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OIL EXPORT AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM NIGERIA

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Abstract

This study examines the impact of oil export on economic growth in Nigeria for the period 1985 to 2020 using time series data generated from secondary sources. A model from endogenous growth theories known as AK growth model is put to empirical testing. The methodology adopted for this study was the Auto regressive Distributed Lag bounds testing approach. The result of the bounds test to cointegration indicates that there is long-run equilibrium relationship between oil export and Nigeria's economic growth. And the result of the long run estimation revealed that oil export exerted a positive and significant relationship with economic growth in Nigeria. This finding suggests that oil exports have translated to a meaningful increase in real Gross Domestic Product per capita growth rate. However, in the short run the results reveal that oil export had a negative and significant relationship with economic growth in Nigeria which is contrary to long run equation results. Therefore, the study recommends that the Nigerian government needs to diversify her export composition by finding a viable alternative to crude oil export. The solid mineral sector could be a viable alternative. In order to boost its export and revenues, the government should invest in technologies for the processing of primary export commodities to ensure value addition. Furthermore, the government needs to provide domestic credits to export-oriented industries more especially Small and Medium Scale Enterprises (SMEs). This funding to export-oriented industries can be done by State-owned development banks. The capability of the Nigerian export Promotion Council (NEPC) and other institutions supporting trade should be enhanced by the government through capacity building programmes in partnership with regional and international trade bodies such as Economic Community of West African States (ECOWAS) and World Trade Organization (WTO) individually for officers of these organizations. This would ensure that these institutions are abreast with current happenings in international export markets.

Keywords: ARDL, Oil export, Economic growth, Nigeria

1. Introduction

Crude oil is currently Nigeria's major export relegating agricultural products that was before the discovery of crude oil, Nigeria's major foreign exchange earnings and revenue. Although it is obvious that petroleum has contributed to the growth of Nigerian economy but there is a continuous reliance on crude oil as major source of export earnings and revenue for Nigeria. Earlier before the discovery and onward exploration of crude oil in

Nigeria, 95% of the country's foreign exchange earnings were gotten from agriculture which generates over 60% of employment capacity in Nigeria and approximately 56% to the country's gross domestic earnings (World Bank, 2013). Aside Agriculture, the country experienced growth in the manufacturing sector. However, the major exportable crops were cocoa, palm products, cotton, ground nut, timber and rubber. With these products contributing most of Nigeria's export, agriculture was the mainstay of the Nigerian economy as oil foreign earnings and revenue from crude oil before oil boom in 1970 was

very low. The Nigeria oil Industry dominates the Nigerian economy as regards foreign earnings and revenue. According to the Organization of the Petroleum Exporting Countries (OPEC 2022) recent report, Nigeria currently occupies the world's eighth largest crude oil reserves and is the world's sixth-largest producer of crude oil. The industry generates for the country according to national statistics over 95 per cent of the country's foreign revenue, and about 80 per cent of government revenue. Also, International Labour Organisation estimated that the industry provided over 65,000 direct jobs in Nigeria with above 250,000 contracts or non-direct employment. Most of the exploration and production of crude oil is from the Niger Delta Region where oil was reportedly first discovered in commercial quantity in Bayelsa State, Niger Delta, in 1956.

Crude oil export in Nigeria has enjoyed a relatively upward trends until 2011, when it experienced a downward trend, reaching its nadir in 2016, and has since improved, reaching its highest point in 2019. Nonetheless, as petroleum production and exports earnings dominate Nigeria total export, Nigerian economy growth according to OPEC in 2016 was 49th in the world with a net export of \$8.3 billion and GDP of \$6 billion per capital. Nigeria crude oil industry accounts for over 90% of its gross exports earnings at a production level of 2.5 million barrels of crude oil per day. Nigeria makes enormous wealth from oil production and exports with 37.2 billion of crude oil barrels in reserves. However, the economy of Nigeria has suffered decline in recent years due to decline in oil production and exports. The period of decline in oil production and revenue was factored by the high level of coordinated attacks on oil reserves due to the high level of militancy in the oil rich Niger Delta of Nigeria agitating for proper oil returns in forms of clean-up of land and water bodies that were damaged due to oil exploration, provision of employment for Niger Delta youths by the international oil companies, provision of social infrastructures i.e. health care and schools and other forms of basic amenities that the oil rich region among other oil spill-effect problems. Nigerian oil revenue from 1981 to 2019 shows a relatively upward trend until 2007 to 2009 where a major downturn is observed.

This period is associated with the period of global financial crises. There was an improvement in the oil revenue between 2009 and 2011, afterwards, it continues to decline up until 2016. This period of decline is

associated with high level of insecurity and militancy in the Niger Delta region – The region where crude is extracted in Nigeria. From 2017, revenue generated from crude oil has since improved. The economic development of Nigeria is measured by Real GDP growth estimated at 3.6% in 2021, marginally higher than 1.8% in 2020 according to African Development Bank (2022). The growth is investigated to be influenced by transport, an improved oil sector, and information and communications technology. Also, considering Nigeria's export where crude oil accounted for more than 90% of the total exports, recent estimates of 2018 to 2020 show that Nigeria in 2018, ranked number 29 economy in the world as per GDP (current US\$), the number 50 in total exports, the number 53 in total imports, the number 151 economy in terms of GDP per capita (current US\$) and the number 134 most complex economy according to the Economic Complexity Index (ECI) (Observatory of Economic Complexity, 2018).

The top export of Nigeria is crude petroleum (\$44.8B), petroleum gas (\$621M), Cocoa Beans (\$621M) and Gold (\$577M) while foreign exchange earnings from crude oil are from India (\$10B), Spain(\$6.12B), United States (\$5.74B), France (\$4.02B), and South Africa(\$3.87B). Due to sole reliance on crude oil to boost Nigeria economic growth, the economy during the periods of global increase in oil price is for Nigeria a favourable trade balance, increase in foreign reserves, and exchange rate appreciate and increase in the value of the naira. On the opposite, Nigerian economy growth suffers decline when the global oil price is experiencing decline. As the foreign earnings from crude oil decline amounting to a significant drop in the foreign reserve, the country experiences budget deficit and slower economic growth. The research questions that come into play at this point are: Have oil exports contributed to the economic growth of Nigeria? Is there any long run as well as short run equilibrium relationship between oil exports and economic growth in Nigeria? The rest of the paper is organized as follows: The next section provides the empirical literature review and theoretical framework, followed by a discussion of the methodology in section three. Section four focused on data presentation and discussion of results while section five dwelled on conclusion and policy recommendations.

2. Literature Review

2.1 Conceptual literature

2.1.1 Concept of Export

Export: can be defined as surplus goods and services of a country that are sent to other countries in the world for sale. Export in Nigeria is broadly classified into oil export and non-oil export. The oil export is solely crude oil exported in large quantities. The non-oil export on the other hand, comprises; agricultural products, manufactured and semi-manufactured goods, and the solid minerals components. Before 1970's non-oil exports were the main sources of foreign exchange, particularly agricultural products such as cocoa, rubber, palm oil and groundnut among others, from 1970s the government begins to make coherent efforts to diversify its export base by promoting non-oil export (Nwanne, 2014).

Types of Export

There are two types of exports:

(a) Visible export: consists of commodities that are tangible and can be seen and touched. They appear in a country balance of trade. They include crude oil, coal, tin, columbite, palm oil, cotton, rubber etc.

(b) Invisible export: consists of intangible commodities that cannot be seen or touch, such as services. The services are calculated in terms of money. They are insurance, civil aviation, banking services, and tourism, audio-visual services etc. (Beblawi & Luciani 1987).

Crude Oil Export: can be defined as the surplus of crude oil of a country that is sent to other countries in the world.

Types of Crude Oil Export in Nigeria

1. Bonny light oil
2. Farcados crude oil
3. Qua Iboe crude oil
4. Brass river crude oil.

2.1.2 Oil -Export and the Nigerian Economy

The crude oil discovery in Nigeria had been and up till now is playing a vital role in the process of economic growth especially through the exportation of the petroleum products for foreign exchange earnings generation. Substantial amount of revenue from the petroleum sector is being generated to the government through the foreign exchange earnings. According to estimates, about 98 percent of the Nigerian export comes from oil and gas sectors of the economy and this formed about 83 percent of the total government revenue in the year 2000. This huge percentage of the revenue that goes to the government led to the substantial balance of payments surplus. The analysis of this revenue revealed

that 80% of the total country's revenue goes to the Nigerian government, 16 percent ends up on taking care of the administration while only 4 percent goes to the investment sector, which investors can access for investment purposes. It is very pathetic that 99 percent of the population benefits only an insignificant percentage of the oil revenue with only 1 percent of the population benefitting the most because of corruption and self-centeredness. The Nigerian oil reserve was estimated to have been around 35 billion barrels; natural gas reserve was around 1000 trillion ft, and the crude oil production was about 2.2 million barrels per day (Odularu, 2008).

2.1.3 Economic Growth

Economic growth can be defined as an increase in value of goods and services produced in a country. Growth implies an increase in real GNP per unit of labour input. This refers to changes in labour productivity over time. Economic Growth is conventionally measured as the rate of increase in Gross Domestic Product (GDP). Growth is usually calculated in real terms (netting out the effect of inflation on the price of the goods produced and services provided). Growth improved the standard of living of the people in that particular country (Beblawi & Luciani 1987).

2.2 Theoretical Literature

Endogenous growth theories focus on advantages of a dynamic export sector. Endogenous growth theories emphasize the role of total factor productivity in the process of growth. The effects include mainly the expansion of advanced techniques, employment of highly skilled workforce and improvement of managerial skills due to the intense competition that exporters face in global markets (Romer 1990 & Barro, 1991). In his model, Romer (1990) considers diversification, along the line of Adam Smith, as a factor for increasing labour productivity and human capital. Romer developed a model including four production factors (capital, human capital, labour and a technological index) and three sectors: the sector of Research & Development which uses human capital and the existing stock of knowledge to produce more knowledge (i.e. new designs); the sector of intermediate goods which exploits these new designs to produce a large range of intermediate goods; and lastly the sector of final goods which utilizes these products to

provide consumer goods. Romer stresses that the more available differentiated intermediate goods are, the higher marginal capital productivity will be. Diversity of intermediate inputs enhances productivity of the final goods sector. In particular Romer (1990) incorporated a Research and Development sector (R&D) in the process of growth. In the Romer (1990) model;

$$Y(t) = [(1-\alpha_k) K(t)]^\alpha [A(t)(1-\alpha_L)L(t)]^{1-\alpha}, 0 < \alpha < \dots\dots\dots(1)$$

The production of new ideas depends on the quantities of capital and labour engaged in research and on the level of technology:

$$A(t) = G(\alpha_k K(t), \alpha_L L(t), A(t)) \dots\dots\dots(2)$$

Some other models like Matsuyama (1992) put much emphasis on the importance of manufacturing sector for a sustained economic growth. In another sharp contrast to the Ricardian idea of specialization, Hausman and Rodrik (2006) refute that economic growth is not driven by comparative advantage but by country's diversification of their investment into new activities. This set of models is adopted for this study, specifically the AK model.

2.2.1 The AK Growth Model

The AK model is actually considered the first version of endogenous growth theory. However, the earlier version of this model goes back to Harrod (1939) and Domar (1946) who assumed an aggregate production function with fixed coefficients. According to endogenous growth theory, labor productivity and investments can affect both the level of growth and per capita output. However, the first model of endogenous growth theory was the AK model which is based on the basis of learning by doing. The AK model assumes that when people accumulate capital, learning by doing generates technological progress that tends to raise the marginal product of capital, thus on-setting the tendency for the marginal product to diminish when technology is unchanged. The model results in a production function of the form;

$$Y = AK \dots\dots\dots(3)$$

Where A is a positive constant that affects level of technology, K is capital (to include human capital). $Y = AK$, output per capita and the average and marginal product are constant at the level $A > 0$. Then $f(k)/k = A$ in

equation of transitional dynamics of Solow-Swan model which shows how an economy's per capita income converges towards its own steady-state value and to the per capita incomes of other nations.

Transitional dynamic equation, where growth rate on K is given by

$\Delta k = k/K = s.f(k)/K - (n+\delta)$, substituting A, we get $dK = sA - (n+\delta) At$ at $x = 0$, because we want to show that per capita growth can now occur in the long run even without exogenous technological change.

The AK model specifically will be the most vital theoretical framework for this study. It is considered most appropriate for some reasons. One is for its simplicity and the fact that it establishes the role of factor productivity in growth through technological progress which is assumed to be constant positive. Feasel, Kim and Smith (2005) noted that there are various ways to endogenize improvements in technology, notably through "learning by doing". In the development literature such learning by doing can potentially be gained either through exporting due to interactions with technologically more advanced foreign firms, or through investing, due to the use of better quality foreign technology. Thus, one way to proxy this learning effect is through investment and export levels. Another reason is because the model is previously empirically tested and produced significant results in both case country studies and cross-country analysis (Herzer, 2011) and Fogha, Sama and Atangana (2014) and Feasel, Kim and Smith (2005)).

2.3 Empirical review

Jabir (2020) carried out a study of oil revenue on economic growth in 83 oil-producing countries from 1990 to 2015. The study employed ex post and correlational research designs. The study utilized the financial markets development mechanism and discovered that government investment of oil revenues exerted a positive impact on economic growth through banking sector development. There was no effect found on stock market development. The study further recognized that the private investment of oil revenues indicated a negative influence on banking sector development did not have any effect on stock market development. Eganga (2020) conducted a study on the oil revenue and economic growth of Nigeria for the period 1981 to 2018. Using Auto-regressive Distributed Lag (ARDL) model to analyse data. The results disclosed

that oil revenue positively and significantly affects the economic growth of Nigeria. The study, therefore, recommended that since oil revenue had a significant positive influence on the economic growth of Nigeria within the period under review and also makes up about 70% of Nigeria's annual budget.

Omodero and Ehikioya (2020) carried out a study of oil and non-oil revenue in Nigeria for the period 2005 to 2019. The study used *ex post facto* and correlational research designs. The study used secondary data from the Central Bank of Nigeria Statistical Bulletin and relevant econometric models were employed for data analysis. The study revealed that oil revenue and exchange rate have a significant negative impact on infrastructural provisions. The inflation rate is not substantial in this study. Conversely, non-oil revenue has a significant positive influence on infrastructural development in the country. The results provide the recommendation that the government will have to leverage more on tax revenue to execute its public responsibilities. Ugwo (2019) conducted a study of crude oil export and economic growth of Nigeria for the period 1980 to 2017. The study used *ex post facto* and correlational research designs. The study utilized time-series data from the Central Bank of Nigeria (CBN) and the time series were analysed using unit root test, cointegration and multiple regressions. The study used crude oil revenue and crude oil barrels as measures for crude oil export and real gross domestic product as a proxy for economic growth. The empirical analysis disclosed a positive impact of crude oil export and the economic growth of Nigeria for the period under review. The study, therefore, recommended that crude oil and its natural components should be utilized for the development of the country.

Olayungbo (2019) investigated oil revenue on Nigeria's economic growth for the period 1970 to 2015. The study employed *ex post facto* and correlational research designs. The data was obtained from the Central Bank of Nigeria Statistical Bulletin and Annual Reports for the period under review. The secondary data obtained were analysed using the Bayesian time varying parameter and the result found that oil revenue had significantly and positively contributed to Nigeria's economic growth for the period 1970 to 2015. Khayati (2019) explored the relationship between exports of oil and non-oil trade and the growth of the Bahrain economy. He discovered the co-integration outcome to be strongly influenced by both oil and non-oil export on economic growth in both long

and short-run and revealed that oil export has a strong influence on economic growth. Further, he suggested that Bahrain should expedite the broadening process of the economy and enhance its industrial and service sectors to hike the percentage of non-oil export. It would diminish the impact of abrupt change in oil prices and boost capital efficiency and labor productivity in the global market.

Adedigba and Samuel (2019) investigated the role of oil and non-oil revenue in Nigeria's economic development process, where economic development was proxied as the human development Index. The Johansen Cointegration outcomes revealed the presence of long-run association among the variables. The error correction estimates showed that oil revenue has a negative but significant relationship with the human development index, while non-oil revenue has a positive but insignificant relationship with the human development index. Moreover, he emphasized the diversification of exportable products and suggested a need to boost security surveillance on the high sea to reduce smuggling, which will reduce the illegal export of crude oil. Zafar and Mohammad (2018) investigated the effect of oil exports on economic growth; in Saudi Arabia. The paper applies Johansen cointegration method to establish long run relationship of economic growth with oil exports, imports and government consumption expenditure. The study finds that economic growth has a positive long run relationship with oil exports, and consumption expenditure of the government. Further, there is a negative long run association between imports and economic growth. Finally, the study recommends regulating imports and intensive efforts to diversify economic base in import substituting industries.

Ibrahim (2017) determines the extent to which export components can influence economic growth in Nigeria by empirically estimating the dynamic impact of oil and non-oil exports on the economic growth of Nigeria, using Vector Autoregressive (VAR) approach. Using time series data from 1975 to 2015, a model from endogenous growth theories is put to empirical testing. Findings from the study indicate that the oil export component has significant dynamic impact on the Nigerian economic growth while non-oil export component has significantly positive long run impact on the economy. Also, external shocks to both oil and non-oil compositions evoke positive response from the GDP. Awujola, Adam and Alumbugu (2015) in their study, examined the economic impact of oil exportation on

Nigerian economy covering a period of 1970 to 2012. Vector error correction model was used to analyse the data. The result obtained from our empirical analysis shows that there exists a long run relationship between the crude oil exports and the growth. The conclusion of the study is that exports should not be promoted at all cost, but rather the utilization and allocation of the physical resources and labour complement of the country in the most advantageous combination as between production for the local and foreign markets and that diversification should be seen as an economic management strategy aimed at ensuring stability of incomes. Usman, Madu and Abdullahi (2015) carried out a study titled evidence of petroleum resources on Nigerian economic development (2000-2009). The main objective of the study was to examine the impact of petroleum on Nigeria's economic development. The variables were two, that is, crude oil revenue and the Gross Domestic Product GDP. The study was based on secondary data. Data was sourced from the Central Bank of Nigeria Statistical Bulletin and National Bureau of Statistics. The data used was a ten years record of GDP and oil revenue. The tool of analysis used was simple linear regression model with the aid of Statistical Packages for Social Sciences (SPSS). The study found that petroleum has a direct and positive significant relationship with the economy.

Awujola, Adam and Alumbugu (2015) in their study conducted, examines the economic impact of oil exportation on Nigerian economy covering a period of 1970 to 2012. Vector error correction model was analysis the data. The result obtained from our empirical analysis shows that there exists a long run relationship between the crude oil exports and the growth. The conclusion of the study is that exports should not be promoted at all cost, but rather the utilization and allocation of the physical resources and labour complement of the country in the most advantageous combination as between production for the local and foreign markets and that diversification should be seen as an economic management strategy aimed at ensuring stability of incomes.

Eravwoke, Alobari and Ukavwe (2014) carried out a study titled crude oil export and its impact in developing countries: A case of Nigeria. The study used ordinary least squares regression method. The study found that there was an inverse relationship between crude oil exports on economic growth in the Nigerian economy. Odularu (2008) carried out a study titled crude oil and the Nigerian economic performance. The study

analysed the relationship between the crude oil sector and the Nigerian economic performance using the ordinary least square regression method. The study found that crude oil consumption and export have contributed to the improvement of the Nigerian economy. The study concludes that the production of crude oil (domestic consumption and export) despite its positive effect on the growth of the Nigerian economy has not significantly improved the growth of the economy, due to many factors like misappropriation of public funds (corruption) and poor administration.

3. Methodology

3.1 Sources of Data

This paper employed time series data over the period of 1985 to 2020. The data needs were identified on the basis of the objectives of the study. The data were drawn from World Development Indicators (WDI) database and Central Bank of Nigeria (CBN) Statistical bulletin (2020). The data on which the variables were collected include; Data on GDP, Oil export, Gross fixed capital formation, Exchange rate and Foreign direct investment.

3.2 Estimation Procedure and Model Specification

3.2.1 Unit Root Test

Observed that the mean variance and covariance of time series data are time dependent and varying which can deliver unreliable estimated result, thus failure to test for stationary in time series analysis may lead to spurious regression. In order to test the stochastic property of the series employed in this study, Augmented Dickey Fuller was employed. The ADF and PP models are stated in equation 4 and 5 respectively.

$$\Delta W_t = \gamma + \beta W_{t-1} - \sum_{j=1}^p \alpha_j \Delta W_{t-j} + \varepsilon_t \dots\dots\dots (4)$$

$$\Delta Z_t = \tau + \phi_t Z_{t-1} + \varepsilon_t \dots\dots\dots (5)$$

The null hypothesis of unit root is tested against the alternative of no unit root. The null hypothesis is rejected where the value of t-statistic is greater than the critical values at either 1%, 5% or 10% as the case may be. A variable is said to be stationary at level if it is integrated of order 0, I (0). A variable that is differenced once to be stationary is said to be integrated of order 1 that is I (1).

3.2.2 Cointegration Technique

In order to determine if cointegration exist, Auto Regressive Distributed Lag (ARDL) proposed by Pesaran, was employed. Cointegration implies long-run equilibrium relationship. ARDL is chosen because of its numerous advantages over other estimation techniques. ARDL is an unbiased long-run estimator, it is efficient for small sample and is also applicable to series that are either integrated at order 1 or are of mixed integration that is, of $I(0)$ and $I(1)$. In addition, ARDL model has parameterization property which generates the error correction model. This technique required testing for cointegration ARDL bound test. Long-run equilibrium relationship is said to exist if the f-statistics is higher than the upper bound $I(1)$ at either 1%, 5% or 10% level of significance. In the same vein, if the value of f-statistics is lower than the lower bound $I(0)$ at the aforementioned level of significance, we conclude that there is no cointegration and if the value of f-statistics is in between $I(0)$ and $I(1)$ bounds then the result will be declared inconclusive. Post estimation diagnostic test include goodness of fit, normality test, serial correlation test. Heteroskedasticity test, residual specification error (RESET) test stability test and Multicollinearity test.

3.2.3 Model Specification

$$\ln Y_t = \beta_0 + \beta_1 \ln OX_t + \beta_2 \ln FDI_t + \beta_3 \ln EXR_t + \beta_4 \ln GFCF_t + \varepsilon_t \dots \dots \dots (6)$$

Where: Y: Represents GDP per capita, OX= Stands for oil exports, GFCF=Stands for Gross fixed capital formation, EXR=Stand for exchange rate and FDI= Foreign direct investment and ε_t = Stochastic disturbance term. The time series properties of the data were checked for stationarity through the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests before estimating the growth equation. In order to ascertain the goodness of fit and model adequacy, our specification was also subjected to diagnostic and stability tests. The autoregressive distributed lag (ARDL) bounds test to cointegration proposed first by Pesaran and Shin (1999) and advocated by Pesaran, Shin, and Smith (2001) were employed for the estimation of the growth equations. This is based on the premise that it shows the short-run and long-run dynamics of the variables for estimation. Version 10 of the E-views econometric software facilitated the computation of the above statistical techniques. Therefore restating equation (6) into the ARDL model form we have:

$$\begin{aligned} \Delta (\ln GDP)_t = & \alpha \beta_0 + \sum_{i=1}^p \beta_{1,i} \Delta (\ln GDP)_{t-i} + \sum_{i=0}^K \beta_2 \Delta (\ln OX) + \sum_{i=0}^K \beta_3 \Delta (\ln EXR)_{t-i} + \sum_{i=0}^l \beta_4 \Delta (\ln GFCF)_t \\ & - i + \sum_{i=0}^m \beta_5 \Delta (\ln FDI)_{t-i} + \dots \dots (7) \\ & \delta_1 (\ln GDP)_{t-1} + \delta_2 (\ln OX)_{t-1} + \delta_3 (\ln EXR)_{t-1} + \delta_4 (\ln GFCF)_{t-1} + \delta_5 (\ln FDI)_{t-1} + \varepsilon_t \dots \dots (8) \end{aligned}$$

Where; all the variables are in rate i.e. $\ln GDP$, $\ln OX$, $\ln GFCF$ and $\ln FDI$ the remaining variables are in natural logarithm, and Δ is the first different operator. The symbols p, k, l, m, n, and r are the optimal lag lengths

determined by AIC criterion, and $\ln$ denotes logarithm. Upon confirming the cointegration relationship between the variables, long-run model is estimated using the equation specified as:

$$\ln GDP_t = \beta_0 + \sum \beta_1 GDP_{t-i} + \sum \beta_2 \ln OX_{t-i} + \sum \beta_3 \ln EXR_{t-i} + \sum \beta_4 \ln GFCF_{t-i} + \sum \beta_5 \ln FDI_{t-i} + \varepsilon_t \quad (9)$$

Moreover, in order to get the short-run coefficients, an Error Correction Model (ECM) is estimated. The ARDL specification of the ECM is represented as:

$$\begin{aligned} \Delta (\ln GDP)_t = & \alpha \beta_0 + \sum_{i=1}^p \beta_{1,i} \Delta (\ln GDP)_{t-i} + \sum_{i=0}^K \beta_2 \Delta (\ln OX) + \sum_{i=0}^K \beta_3 \Delta (\ln EXR)_{t-i} + \sum_{i=0}^l \beta_4 \Delta (\ln GFCF)_t \\ & - i + \sum_{i=0}^m \beta_5 \Delta (\ln FDI)_{t-i} + \phi ECT_{t-1} + \mu t \quad (10) \end{aligned}$$

Moreover, ECT is the error-correction term. ECT_{t-1} is the one period lag of the error-correction term, and the statistical significance of the ECT_{t-1} is used to determine the long-term relationship.

4.0 Result Discussion

4.1 Unit Root Test Result

The result of unit root tests from ADF, PP and KPPS are shown in table 1 there is consistence between the three traditional tests on the order of integration of the variables. Variables GDP, OX, GFCF and EXR are stationary at first

difference. On the other hand, FDI is stationary at level. As noted in that traditional unit root test such as Dickey Fuller, Augmented Dickey Fuller, Philips and Perron, Kwiatkowski-Phillips-Schmidt-Shin, etc. have low power in the presence of structural break and may confused structural break effect to mean non stationarity, for this reason, this study conducted breakpoint unit root test by employing Innovational outlier model to confirm the order of integration of the variables in order to justify the application of ARDL in this study. Innovational outlier model measures a sudden change in the series and also reveal the break date.

Table 1:
Unit root test result

Variables	ADF Test		PP Test		KPPS	
	T-stat	Level of Int	T-Stat	Level of Int	T-stat	Level of Int
lnGDP level	-1.74	I(1)	-1.72	I(1)	0.073248*	I(1)
1 st difference	-5.07*		-5.07*			
lnOX level	-2.42	I(1)	-2.77	I(1)	0.622915*	I(1)
1 st difference	-4.75*		-5.89*			
lnGFCF level	-0.58	I(1)	-0.69	I(1)	0.074547*	I(1)
1 st difference	-6.37 *		-6.27*			
lnEXR level	-1.59	I(1)	-1.59I	I(1)	0.115128*	I(1)
1 st difference	-5.55*		-6.13*			
lnFDI level	3.58*	I(0)	-3.54*	I(0)	0.154156*	I(0)
1 st difference	-7.42		-7.42			

Source: Computed by Author (2023)

Note: *, **, *** represent significance level of 10%, 5% and 1% respectively.

Similarly, variables lnGDP, lnNX and ,lnGFCF are integrated at first difference which is in congruent with the result of ADF and PP tests at both intercept and trend and intercept whilst variable FDI is also consistent with the result of ADF and PP as its stationary at level. However, the result of lnFDI at intercept and Trend and intercept are not consistent. The break dates are consistent for intercept and intercept and trend.

4.2 Bounds test for cointegration

The ARDL bounds testing to cointegration was used to examine the existence of a long-run relationship between the variables. The result of the cointegration test is presented in Table 2 illustrates that the calculated F-statistic (5.78471) is greater than the upper critical bounds at the 1% level. This indicates that there is a long-run relationship between the variables. Giving the confirmation of cointegration relationship between the variables, this study proceeded to estimate the relationship between the variables.

**Table 2:
ARDL Bound Testing**

Dependent variable	Function	F-Statistic
lnGDP	f(lnGDP/ lnGFCF, lnOX, lnEXR, lnFDI	5.78471*
Significance	I(0)	I(1)
1%	3.74	5.06
5%	2.86	4.01
10%	2.45	3.52

Source: computed by the Author (2023)

4.3 Results of ARDL Model

Estimations using ARDL and ECM

Since the long-run relationship between the variables had been established, the ARDL model was estimated. The results of the long-run and short-run for the models are presented in Table 3 Based on the results, for some of the variables were in line with theoretical expectations. Gross fixed capital formation, utilized as a proxy for investment had a negative and significant relationship with real GDP per capita growth rate. This implies that investment does not encourage growth in Nigeria. The plausible reason for

this may be the unconducive investment climate in Nigeria caused by Boko Haram activities in the North, youth restiveness in the Niger Delta and lack of basic infrastructures like energy, telecommunications, water supply, road and security needed to make the business environment attractive. This result suggests that a unit increase in gross fixed capital formation would decrease economic growth by -0.69027 per cent. This finding is consistent with the submissions of Kagnew (2007) and Duru (2018).

**Table 3:
Long-run Estimation Result**

Long-run Coefficients – dependent variable is (lnGDP)		
Variables	Coefficient	Prob.
LGFCF	-0.69027	0.0009
LOX	0.15013	0.0151
EXR	-0.00047	0.55
LFDI	-0.39948	0.0079

Source: computed by the Author (2023)

**Table 4:
Short-run Dynamic and Error Correction Result**

Variables	Coefficient	Prob.
D(LOX)	-0.106129	0.0204
ECT(-1)	-0.432997	0.0000

Source: Author's calculation (2023)

Oil exports had a positive and significant relationship with the real GDP growth rate. This is because crude oil export constitutes the bulk of Nigeria's exports. This implies that a unit increase in oil exports would increase growth by 0.150134 %. This finding suggests that oil exports have translated significantly to a meaningful increase in real GDP per capita growth rate. Crude oil is currently Nigeria's major export relegating agricultural products that was before the discovery of crude oil, Nigeria's major

foreign exchange earnings and revenue. Although it is obvious that petroleum has contributed to the growth of Nigeria economy but there is a continuous reliance on crude oil as major source of export earnings and revenue for Nigeria. The result in a nutshell revealed that the efforts of the Federal Government of Nigeria in shifting the revenue base of the economy away from crude oil through diversification is not yielding the desired result as expected. This finding concurs to the submissions of Ugwo et al (2019).

Exchange rate (EXR) exerted a negative and insignificant relationship with the GDP in the long run. This implies that a unit increase in EXR would decrease growth by -0.00047% this result also indicates that EXR does not in any way support Nigeria's economic growth. Finally, foreign direct investment (FDI) had a negative and significant relationship with the GDP. This implies that FDI does not contribute to economic growth in Nigeria. This implies that a unit increase in FDI would decrease growth by -0.39948 %. The result of the FDI variable revealed the need for necessary actions to be put in place to check the unfaithful and exploitative modes of operation and negative effect of dumping activities of foreign direct investors.

On the other hand, in the short run the coefficient of oil export from (Table 4 above) had a negative and significant relationship with real GDP, 1% increase in OX will reduce growth by 0.10%. The one-lagged error correction terms ECT (-1) is negative and statistically significant, which shows the adjustment from the short-run leading to the long-run. . It is therefore evident from the coefficient of

the error correction term that 43% of the past deviation in GDP from equilibrium is corrected by it within one year. This implies that the speed of adjustment in the growth of output from short run towards the long-run equilibrium level is relatively low because it takes an average speed of 43%. The F-statistic (5.78471) reveals that the coefficients of independent variables are jointly significant and are capable of influencing GDP at 1% level. In addition, the R^2 reveals that all the explanatory variables account for approximately 80% variation in the model.

Diagnostic Tests

Table 5 gives the diagnostic test results conducted on the residual of the model. The normality test indicates acceptance of the Null hypothesis that residuals are normally distributed. Furthermore, the heteroskedasticity and serial correlation test also shows the acceptance of the Null hypothesis that residuals are not heteroskedasticity nor serially correlated respectively. The adjusted R square for the short-run ARDL model is approximately 66% and satisfies the diagnostic tests for normality, serial correlation and heteroskedasticity. (See Table 5)

Table 5:
Diagnostic Test Result

Test statistic	Results
Serial Correlation: Breuch-Pegan LM CHSQ(2)	0.84773 [0.4525]
Functional Form: Ramsey Reset F-stat (1, 54)	1.893825 [0.192]
Normality: Jarque-Bera	0.679890[0.7118]
Breuch-Pegan Hetroscedasticity: CHSQ(20)	0.70195 [0.7583]

Source: Author's calculation (2023).

Stability Test

Finally, to ensure that the models satisfy the stability test, we apply the cumulative sum of recursive residuals (CUSUM) and CUSUM of squares (CUSUMSQ) test proposed by Brown *et al.* (1975) to the residuals of the error-correction model. Figure 1 present plot of both CUSUM and CUSUMSQ test statistics that fall inside the critical bounds of 5% significance. This implies that the estimated parameters are stable over the period 1985-2021.

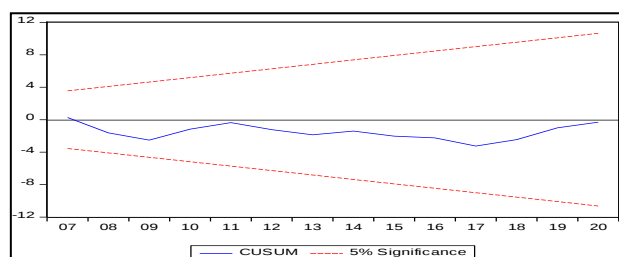
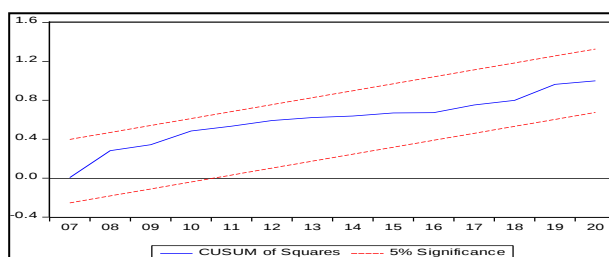


Figure 1 and 2: Plots of cumulative sum of recursive residual and cumulative sum of square of recursive residuals.

The cumulative sum of recursive residuals (CUSUM) and cumulative sum of square of recursive residuals (CUSUMQ) tests were conducted. The plots of both CUSUM and CUSUMQ are within the boundaries (see Figure 1 and Figure 2). Generally, the estimated parameters are stable in the long-run.



5. Conclusion and Recommendations

The Study examined the relative role of oil export on Nigeria's economic growth using ARDL bounds testing cointegration. It was aimed at estimating the short and long-term relationship between the variables of interest and the potential role of policy actions in stimulating the economy. ARDL model was found to be appropriate following the non-stationarity of the variables. After the series of tests and analysis of the data, we arrived at findings that summarily oil export has dynamic impact on the GDP and also oil export plays much role in bringing the economy to its stable equilibrium relationship (43% speed of adjustment yearly). Therefore, from the result of the bounds test to cointegration it indicates the existence of the long-run equilibrium relationship between oil export and Nigeria's economic growth. And the result of the long run estimation revealed that oil export had a positive and significant relationship with economic growth in Nigeria. This finding suggests oil exports have translated to a meaningful increase in real Gross Domestic Product per capita growth rate. Moreover, the result in a nutshell revealed that the efforts of the Federal Government of Nigeria in shifting the revenue base of the economy away from crude oil through diversification is not yielding the desired result as expected. Crude oil is currently Nigeria's major export relegating agricultural products that was before the discovery of crude oil, Nigeria's major foreign exchange earnings and revenue. Although it is obvious that petroleum has contributed to the growth of Nigeria economy but there is a continuous reliance on crude oil as a major source of export earnings and revenue for Nigeria. Earlier before the discovery and onward exploration of crude oil in Nigeria, 95% of the country's foreign exchange earnings were gotten from agriculture which generates over 60% of employment capacity in Nigeria and approximately 56% to the country's gross domestic earnings (World Bank, 2013).

The short-run result indicates that there is a negative and significant short-run dynamic relationship between oil export and economic growth in Nigeria. Thus 1% increase in oil export will reduce growth by 0.10%. The one-

lagged error correction terms ECT (-1) is negative and statistically significant, which shows the adjustment from the short-run leading to the long-run. It is therefore evident from the coefficient of the error correction term that 43% of the past deviation in GDP from equilibrium is corrected by it within one year. This implies that the speed of adjustment in the growth of output from short run towards the long-run equilibrium level is relatively low because it takes an average speed of 43%. The F-statistic (5.78471) reveals that the coefficients of independent variables are jointly significant and are capable of influencing GDP at 1% level. In addition, the R^2 reveals that all the explanatory variables account for approximately 80% variation in the model.

The following are some of the policy recommendations based on the findings of the study:

- i. There is a need for the diversification of the exports basket to enable the non-oil sectors of the economy to play a meaningful role through export. This is premised on the fact that the bulk of Nigeria's exports is from crude oil. Hence, there is a heavy reliance on crude oil exports that suffers from volatilities in the international export price for crude oil. With the quest for alternative sources of energy by countries of the world, relying on crude oil export as the main avenue to foster and sustain economic growth will be a risky decision that the country cannot afford to take. The Nigerian government needs to diversify her export composition by finding a viable alternative to crude oil export. The solid mineral sector could be a viable alternative. In order to boost its export quality and revenues, the government should invest in technologies for the processing of primary export commodities to ensure value addition.
- ii. Moreover diversifying the economy to non-oil export should also be through efforts in Research and Development sector, not through shifting resources from the oil sector. Moreover the oil exports show a critical short run impact on the economy, as such, diversification that leads to its neglect may come with great cost.

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