thumb, given that coefficient of the relationship between all the variables are less than 0.8, it can be concluded that there is no problem of multicollinearity in the model.

Table 2: Correlation Matrix

	LNGDP	LNAXP	LNNAR	LNSCHEN	OPENS	LNKAP
LNGDP	1	-0.4167	0.3355	0.2553	0.0019	0.0458
LNAXP	-0.4167	1	-0.1198	-0.0022	0.5331	-0.1507
LNNAR	0.3355	-0.1198	1	0.1673	-0.0345	0.2313
LNSCHEN	0.2553	-0.0022	0.1673	1	0.0881	-0.0949
OPENS	0.0019	0.5331	-0.0345	0.0881	1	-0.1744
LNKAP	0.0458	-0.1507	0.2313	-0.0949	-0.1744	1

Source: Authors' Computation from E-Views 10 Output

Cross Sectional Dependence Test (CDT)

The results of CD test are presented in Table 3. The rule is if t> n, use Breusch-Pagan LM, if t and n are large or close to infinity use bias-corrected scaled LM, if t is small, use Pesaran CD test. Hence, since t>n in the model of this study, Breusch-Pagan LM test is used and reported in table 3. Since the p-values of Breusch-Pagan is greater than 5%, the H_o of no cross-section dependence residuals is accepted. In other words, the model of this study is free from cross sectional disturbances and as such the first-generation unit root test suffices.

Table 3: Cross Sectional Dependence Test (CDT)

Variable	Statistics	P-Values
Breusch-Pagan LM	0.898577	0.3432
Pesaran scaled LM	-0.071717	0.9428
Pesaran CD	0.947933	0.3432

Source: Authors' Computation from E-Views 10 Output

The result of unit root test is presented in table 4. The result shows that all the variables are integrated of order one. In other words, long run relationship exists in the model which is equally accounted for in the ARDL model employed in the study. The implication of this unit root test being I(1) is that effect of policy change on these variables changes from time to time, hence the need to frequently review them in line with the policy change(s).

4.3 Unit Root Tests

Table 4: Panel Results of Unit Root Tests

	Levels				First Difference				
	LLC	**IPS**	**ADF-F**	**PP-F**	**LLC**	**IPS**	**ADF-F**	**PP-F**	**Status**
LnGDP	1.42004	2.61909	0.16593	0.37580	-7.78496	-7.09040	44.5471	67.3544	I(1)
P-Values	0.9222	0.9956	0.9967	0.9844	0.0000	0.0000	0.0000	0.0000	
LnAXP	1.54570	0.74162	1.29954	1.26852	-2.59560	-4.02875	23.1101	38.7135	I(1)
P-Values	0.9389	0.7708	0.8615	0.8667	0.0047	0.0000	0.0001	0.0000	
LnNAR	-0.53582	-1.22193	6.99576	9.75320	-4.62200	-5.20276	31.2968	56.5785	I(1)
P-Values	0.2960	0.1109	0.1361	0.0448	0.0000	0.0000	0.0000	0.0000	
LnKAP	-0.84445	-1.02873	7.19564	6.88177	-3.51057	-3.94123	22.9368	30.9730	I(1)
P-Values	0.1992	0.1518	0.1259	0.1423	0.0002	0.0000	0.0001	0.0000	
LnSCHEN	-1.41823	-1.43032	9.64976	7.02078	-4.88640	-3.91648	22.5669	64.6758	I(1)
P-Values	0.0781	0.0763	0.0468	0.1348	0.0000	0.0000	0.0002	0.0000	
LnOPENS	-0.75793	-1.22315	6.92775	9.62714	-6.61256	-6.31577	39.5700	57.4281	I(1)
P-Values	0.2242	0.1106	0.1398	0.0472	0.0000	0.0000	0.0000	0.0000	

Source: Authors' Computation from E-Views 10 Output

Table 5 presents the result of lag selection criteria.

Table 5: Lag Structure Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-131.5190	NA	2.60e-06	4.167244	4.366303	4.245902
1	160.1954	521.5501	1.13e-09	-3.581679	-2.188263*	-3.031074
2	226.4308	106.3780*	4.63e-10*	-4.497902*	-1.910128	-3.475350*
3	252.1336	36.60701	6.77e-10	-4.185866	-0.403735	-2.691366

NOTE: * indicates lag order selected by the criterion
Also, LR, FPE, AIC, SC and HQ represents sequential modified LR test statistic (each test at 5% level), final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion respectively.

The findings from this result suggest that lag 2 is the optima lag order as indicated by majority of the criteria (see LR, FPE, AIC and HQ carrying asterisk at lag 2). The ARDL test is therefore employed at lag 2.

ARDL/PMG Result

The result is presented in table 6.

Table 6: Results of ARDL/PMG

Variable	Coefficients	t-statistics	p-value
Long Run Results			
lnAXP	0.111944	-4.936729	0.0000
lnNAR	1.335191	2.846980	0.0069
lnKAP	-1.936505	-4.168592	0.0002
lnSCHEN	2.436347	4.282600	0.0001
OPENS	14.96056	1.947351	0.0584
Short Run Results			
EC-T	-0.222984	-15.72544	0.0000
lnAXP	0.004305	0.221202	0.0260
lnNAR	-0.148439	-0.937766	0.0353
lnKAP	0.353460	2.968230	0.0050
LNSCHEN	0.188520	0.422360	0.6750
OPENS	2.038143	1.430704	0.1601

Source: Authors' Computation from E-Views 10 Output

The result shows the relative differences in the size, direction, and significance of coefficients throughout the sample. From the long-run results, estimates of the variables lnAXP, lnNAR, lnSCHEN, and OPENS positively affects lnGDP while lnKAP has negative effect on lnGDP. All the estimates of the variables are statistically significant except for OPENS which is not. The result shows that a one percent increase in agricultural exports (lnAXP), natural resource rent (lnNAR), technical efficiency (lnSCHEN) and trade

openness (OPENS) will bring about a 0.11, 1.3, 2.43 and 14.96 percent increase in economic growth (lnGDP) respectively, while same increase in capital (lnKAP) will bring about 1.93 percent decrease in gross domestic product.

On the other hand, from the short run result, the value of the lagged ECT [(ECT (-1)] is correctly signed and significant demonstrating that there is short run dynamics and long run relationships. The speed of adjustment from the short to long run equilibrium is 0.22. The value shows that about 22% of the error is corrected in each time period. The short run result shows that all the variables of study have positive effect with economic growth except natural resource rent which has negative effect. The result of agricultural exports, capital, and natural resource rent are statistically significant while trade openness and technical efficiency are not. The result shows that in the short run, a percent increase in agricultural exports, capital, technical efficiency and trade openness will bring about 0.004, 0.35, 0.19 and 2.04 percent increase in economic growth respectively, while the same one percent increase in natural resources rent will reduce economic growth by about 0.15%.

The findings of this study suggests that agricultural exports have significant positive impact on economic growth of these economies. This result confirms the findings of Ijuo and Andohol (2020) and Omran (2015). Similarly, the finding of this study indicates that resource curse hypothesis holds for these economies (Nigeria and Ghana) in the short run, but does not hold in the long run. While the short run finding is consistent with the findings of Rahim et al. (2021), Satti et al. (2013), Shabbir (2021), Aljarallah and Angus (2020), Ahmed et al. (2016) Badeeb et al. (2017) Cockx and Francken (2016) Moradbeigi and Law (2017), Shao and Yang (2014), the long run finding is on the other hand in line with the findings of Hamdi and Sbia (2013), James (2015), Ji et al. (2014), Michaels (2011), Oyinlola et al. (2015) and Yuxiang and Chen (2011) who attributed the reason to probable existence of sound institutions which ensures that rent from natural resources are not looted, but invested in productive ventures.

Also, while the long run result of the impact of capital on economic growth is at variant with economic theory, its (capital) short run effect, the short run and long run results of the impact of technical efficiency and trade openness on economic growth are consistent with economic theory that these variables should stimulate economic growth.

Post-Estimation Statistical Diagnostic Test

A post estimation statistical diagnostic test (AR Root test) was carried out to confirm the stability of the parameters of the model and presented in figure 1. The result confirmed that the parameters of the model are stable as no root lies outside the AR root circle. Thus ARDL model adopted in this study satisfies the stability condition and therefore policy output of the study will not be misleading.

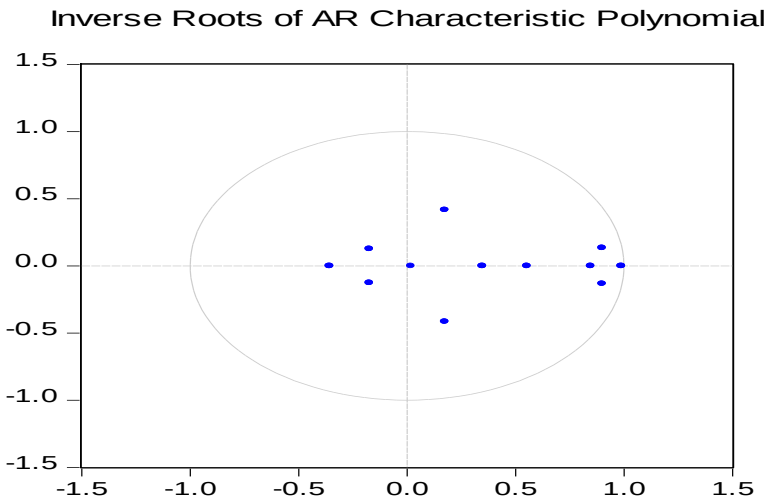

Figure 1: AR Root Graph

5. Conclusion and Policy Suggestion

The findings from this study indicates that agricultural exports have significant positive impact on the growth of the economies of Nigeria and Ghana. Similarly, natural resource rent significantly retards economic growth in the short run-a support for resource curse hypothesis, but stimulates economic growth in the long run. It can therefore be recommended that existing government policies and programs regarding agricultural exports such as agricultural exports diversification and export promotion strategy should be sustained while

at the same time strengthening the quality of education provided to their citizenry as it has the potency of creating right thinking and increasing efficiency that will stimulate economic growth.

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