IMPACT OF OIL TRADE ON NIGERIA'S OIL SECTOR GROWTH

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Abstract: This study examined the impact of oil trade on Nigeria's oil sector growth 1983 to 2021, with the use of secondary data. The results revealed economically that CEPGR, CERGR PPIPGR, PPIEGR, OCTOT and ODFTOT have positive impact on NOSGR. Whereas CEPGR, CERGR and ODFTOT had positive impact of high magnitude on NOSGR, OCTOT exhibits moderate positive impact on NOSGR, while PPIPGR and PPIEGR had positive impact of low magnitude on NOSGR. The result indicates that the export bloc outperformed the import bloc within the study period. From empirical results, the study conclude that the oil supply bloc have more potential to promote Nigerian oil sector growth if properly managed than the demand bloc. From the conclusion, the study then recommend that Nigerian Government should prioritize fixing the refineries to produce at full capacity and channel oil trade towards exportation of both crude oil and refined petroleum products in order to expand oil revenue base of the economy and zero import expenditure of refined petroleum.

Keywords: Oil trade, Commodity Terms of Trade, Double factoral Terms of Trade, Oil Sector

1. Introduction

In Nigeria oil trade cuts across export (supply) and import (demand) blocs. Whereas the export bloc involves exportation of sweet crude oil and exportation and re-exportation of refined petroleum products, the import bloc involves importation of sour crude oil and refined petroleum products. As a relatively mono-cultural economy that depends largely on oil sector, oil trade (export and import) determines largely the state of oil sector growth which in turn determines aggregate economic growth of the country. The sector on average has played and continues to play a dominant role and occupies a strategic position in the economic growth of Nigeria.

In respect of the export bloc, Azaiki and Shagary (2007) opined that after joining OPEC in 1971, crude oil export revenue contributed to 24% of Nigerian gross domestic product (NGDP) in 1972 which increased to 30.2% and 32.7% in 1973 and 1974 respectively. In the late 80's the contributions of crude oil export revenue to NGDP declined when compared to the 70's, from 1986 to 1989 crude oil export revenue contributed to 21.5%, 17.3%, 13.9% and 13.8% of Nigeria's GDP respectively (CBN, 1997). This falling trend changed in the 90's down to 2000's; for instance, in 1992, 1995, 1996, 2007, 2010 and 2014 respectively crude oil export revenue contributed to 30.2%, 31%, 30%, 48%, 56% and 52% of NGDP while in 2009 and 2015 its contribution dropped to 37% and 35% respectively and dropped drastically to less than 20% in 2016 and 21.6% in 2017(CBN, 2017). Beyond the contribution of oil sector to Nigerian's GDP, it is also the major source of foreign exchange earnings by accounting for more than 89 per cent of foreign exchange earnings in Nigeria (Oleosodo, 2018).

From the import zone, available statistics revealed that within 1998-2003, 2004-2009, and 2010-2021 the total imported refined petroleum recorded 14,331,384,931 litres for PMS; 3,210,023,910.60 litres for DPK, and 936,087,562.20 litres for AGO respectively.

The import and export activities of Nigeria's oil sector which have shown applauded record amid of dwindling economic growth in the country have provoked researchers to investigate the impact of oil sector trade on Nigeria's economic growth. Empirical studies such as Usman, Badawi and Farouq (2020), Abdulkareem and Abdulhakeem (2015), Nwanna and Eyedayi (2015), Ahuru and James (2015), Nweze and Edeme (2015) who examined the impact of international oil trade on Nigeria's economic growth found that crude oil price and revenue have positively impacted on Nigeria's economic growth. However, Offiong, Atsu, Ajaude and Ina (2015) hold contrary opinion.

Given the findings of the empirical aforementioned evidence, it appears that the controversy on the impact of oil sector trade on Nigeria's economic growth remains. However, it is pertinent to note that plethora of literature reviewed with respect to impact of oil trade and Nigerian economy have focused on the fraction of the supply side (export bloc) of Nigeria's oil trade with respect to Nigeria's Economic growth, hence neglecting the demand side (import bloc) as well as some variables that can be used to measure the supply and demand sides simultaneously. The interaction between oil demand and supply sides in respect of oil sector growth have also been neglected relatively by the literature reviewed as they focused on the interaction between supply side with respect to Nigeria's economic growth. In practice oil trade impacts first on oil sector growth, while the oil sector growth impacts on aggregate economic growth. But the reviewed literature neglected the first stage. Further, reviewed literature failed to examine the rate of change in oil sector as a result of rate of change in oil supply, demand and oil term of trade.

Given the above gaps, the major objective of this paper is to examine the impact of oil trade on Nigeria's oil sector growth rate with recognition to oil supply and demand growth rate as well as oil terms of trade. The oil terms of trade were adopted to capture simultaneously demand and supply sides of international oil trade in Nigeria.

This work is organized into five sections: section one is the introduction, section two is review of empirical literature, section three is research method, section four is result presentation, analysis and discussion of results and section five as the conclusion and recommendations of the work.

1.1 Conceptual Framework

A conceptual framework herein represents a logical structure, graphical/visual display that identifies, connects and shows the casual/correlation/effect/impact and trend pattern among assumption, events, factors, constructs, concept and variables that relates to the phenomenon under study within a chosen theoretical/observational background. On this background, the conceptual framework herein tries to show the link between the independent variables (oil trade) and the dependent variable (oil sector growth). For the purpose of clarity, the link that connects the key parts of the concept within the context of oil trade and oil sector growth is captured below.

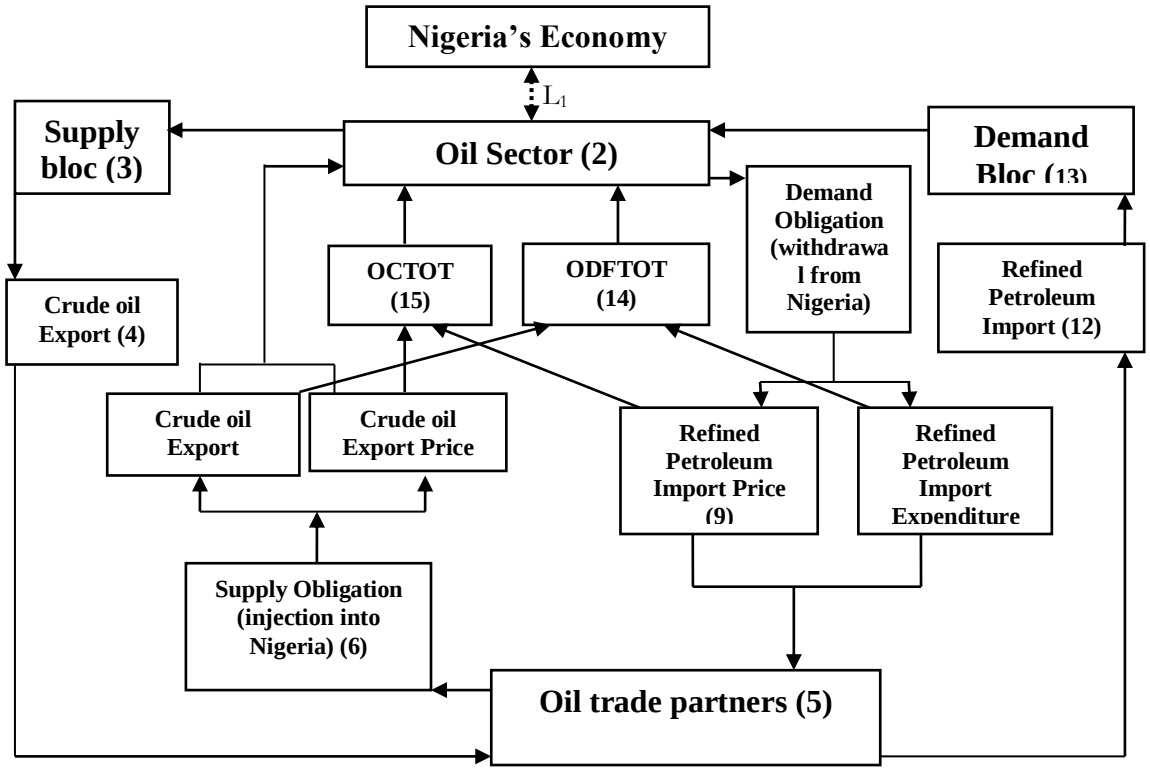

Figure 2.1: The link between Nigeria's oil supply bloc, oil demand bloc, oil terms of trade, and oil sector and Nigeria's economy

Source: *Researchers' Concept*

In Figure 2.1 above, the downwards pointing arrow (L_1) indicates that oil sector is a sector under Nigeria's economy, while the upwards pointing arrow of L_1 shows that the oil sector has influence over the Nigeria's economy. Boxes 3 and 13 show that Nigeria's oil sector trade is structured into supply (export) and demand (import) blocs. Figure 2.1 also indicates that the supply bloc and the demand bloc have influence on the oil sector individually and simultaneously. Individual impact of the supply bloc on oil sector is traceable from boxes 3, 4, 5, 6, 7, 8 and 2, while the individual impact of the demand bloc on oil sector is traceable from boxes 11, 9, 10, 5, 12, 13 and 2. Simultaneous impact of the oil supply and demand blocs on oil sector is shown on interaction between boxes 16 and 2 with oil commodity terms of trade (OCTOT) and oil double factoral terms of trade variable.

1.2 Review of Basic Theories Theory of supply and demand

This paper adopts the Marshall's 1890 theory of supply and demand with a view to modify it in order to explain oil supply and demand in international frontier. Alfred Marshall'stheory of supply and demand is a theory that explains the interaction between the sellers of a resource and the buyers for that resource. Generally, he opined that as price increases, people are willing to supply more and demand less and vice versa when the price falls (Jhingan, 2006). This study the theory is modified to reflect open economic scenario with respect to international oil trade where supply (export) of oil and demand (import) for oil explains the interaction between the exporters of oil and importers of oil product. Usually it is assumed that as oil price increases, the exporters are willing to supply more and while importers demand less and vice versa when the price falls.

Prebisch-Singer terms of trade (TOT) Hypothesis:

The TOT hypotheses discussed herein are (1) Commodity Terms of Trade (CTOT) and (2) Double factoral Terms of Trade (DFTOT). The two constructs focused on the economic implication of exportation of primary products from LDC's into DC's and importation of manufactured products from DC's into LDC's. The theory has gained popularity in literature as a measure of trade efficiency or gain that captures simultaneously the supply

and demand sides of international trade. CTOT is the simplest TOT for measurement of international trade efficiency or trade gain. CTOT for any country is defined as the price of that country's export divided by the price of its import or the ratio of country's export to her import or the gap between country's export and her import, CTOT is represented as (P_X/P_M) or ((P_X/P_M)-1)). Economic interpretation of the CTOT is that, as the price of export rises relative to the price of imports, the price gap between export and import should be large enough to purchase a larger quantity of import and bring higher utility and welfare to the citizens of the importing country which will further lead to economic growth and development and vice versa.

For Prebisch-Singer CTOT will always be negative for developing countries and will always contribute negatively to her economic growth even in the long run because demand pressure of manufactured products outstrips the demand pressure of primary products, oil producing countries excluded. By implication manufactured products conducts higher prices than primary products oil products excluded.

Again Prebisch and Singer assert that the double factors (that is price of export and import, and quantity of export and import) which determines trade gain need to be considered in terms of trade measurement. They forwarded a measurement for DFTOT as thus P_XQ_X / P_MQ_M. By interpretation, P_XQ_X represents export revenue, P_X is the price of export and Q_X is the quantity exported, P_MQ_M represents import expenditure, P_M is the import price while Q_M is the quantity imported (Jhingan, 2006; Appleyard & Field, 1998). Further, they added that international trade benefits primary export developing countries when the gap between primary export revenue and manufactured import cost is positive or when per unit revenue generated from primary export is high enough to offset per unit cost incurred from manufactured import, if otherwise, trade will deter the development of the primary exporting developing countries.

Meade's Neo-Classical Model of Economic Growth:

Meade (1961) cited in Jhingan (2008) constructed a neo-classical model of economic growth which is designed to show the simplest path to economic growth rate. In the economy visualized by Meade's neo-classical model of economic growth, the net output produced depends upon three factors: (i) the net stock of capital available in form of machines (ii) the amount of available labour force (iii) the availability of land and natural resources. This relationship is expressed in form of the production function as,

$$Y = f(K, L, N, t) \qquad (1.1)$$

Where, Y is the net output, K the existing stock of capital (machines), L the labour force and N land natural resources and t as technical progress. Assuming the amount of N to be fixed and t to be embodied by K, net output can increase in any one period with the growth in K and L. This relationship is shown as;

$$\Delta Y = q\Delta K + r\Delta L \qquad (1.2)$$

Where Δ in each case represents an increase and q and r represents the incremental product of capital and labour respectively. The increase over the years in the rate of annual net output (ΔY) is equal to the increase in the stock of machinery (ΔK) multiplied by q plus the increase in the amount of labour (ΔL) multiplied by r plus. The annual proportionate growth rate of output is;

$$\Delta Y/Y = qK/Y * \Delta K/K + rL/Y * \Delta L/L \qquad (1.3)$$

Where ΔY/Y is the proportionate growth rate of output, ΔK/K and ΔL/L are the proportionate growth rate of capital and labour respectively, qK/Y and rL/Y are the proportional marginal product of capital and labour respectively. Equation 1.3 above shows that growth rate of output depends on the weighed sum of the capital and labour growth rates (Jhingan, 2008).

Meade's model has been severely criticized by Kendrich first due to lack of clarity about qK/Y and rL/Y which Meade called proportional marginal product of capital and labour respectively. Further criticism against the model is its unrealistic assumptions of perfect competition and closed laissez-faire economy which is unrealistic. The model is also deficient by neglecting international trade transactions. Despite these defects, Meade's model has the chief merit of demonstrating the influence of input growth rates on economic growth rate. The major reason for

adopting Meade's model in this study is that Meade's model used economic growth rate as dependent variable, and in this study the dependent variables are Nigerian oil sector growth rate and Nigeria's economic growth rate.

2 Review of Empirical Literature

Usman, Badawi and Farouq (2020), empirically addresses the impact of non-oil export on economic growth in Nigeria. The method used in the study is Auto Regressive Distributive Lag (ARDL), to capture both the long run and short run dynamic relationship. Augmented dickey fuller of unit root test was used to avoid the error of accepting the null hypothesis of unit root test when it had been rejected. Annual time series data were obtained and analyzed. The finding of the study revealed that, there is a positive and significant relationship between non-oil export and economic growth in Nigeria.

Abdulkareem and Abdulhakeem (2015) examined crude oil price and macroeconomic volatility in Nigeria 1980 – 2012. The paper employed Generalized Autoregressive Conditional Heteroskedastic (GARCH) model and its variants with daily, monthly and quarterly data. The findings of the study revealed that: all the macroeconomic control variables considered in the study such as real gross domestic product, interest rate and exchange rate are highly volatile including the core variable which is crude oil price; the asymmetric models outperform the symmetric models. By implication, the Nigerian economy is vulnerable to both internal shocks (interest rate volatility, real GDP volatility) and external shocks (exchange rate volatility and oil price volatility). Therefore, the study concluded that more credence should be given to asymmetric models in dealing with macroeconomic volatility in Nigeria and oil price volatility should be considered as relevant variable in the analysis of macroeconomic fluctuations in Nigeria. The study recommended that Nigerian economy should be diversified by revamping other sectors such as the agricultural sector and the industrial sector in order to reduce the impact of oil price uncertainty on macroeconomic volatility.

Ahuru and James (2015) examined the impact of oil price volatility on Nigerian economic growth from 1980 to 2013. The study relied on secondary data which was subjected to unit root and co-integration tests and the variables were stationary with evidence of two co-integrated variables, this ensures long-run relationship between the dependent and independent variables in the study. The study made use of VAR and dynamic simulations of forecasting error variance decomposition alongside pair wise granger causality as techniques of analysis. Nominal exchange rate, inflationary rate, public expenditure, oil price volatility were the explanatory variables while real GDP was adopted as the dependent variable. The study found bidirectional relationship between real GDP and all the explanatory variables. Secondly, the study found also that price volatility does not significantly stimulate real GDP. The study recommended that efforts should be made to safeguard Nigerian economy through appropriate revenue policy measure such as promotion of sound fiscal institutions, promotion of budget flexibility and diversification of the revenue base of Nigerian economy. Ahuru and James (2015),

Nweze and Edame (2015) examined oil revenue and economic growth in Nigeria from 1981 to 2014. Secondary data on gross domestic product (GDP) was used as a proxy for economic growth; oil revenue (OREV), and government expenditure (GEXP) which represented the explanatory variables were sourced mainly from CBN publications. In the course of empirical investigations, various advanced econometric techniques like Augmented Dickey Fuller Unit root test, Johansen Co-integration Test and Error Correction Mechanism (ECM) were employed and the result reveals among others: That all the variables were all stationary at first difference, meaning that the variables were integrated of the same order justifying cointegration and error correction mechanism test. The co-integration result indicated that there is long run relationship among the variables with three cointegrating equation(s). The result of the error correction mechanism (ECM) test indicated that all the variables except lag of government expenditure exerted significant impact on economic growth in Nigeria. However, all the variables exhibited their expected sign in the short-run but exhibited negative relationship with economic growth in the long-run except for government expenditure, which has positive relationship with economic growth both in the long-run and short-run. The study also found that oil revenue has positive relationship of low magnitude on economic growth in Nigeria. Hence, concluded that Government should use the revenue generated from petroleum to invest in other domestic sectors such as Agriculture and manufacturing sector in order to expand the revenue source of the economy and further increase the revenue base of the economy.

Offiong et al (2015) analyzed the impact of crude oil revenue on Nigerian economic growth, evidence from cross river state. This study opined that with decreasing demand for fossil oil globally, international price of crude oil have fallen continuously, reaching an all time low of below $30 lately. This has several implications on the Nigerian public finance structure at national and sub-national levels. The study analyzed the impact of this plunge on the economic development of Cross River State (CRS), Nigeria and found that crude oil revenue shocks affected the State's economy inversely. Consequently, the study recommended that CRS government should de-emphasize the over-reliance on crude oil revenue and seek and optimize earnings from other non-oil sectors of the economy. Further, the State's economy should be diversified to boost internally generated revenue with less dependence on Federal government revenue allocation. Finally, there should be effective machinery for checks and balances put up by the government to stem fiscal abuse and wastage of resources by the ministries, departments and agencies in the State.

3 Research Method

3.1 Theoretical Framework

The theoretical framework guiding this study is drawn from: a) Meade's Neoclassical model of economic growth b) modified Marshall's theory of supply and demand c) Prebisch-Singer commodity terms of trade hypothesis.
Meade's model is specified as;

$$\Delta Y/Y = qK/Y * \Delta K/K + rL/Y * \Delta L/L \quad 3.1$$

For lack of clarity about qK/Y and rL/Y as pointed out by Kendrich, the researcher modified the model to read

$$\Delta Y = q\Delta K + r\Delta L \quad 3.2$$

Where Δ in each case represents an increase and q and r represents the incremental product of capital and labour respectively. The increase over the years in the rate of annual net output (ΔY) is equal to the increase in the stock of machinery (ΔK) multiplied by q plus the increase in the amount of labour (ΔL) multiplied by r. The annual proportionate growth rate of output is specified as;

$$\Delta Y/Y = \Delta K/K + \Delta L/L \quad 3.3$$

Where ΔY/Y is the proportionate growth rate of output, ΔK/K and ΔL/L are the proportionate growth rate of capital and labour respectively. Equation 3.3 above shows that growth rate of output depends on the weighed sum of the capital and labour growth rates (Jhingan, 2008). Model 3.3 excluded export and import activities as well as terms of trade as explanatory variables to economic growth rate. Following the Supply-Demand and TOT theories coupled with the fact that the objectives of this study is to query the impact of oil supply growth rate, oil demand growth rate, and oil terms of trade on Nigeria's oil sector growth rate. Hence, the researcher modified equation 3.3 by including oil supply and demand growth rates and oil terms of trade. The modified model is expressed as;

$$\Delta Y/Y = \Delta K/K + \Delta L/L + \Delta S/S + TOT \quad 3.4$$

Where ΔY/Y, ΔK/K, and ΔL/L are as in 3.3 and ΔS/S is trade growth rate. ΔS/S is decomposed into export growth rate and import growth rate. The export growth rate and import growth rate are further decomposed into export price growth rate, export revenue growth rate, import price growth rate, import cost growth rate, and TOT is decomposed into oil commodity terms of trade and oil double factoral terms of trade.
Equation 3.4 is expanded as;

$$\Delta Y/Y = \Delta K/K + \Delta L/L + \Delta EPGR/EPGR + \Delta ERGR/ERGR + \Delta IPGR/IPGR + \Delta ICGR/ICGR + ((P_X/P_M)-1)) + ((P_XQ_X/P_MQ_M)-1)) \quad 3.5$$

Aligning equation 3.5 to this study, ΔY/Y = Nigeria's oil sector growth rate (NOSGR), ΔK/K = Growth rate of Capital (GRC), ΔL/L = Growth rate of Labour (GRL), ΔEPGR/EPGR = Crude oil export price growth rate (CEPGR), ΔERGR/ERGR = Crude oil export revenue growth rate (CERGR), ΔIPGR/IPGR = Refined Petroleum products import price growth rate (PPIPGR), ΔICGR/ICGR = Refined Petroleum products import

expenditure growth rate (PPIEGR), $((P_X/P_M)-1)$ = Oil commodity terms of trade (OCTOT) and $((P_XQ_X/P_MQ_M)-1)$ = Oil double factoral terms of trade (ODFTOT).

3.2 Empirical Model Specification

From equation 3.5, the appropriate model for the study objectives is specified thus:

$$NOSGR = (GRC + GRL + CEPGR + CERGR + PPIPGR + PPIEGR + OCTOT + ODFTOT) \quad 3.6$$

The econometric form of equation 3.6 is presented as;

$$NOSGR = b_o + b_1GRC + b_2GRL + b_3CEPGR + b_4CERGR + b_5PPIPGR + b_6PPIEGR + b_7OCTOT + b_8ODFTOT + u. \quad 3.7$$

$b_1 ; b_2 ; b_3 ; b_4 ; b_5 ; b_6; b_7$ and $b_8 > 0$

u = stochastic variable

3.3 Estimation Techniques and Procedures

This study adopted estimation techniques and procedures that are relevant to the study. They include: Unit root test, Co-integration test and Error correction model.

3.3.1 Unit Root Test

Unit root test is a pre-test which is used to examine whether a time series data is stationary or not, in order to avoid running a spurious regression. Unit root test ensures validity of the test statistics. This study adopts the Augmented Dickey Fuller test statistics. The ADF equation is specified below as thus;

$$\Delta Y_t = \beta_0 + \beta_2 t + \psi Y_{t-1} + \alpha_1 \sum_{i=1}^{p} \Delta Y_{t-1} + \varepsilon_t \quad 3.8$$

Unit root test hypothesis and decision rule are stated thus:

H_0: the variables has unit root (not stationary)
H_1: the variables has no unit root (stationary)

Decision rule: reject H_0 if ADF is greater than critical value in absolute terms at chosen level of significance.

3.3.2 Co-integration Test

After establishing the existence of stationarity and their order of integration identified, next is to determine if the dependent and independent variables are co-integrated for robust long-run analysis and this can only be achieved through co-integration test. The nature of co-integration test to be applied in a study is subject to stationarity test outcomes. For instance, if the variables of study interest are integrated at purely order zero that is 1(0) or purely order one that is 1(1), under such stationarity outcomes single co-integration tests such as Johansen or Engle-Granger respectively are appropriate for long-run analysis. Contrarily, if the variables are fractionally integrated at 1(0) and 1(I) ARDL bound testing become more appropriate.

4 Result Presentation, Analysis and Discussion of Results

The empirical results from data analysis are presented in this section. The results include pre-test results, data analysis, post test results. Empirical findings are also discussed.

4.1 Result Presentation and Analyses

Pre-test results: This section includes unit root test, co-integration test and error correction test.

Table 4.1: Augmented Dickey-Fuller (ADF) unit root test Model.

VARIABLES	ADF	Critical 5%	Order	Remarks
Dependent variable				
NOSGR	-7.6813	-3.5577	I(I)	Reject H_0
Independent variable				
CGR	-6.1840	-3.5628	I(I)	Reject H_0
LGR	-7.5415	-3.5577	I(I)	Reject H_0
CEPGR	-5.6973	-3.5529	I(I)	Reject H_0
CERGR	-5.0318	-3.5577	I(I)	Reject H_0
PPIPGR	-4.1424	-3.5507	I(I)	Reject H_0
PPIEGR	-6.0767	-3.5076	I(I)	Reject H_0
OCTOT	-5.7891	-3.5577	I(I)	Reject H_0
ODFTOT	-4.4333	-3.5742	I(I)	Reject H_0

Source: Author's Computation 2021.

Unit root test hypothesis and decision rule

H_0: The variable has unit root (not stationary)
H_1: The variable has no unit root (stationary)

Decision rule: reject H_0 if ADF is greater than critical value in absolute terms at chosen level of significance.

From unit root test, it is obvious that all the variables are stationary at order I(I), we therefore reject H_0 across all the variables in the model specified and then conclude that the variables are stationary (the variables have no unit root).

Since all the variables are stationary at order I (I), this study therefore adopted Engel-Granger two stage co-integration test, First stage of EG co-integration test states that residual is a level stationary variable and second stage states that there should be at least one co-integrated variable in the equation.

Table 4.2: Residual unit root test

VARIABLE	ADF	Critical 5%	Critical 5%	Order	Remarks
Resid01	-7.3326	-2.9540	-2.9540	I(0)	Reject H_0

Source: Author's computation 2021.

Table 4.3: Engel-Granger co-integration test

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
NOSGR	-4.118873	0.6499	-23.00700	0.6411
CGR	-6.061111	0.0710	-35.21932	0.0677
LGR	-2.412293	0.9943	-15.70338	0.9448
CEPGR	-6.119848	0.0648	-35.40325	0.0641
CERGR	-6.462436	0.0372**	-36.89796	0.0403**
PPIPGR	-6.805533	0.0207**	-38.92446	0.0197**
PPICGR	-6.275487	0.0505**	-36.92114	0.0399**
OCTOT	-3.890262	0.7406	-23.84673	0.5906
ODFTOT	-2.530695	0.9912	-14.59071	0.9645

** denote co-integration
Source: Author's computation 2021.

Table 4.2 shows that residual series is stationary at order zero I(0), while tables 4.3 indicate that the time series in the model specified are co-integrated as evidenced by three co-integrating variables.

The result in table 4.2 and 4.3 indicate that there exist long run relationship between the dependent and independent variables in all the models specified in this study. Granger representation theorem cited in Gujarati, Porter and Gunasekar (2012) states that if two variables dependent and independent are co-integrated, the relationship between the two can be expressed as error correction mechanism (ECM). This means that in short-run there may be disequilibrium which will warrant treating the error term in equations 3.8 as equilibrium error. Correction of the likely disequilibrium in co-integration equation is the major import of ECM. If short-run disequilibrium is not corrected we conclude that the dependent variable cannot adjust to equilibrium level in the short-run, as a result the analysis of the study will be based on long-run result. On the other hand, if the short-run disequilibrium is corrected we conclude that the dependent variable can adjust to equilibrium level in the short-run as a result the study analysis will rely on short run result.

Engel-Granger Error Correction Model (Short-run).

Table 4.5: Error correction test

Variable	Coefficient	t-statistic	Prob.*
ECM01(-1)	-0.2108	19.7737	0.0022

Source: Author's Computation 2021.

Table 4.5 reveals that there exists short-run disequilibrium in the model specified. The negative coefficients imply that for short-run disequilibrium in the specified model to be corrected in the long run, it will require 21% speed of adjustment. Given the ECM results, the analysis of this study relied on short run result and the particular short run result to be applied is the model with minimum Akaike information criterion, Schwarz criterion and Hannan-Quinn criterion.

4.2 Data/Result Analysis

The analysis of this study relies on short-run result with minimum Akaike, Schwarz and Hannan-Quinn information criteria across all the models specified.

Table 4.6: Engel-Granger ECM (Short-run) result for model one

Dependent Variable	NOSGR		
independent Variables			
Variable	Coefficient	t-Statistic	Probability
CGR	4.146449	-5.236067	0.0044
LGR	1.657720	-3.145183	0.0005
CEPGR	2.775121	7.658067	0.0027
CERGR	4.219029	8.844265	0.0007
PPIPGR	0.028050	5.145988	0.0012
PPIEGR	0.044065	12.59380	0.0005
OCTOT	1.020002	5.827248	0.0011
ODFTOT	1.193407	7.229369	0.0009
ECM(-1)	-0.210842	19.77376	0.0022
Other test statistic			
Variables	Values		
R-squared	0.680300		
Adjusted R-squared	0.527000		
F-statistic and Prob(F-statistic)	6.200032 (0.000001)		
Durbin-Watson stat	1.758174		
Information criteria			

Akaike info criterion	6.167916
Schwarz criterion	6.576055
Hannan-Quinn criterion	6.305243

Source: Author's Compilation 2021.

Economically, the above short-run result reveals first among other that a unit increase in capital and labour growth rates (CGR and LGR) in Nigeria will increase Nigeria's oil sector growth rate (NOSGR) by 4.14 and 1.66 units respectively. Second, a unit increase in Nigeria's Crude oil Export Price Growth Rate (CEPGR) and Crude oil Export Revenue Growth Rate (CERGR) will increase NOSGR by approximately 2.78 and 4.22 units respectively. Third, a unit increase in Nigeria's Petroleum Products Import Price Growth Rate (PPIPGR) and Petroleum Products Import Expenditure Growth Rate (PPIEGR) will increase NOSGR by approximately 0.03 and 0.04 units respectively. Fourth, a unit increase in Nigeria's Oil Commodity Terms of Trade (OCTOT) and Oil Double Factorial Terms of Trade (ODFTOT) will increase NOSGR by approximately 1.02 and 1.19 units respectively. On the other hand, t-test statistics shows that CGR and LGR have negative significant impact on NOSGR, while CEPGR, CERGR, PPIPGR, PPIEGR, OCTOT and ODFTOT have positive significant impact on NOSGR. F-test shows that overall test statistics is positive and statistically significant.

4.2.1 Evaluation of Estimate.

Estimated results are evaluated based on Economic criteria (a priori expectations),

Economic Criteria (a-priori expectation)

Table 4.8: a-priori expectation

Independent variables	Exp. Signs	Obtained results	Remarks
CGR	+	4.146449	Conform to a-priori
LGR	+	1.657720	Conform to a-priori
CEPGR	+	2.775121	Conform to a-priori
CERGR	+	4.219029	Conform to a-priori
PPIPGR	+	0.028050	Conform to a-priori
PPIEGR	+	0.044065	Conform to a-priori
OCTOT	+	1.020002	Conform to a-priori
ODFTOT	+	1.193407	Conform to a-priori

Source: Researcher's Computation 2021.

Table 4.8 shows that all the variables conformed to a-priori expectation, however CGR, CEPGR and CERGR are more economically significant to reckon with given their signs and magnitude. LGR, OCTOT and ODFTOT are more of breakeven factors as their unit increase can only contribute to a unit increase in NOSGR.

4.3 Discussion of Findings.

From the obtained results, the individual test statistic reveals that oil supply growth rate variables (CEPGR and CERGR), oil demand growth rate (PPIPGR and PPIEGR) and oil terms of trade (OCTOT and ODFTOT) have positive significant impact on NOSGR. In the same vein the F-test statistics reveals that all the explanatory variables have positive significant impact on NOSGR. Economically, CEPGR, CERGR PPIPGR, PPIEGR, OCTOT and ODFTOT have positive impact on NOSGR. Whereas CEPGR, CERGR and ODFTOT had positive impact of high magnitude on NOSGR, OCTOT exhibits moderate positive on NOSGR, while PPIPGR and PPIEGR had positive impact of low magnitude on NOSGR.

The statistical and economic results obtained from the model one of this study agree with Prebisch-Singer hypothesis which posit that TOT will always be negative for developing countries and will always contribute

negatively to her economic growth except oil producing countries. Empirically despite the diverse approaches adopted by different studies, the result obtained from crude oil export price growth rate agree with the findings Umar and Abdulhakeem (2010) who found positive relationship between crude oil export price and its changes thereof and Nigerian economic growth.

5. Conclusion and Recommendations

From the observed results, the study conclude that the oil supply bloc have more potential to promote Nigerian oil sector growth if properly managed then the demand bloc. Secondly it was observed that the oil demand bloc is more responsible for decline in joint trade performance of the upstream and downstream sub-sectors. Further on average Nigeria's oil trade pattern is surrounded with doubting benefits and may not be good enough to set economic growth and developmental platform required in the economy. From the conclusion, the study then recommend that Nigerian Government should prioritize fixing the refineries to produce at full capacity and channel oil trade towards exportation of both crude oil and refined petroleum products in order to expand oil revenue base of the economy and zero import expenditure of refined petroleum.

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