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**HOW FAR DO NON-OIL REVENUES PROMOTE ECONOMIC DEVELOPMENT IN NIGERIA? A  
POVERTY INDEX PERSPECTIVE**

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**Abstract**

*Given the importance attached to poverty index as a contentious issue in development economics and finance, this study evaluates the interrelationships prevailing between Nigeria's non-oil revenues and her poverty index. Economic development was captured with Poverty Index. Secondary data was obtained from the Central Bank of Nigeria's Statistical Bulletin, Federal Inland Revenue Service Board, Knoemia.com (2019), and the World Bank over the period 1981 to 2019 (40 years). Stationarity, Johansen's cointegration, error correction, and Granger causality tests were employed in processing the obtained data. The results obtained show that, among the non-oil revenue elements, only personal income tax and royalties constitute the key factors that valuably prevail in the prediction of poverty index in Nigeria. In light of this, the study recommends that; (i) Personal income tax revenue collections should be increased through proper linkage of Nigeria's taxable adults' vital information like national identity card, bank verification number and the individual potential payers' bank accounts. These will facilitate tax assessments in order to minimize tax evasion and avoidance. ii) More infrastructure and security should be provided by the state and solid mineral exploration firms in Nigeria's rural areas in order to enhance the percentages of non-oil related revenues accruing from royalty payments and consequently, reduce poverty index as an economic development indicator in Nigeria.*

*Keywords: Non-Oil Revenue, Economic Development, Human Poverty Index. Causality.*

### **Introduction**

Nigeria is endowed with land, crude oil, and other natural resources. However, a substantial portion of its population like other less developed economies are still living below the widely accepted World Bank's standard poverty level according to Todaro and Smith (2011).

Ogunsanwo and Ogunleye (2018) observed the need for urgent diversification of Nigeria's economy and a total departure from a crude oil export oriented economy. However, Abomaye-Nimenibo, Eyo, Mni, and Chika (2018) further reinforced the argument by asserting that governments at all levels in Nigeria should as a matter of urgency, take measures to achieve strategic diversification of the economy at all levels. Further, the continued decline in crude oil export price and the attendant export proceed has made the Nigerian economy unstable and sometimes, largely unpredictable as well as unreliable for national planning according to the Central Bank of Nigeria (2018). Given this circumstance, Idris and Ahmad (2017) observed that government at all levels in Nigeria has continued to seek as a matter of urgency, alternative revenue generating resources, especially in non-oil forms in order to sustain government's cost of administration, fund new and existing projects and through their multiplier effects, reduce poverty level and its associated index as an economic development indicator.

As a standard component of economic development, the level of poverty in an economy could be measured using the poverty index. Poverty index in accordance with Ul Haq (1995; 2002) is an indication of poverty and was developed under the sponsorship of the United Nations to complement the human development index (HDI). It was first reported as part of the Human Deprivation Report in 1997. The poverty index (PI) has consequently been adopted to serve as one of the accepted indicators of standard of living in a country (Alkire & Robles, 2017).

Ul Haq (1995, 2002) observed that unlike the human development index (HDI), poverty index (PI) attempts to reflect the extent of human deprivation in an economy concerning critical socio-economic elements. These value-weighted elements include; life expectancy as indicated by probability at birth of living up to sixty (60) years, and knowledge as expressed by percentage of people lacking functional literacy. Others include the standard of living as captured by the prevailing level of long-term unemployment (12 months or more) of a certain percentage of the labour force, as well as the percentage of the population whose incomes fall below 50% of the median adjusted household disposable income. In the same direction, Sen (1999) observed that an objective explanation of poverty in developing economies should not only be on account of income gaps, but must incorporate a vivid account of the nature of income distribution as well as consumption among those people who live below the poverty line. In this sense also, the study contends that, the more skewed the distribution of income is below the poverty line, the larger remains the poverty gap. Consequently, the study employed poverty index as its criterion variable based on ideas adopted from the studies of Gemmell and Morrissey (2005), Bahiigwa, Ellis, Fieldstad and Iversen (2004) and Van Heerden, Blignant, Mabugu, Gerlagh, Hess, Tol, and Letsoalo (2006).

Despite growing awareness of the adverse impacts of poverty on nations, however, the volume of available literature on the exact nature of interrelationship between nonoil revenues and poverty index is still growing or at best scarce, especially in Nigeria. Also, there is an exigent

need for such studies based on current data. A resolution of the above issues therefore, constitutes the core problem of this study. Having provided an overview as above, the balance of this study will be rendered in four sections. Section 2 provides a review of key propelling studies while the third section provides the materials and methods adopted. Section 4 deals with the results obtained and analysis of same, while section 5 offers the discussions, conclusions, and policy recommendations.

### **Literature Review**

This section is discussed under the following subsections:

#### **Theoretical foundations:**

The theoretical underpinning for this study is the endogenous growth theory associated with the studies of Solow (1956). This theory advocates the potential role of government in improving the efficiency of resource allocation and promotion of investment in order to reduce the incidence of poverty in countries (Stoilova, 2017). The theory predicts that government expenditure and tax will have both temporary and permanent effects on the per capita growth of output. Endogenous growth theory invariably supports all legitimate measures which governments undertake to boost revenue generation. Consequently, this study draws from the endogenous theory by making poverty index a function of non-oil resources.

#### **Empirical Review**

A myriad of studies have evaluated the implication of non-oil revenues on economic development of nations. Some of these studies are consequently reviewed below; Ogunsanwo and Ogunleye (2018) investigated the effect of taxation as an alternative to dwindling oil revenue in Nigeria for the period of 24 years (1994 to 2017). The study employed Johansen cointegration and error correction technique. It specified real gross domestic product (RGDP) as a function of company income tax (CIT) and value added tax (VAT). Based on the results of the cointegration test, the study concluded that although taxation appears to have negative effects on Nigeria's economy, however, the effect could become positive if the government can address the prevailing leakages in tax revenue collection. It could then serve as an alternative to the dwindling oil revenue. The study therefore recommended that government should ensure that taxation is properly managed in a manner that will accelerate economic progress, reduce inflation rate and generate employment in the country. The study further suggested that government should diversify the economy in order to other realize more streams of income from other sectors like agriculture, solid minerals and gas, in order to avoid the ripple effects of our over reliance on crude export which is potentially devastating.

Omodero, Ekwe, and Ihendinihu, (2018), evaluated the influence of non-oil internally generated revenues (IGR) on Nigeria's economic development over the period of 1981 to 2016. Multiple regression technique was employed in analyzing the data which were sourced from secondary sources. The results provided evidence of a valuable statistical relationship between federal, state and local government non-oil related revenues in Nigeria and the nation's economic development. The study consequently concluded that non-oil revenues are valuable in predicting economic development in Nigeria and recommended appreciable compliance with the tax laws in order to improve Nigeria's revenue generation and consequently economic development.

Harelimana (2018), estimated the influence of tax revenue on economic development in Rwanda over the period of 2013 to 2016. The study utilized secondary data. On employment of regression technique, the study found prevalence of a positive and significant relationship between tax revenue and Rwandan economic development. The study concludes that tax revenue was important in predicting Rwanda's economic development and consequently recommended improved tax administration strategies in order to lower the cost of tax collection in Rwanda ensure equity and above all, facilitate rapid economic development through rational state expenditures and investments.

Okeke, Mbonu, and Ndubuisi (2018) examined the nature of relationship between tax revenue and economic development in Nigeria over the period 1994 -2016. The study employed the augmented Dickey-Fuller, multiple regressions, Granger Causality, Johansen Co-integration test and Error Correction techniques in analyzing the data. The findings showed that tax revenues as utilized in funding government spending has a statistically significant

Relationship with infant mortality, labor force productivity and gross fixed capital formation in Nigeria. The study consequently recommended enhanced tax collection efforts and strategies in order to boost government revenues and enhance development projects.

Rianto, Taufik, and Yam (2017) studied the effect of personal income tax revenue on public welfare development of 6 regions in Jakarta City, Indonesia, over the period, 2010 to 2014. The study employed five independent simple regression models. The findings showed that delinquency in tax collection, number of eligible tax entities, tax compliance level and level of employment influenced the value of revenues that accrued to each tax type, while the level of individuals' taxable income significantly influenced the city's development expenditures on infrastructure, education, and health. It was recommended that more information should be developed to capture appropriate taxable incomes of taxable adults.

Ofoegbu and Akwu (2016) examined the effect of tax revenue on Nigeria's economic development. The study compared the predictive models resulting from the employments of human development index and gross domestic product as dependent variables. Time series data covering the period 2005 to 2014 were employed which were analyzed using multiple regression techniques. The predictive effects of the two equations were found significant. However, the resulting coefficient of determination ( $R^2$ ) from the equation that employed gross domestic product as the dependent variable was higher than the one which employed human development index. To this extent, the study concluded that the model which employed GDP was more efficient. This study however, failed to realize that the skewed nature of income distribution using GDP as a measure was a profound limitation of their conclusions with respect to Nigeria.

Ibanichuka, Akani, and Ikebujo (2016) examined the effect of tax revenue on economic development in Nigeria over the period 1995-2014. Secondary data were sourced and analyzed on employment of multiple regression technique. The findings revealed that revenues collected by the federal government via company income tax, value-added tax, and customs and excise duties were significantly related to Nigeria's human development index. Based on the findings, the study concluded that revenues collected by the federal government through company income tax, value added tax, customs and excise duties significantly explained changes in Nigeria's human development index. On the whole, the study recommended efficient

administration of those revenue elements to avert leakages and consequently accelerate improved human welfare in Nigeria.

Nwite (2015) evaluated the implications of tax revenue with respect to economic development of Nigeria from the year 2000 to 2010. The study traced the historical development of taxation in Nigeria, the meaning of taxation as well as the concept of economic development. Pearson product moment correlation was employed for analysis. The results indicated no significant association between tax revenue and economic development in Nigeria. However, the study substantially recommended that the government in Nigeria should employ taxation in tackling the problems of adverse balance of payments as well as curbing inflationary trends.

Viccaro, Rocchi, Cozzi, and Severino (2015) investigated the effect of revenues accruing from royalties on regional developments in Italy over the period 1995 to 2012. The study employed a multi-sector regression analysis. The findings showed that royalty allocations to various regional governments had significantly lower than the expected effects on regional economic development in Italy. The study attributed those results to the fact that externalities arising from investment of royalty proceeds might have benefited people of other regions, especially in terms of employment opportunities.

Adegbie and Fakile (2011), examined the relationship between company income tax (CIT) and Nigeria's economic development. It employed secondary data sourced from Central Bank of Nigeria's Statistical Bulletin and Federal Inland Revenue Services over the period 1990 to 2010. Employing a simple regression analytical technique that Nigeria's economic development was significantly sensitive to variations in company income tax proceeds over the period of study. Consequently, the study recommended enhanced tax incentives to attract more corporate investments into Nigeria in order to boost company income tax proceeds and consequently, economic development.

## Methodology

For clarity, this part is sub-divided as follows:

### Data and Employed Variables Description:

The data for this study were sourced from the Central Bank of Nigeria's Statistical Bulletin, Federal Inland Revenue Service Board Publication, Knoema.com and World Bank Publication from 1981 to 2019 as shown in Appendix.

Further, poverty index is the dependent variable. Since it is a composite value-weighted indices of the extent of deprivation of socio-economic elements of life expectancy, knowledge/functional literacy, standard of living, employment etc. The employed explanatory variables which are the non-oil revenue elements were carried on per capita basis to achieve the same base and compare likes with likes. The resulting statistics on employment of Nigeria's population over the period of study are shown in table 1 below:

**Table 1: Poverty Index (PI), Personal Income Tax per capita (PIT/P), Company Income Tax per capita (CIT/P), Capital gains tax per capita (CGT/P), Custom and excise duties per capita (CED/P), Royalties per capita (ROY/P) in Nigeria, 1981 -2019:**

Year	PI %	PIT/P %	CIT/P %	CGT/P %	CED/P %	ROY/P %
1981	0.405	26.46	5.34	63.42	30.81	58.7

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<b>1982</b>	0.499	9.45	7.1	209.95	30.15	12.0
<b>1983</b>	0.493	8.94	7.07	349.14	24.97	0.8
<b>1984</b>	0.487	7.13	9.66	113.15	19.83	1.8
<b>1985</b>	0.481	11.23	12.01	247.56	26.11	18.0
<b>1986</b>	0.475	5.05	12.85	141.9	20.14	48.0
<b>1987</b>	0.469	4.63	14.02	495.52	40.19	6.9
<b>1988</b>	0.463	5.98	17.15	498.99	62.71	14.0
<b>1989</b>	0.457	10.1	20.62	502.05	62.64	20.7
<b>1990</b>	0.451	18.1	31.46	189.89	90.7	1.9
<b>1991</b>	0.445	31.11	39.17	507.22	117.23	20.6
<b>1992</b>	0.639	48.92	54.05	509.34	160.19	37.4
<b>1993</b>	0.633	54.75	92.97	511.13	150.7	8.7
<b>1994</b>	0.571	36.91	116.51	500.47	173.65	61.2
<b>1995</b>	0.581	189.21	202.56	371.53	345.93	34.5
<b>1996</b>	0.635	30.77	208.61	457.82	496.69	134.8
<b>1997</b>	0.631	73.47	244.88	306.8	554.96	227.7
<b>1998</b>	0.663	97.95	286.12	216.72	4,957.65	1,864.3
<b>1999</b>	0.686	168.44	387.17	105.66	736.63	2,082.3
<b>2000</b>	0.58	311.4	435.63	198.48	8.3	2,724.7
<b>2001</b>	0.563	353.89	553.15	314.36	13.6	3,265.6
<b>2002</b>	0.557	529.27	692.49	222.4	14.1	3,959.7
<b>2003</b>	0.535	410.69	869.88	176.6	14.81	4,476.5
<b>2004</b>	0.584	435.03	834.6	141.47	16.04	4,773.0
<b>2005</b>	0.547	1,526.56	1,009.79	648.86	16.76	5,573.6
<b>2006</b>	0.527	233.5	1,717.22	688.67	12.46	6,518.5
<b>2007</b>	0.596	1,835.17	1,880.25	165.04	16.49	12,365.8
<b>2008</b>	0.565	1,187.25	2,993.07	650.77	18.71	15,900.7
<b>2009</b>	0.561	1,476.02	4,080.90	411	19.27	16,724.1
<b>2010</b>	0.54	4,489.90	4,489.90	594.22	19.5	17,270.7
<b>2011</b>	0.535	4,948.52	4,948.52	26.67	26.91	13,940.0
<b>2012</b>	0.554	5,757.42	5,757.42	281.37	26.27	17,127.9
<b>2013</b>	0.573	5,605.56	48,133.04	61.28	23	18,092.4
<b>2014</b>	0.592	5,515.12	1,896.53	91.59	24.03	21,678.2
<b>2015</b>	0.601	5,389.80	23,145.25	517.03	23.14	33,036.9
<b>2016</b>	0.72	5,655.15	5,019.30	534.46	31.74	39,044.8
<b>2017</b>	0.68	5,653.16	6,365.34	16.66	46.8	36,561.6
<b>2018</b>	0.537	5,544.58	1895.69	1.38	36.35	40,282.3
<b>2019</b>	0.578	5584.938	1777.231	17.95	40.94	40,241.13

**Source:** Computed from Appendix 1.

The study conceives Per capita income (PCI) as the ratio of gross domestic product (market value of goods and services) at a time in Nigeria to total population, Human

Development Index (HDI) as the Composite World Bank index of life expectancy, education, average income, standard of education, quality of health care, quality of good water supply etc., Poverty Index (PI) as a weighted index of standard of living in a county, longevity, knowledge, health standard and security adopted from the United Nation's index database. Personal Income Tax (PIT) as total revenues accruing from direct tax levied on the income of persons per year in Nigeria, measured in millions of Naira and taken as ratio of population, Company Income Tax (CIT) as the total periodic tax revenues on the profits of incorporated businesses in Nigeria, which includes the tax on the profits of non-resident companies carrying on business in Nigeria and is measured in millions of Naira and taken as ratio of population. Capital Gains Tax (CGT) as tax revenues realized on the sale of non-inventory assets over a year, which is measured in millions of Naira and taken as ratio of population, Customs and Excise Duties (CED) as the aggregated duties levied on imported goods into Nigeria (Customs), as well as those levied on goods manufactured within the country (Excise), which was measured in millions of Naira and taken as ratio of population, and Royalty Income (ROY) as the aggregated periodic royalties paid by registered mining firms to the government in Nigeria excluding oil and gas royalties as reported by the Department of Petroleum Resources (DPR) over the study period, which was similarly measured in millions of Naira and taken as ratio of population.

### Model Specifications

Following the works of Arowoshegbe, Emmanuel and Osasere (2017), Gummell and Morrissey (2005) as well as Van Heerden *et al.*, (2006) all of which employed poverty index as a proxy for economic development with valuable results, the model for this study is stated in its functional form in equation (i) below;

$$PI = f(PIT/P, CIT/P, CGT/P, CED/P, ROY/P). \quad (1)$$

Where; PI = Poverty index, P = Total population of Nigeria per year, PCI = Per capita income, PIT/P = Personal income tax per capita, CIT/P = Company income tax per capita, CGT/P = Capital gains tax per capita, CED/P = Custom and excise duty per capita, ROY/P = Royalties per capita. For estimation purposes, equations (1) is re-written as shown in equation (2) in order to accommodate the estimation parameters and the error term;

$$PI_t = \phi_0 + \phi_1 PIT/P_t + \phi_2 CIT/P_t + \phi_3 CGT/P_t + \phi_4 CED/P_t + \phi_5 ROY/P_t + \psi_t \quad (2)$$

### Where;

PI retains its previous notation;  $\phi_0$  is the constant for equation 2, while  $\phi_1$ -  $\phi_5$  are the respective coefficients for PIT/P, CIT/P, CGT/P, CED/P, and ROY/P for equation 2. Further  $\psi_t$  is the error (stochastic) term for the underlying estimated equation.

### Apriori Expectations:

A converse relationship is theoretically expected to prevail between poverty index and elements of non-oil revenues. This is principally because, increased government spending resulting from enhanced non-oil revenues is theoretically expected to improve societal wealth through multiplier effects of the invested proceeds/government spending. In effect, society poverty level is expected to be reduced. Consequently, the sensitivity of Nigeria's poverty index to improvements in non-oil revenues spending is expected to be negative (less than zero) for increases in all non-oil revenue elements. As such, we expect that;

$$\phi_1 < 0, \phi_2 < 0, \phi_3 < 0, \phi_4 < 0, \phi_5 < 0.$$

**Specification of Analytical Tools and Tests.**

The core objective of this study is to ascertain empirically, the influences of classified non-oil revenue elements on poverty index in Nigeria. For clarity, this sub-part is further detailed as follows;

**Stationarity Tests:**

The stationarity attributes of the time series data were verified by employment of unit root tests in order to determine the suitability or otherwise of their employment and avoid spurious estimates. In this exercise, according to Brooks (2009), the Augmented Dickey Fuller (ADF) test is relevant. The decision rule is to reject the implied null hypothesis if the ADF test statistic on absolute basis, is greater than all associated Mackinnon’s Critical Values at 1%, 5% and 10% levels respectively.

**Johansens’s Cointegration Test:**

Johansen’s Co-integration test aims at ascertaining the significance of any long run equilibrium relationship that prevails among the chosen set of study variables (Brooks, 2009). The decision rule implied is that the magnitude of the Max-Eigen or Trace statistics must be more than the associated critical value at 0.05 levels.

**Error Correction Estimates.**

Brooks (2009) showed that error correction estimates tend to assess the long term sensitivities of the explained variable to each of the independent variables. Further, it shows the speed at which the explained variable adjusts back to equilibrium following short run distortions in the explanatory variables.

**Granger Causality Test:**

In accordance with Brooks (2009), the Pairwise-Granger causality test attempts to evaluate the extent to which variations in a given set of explanatory variables tend to support or promote changes in the dependent variable. Further, it shows the extent to which addition of lagged values of the variables under study can improve the explanation and vice versa in accordance with equations (3) and (4) below;

$$Y_t = \beta_0 + \sum_{i=k}^n \beta_i Y_{t-i} + \sum_{i=k}^n \beta_{\mu} X_{t-i} + \mu_t \tag{3}$$

$$X_t = \alpha_0 + \sum_{i=k}^n \alpha_i Y_{t-i} + \sum_{i=k}^n \alpha_i X_{t-i} + V_t \tag{4}$$

**Presentation Of Results**

**Presentation of Stationary (Unit Root) Test Results:**

To verify the reliability of the time series variables collected, a stationary test was conducted, the results of which are presented in table 2 below:

**Table 2 Results of Unit Root Test (Augmented Dickey Fuller) at level**

Variable	ADF T-statistics	Mackinnon’s test critical values			Probability Level	Order of Integration	Decision
	At Level	@ 1%	@ 5%	@ 10%			
PI	-2.416214	-3.626784	-2.945842	2.611531	0.1445	0(0)	Not stationary



PITPC	-1.372329	-3.699871	-2.976263	-	0.6986	0(0)	Not stationary
CIT/PC	-1.530918	-3.699871	-2.976263	-	0.7392	0(0)	Not stationary
CGT/PC	-2.034835	-3.626784	-2.945842	-	0.1102	0(0)	Not stationary
CED/PC	-2.308877	-3.626784	-2.945842	-	0.2115	0(0)	Not stationary
ROY/PC	-0.146279	-3.752946	-2.998064	-	0.9327	0(0)	Not stationary

**Source:** Extracts from E-Views 10.0 output.

The results of the test for stationary of employed variables at levels shown in table 2 above indicate that none of the study variable is stationary at level, since all the ADF t-statistics are on absolute basis, lower than the corresponding Mackinnon's test critical values at 1%, 5% and 10%. Due to the non-stationary of the study variables at level, the study proceeded to evaluate the stationary of the employed variables at first difference. The results are presented below in table 3.

**Table 3: Results of Unit Root Test: (Augmented Dickey Fuller) at First Difference.**

Variable	ADF T-statistics	Mackinnon's test critical values @			Probability Level	Order of Integration	Decision
	1st difference	1%	5%	10%			
D(PI)	- 6.789215***	-3.769597	-3.004861	-	0.0000	I(1)	Stationary
D(PIT/PC)	- 5.737456***	-3.769597	-3.004861	-	0.0001	I(1)	Stationary
D(CIT/PC)	- 4.553106***	-3.699871	-2.976263	-	0.0000	I(1)	Stationary
D(CGT/PC)	- 8.767163***	-3.632900	-2.948404	-	0.0000	I(1)	Stationary
D(CED/PC)	- 8.802553***	-3.632900	-2.948404	-	0.0000	I(1)	Stationary
D(ROY/PC)	- 4.990043***	-4.571559	-3.690814	-	0.0046	I(1)	Stationary

\*\*\* sign at 10%, 5% and 1%, \*\* sign at 10% and 5%.

**Source:** Extracts from E-Views 10.0 output.

The stationary test results at first difference presented in table 3 above show that all the employed variables are significant at first difference. The results therefore confirm absence of any unit root in the time series. To that extent, all the employed variables are confirmed reliable for further estimations with minimal possibility of biases in long run estimations. They also, are deemed to satisfy conditions for employment in Johansen Co-integration analysis. In

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the light of the observed stationary, the study therefore proceeded to the Johansen's integration test.

**Presentation of Johansen's Co-integration Test Results:**

The results of Johansen's Cointegration test for the study variables are presented in table 4 below:

**Table 4: Results of Johansen's Unrestricted Cointegration Rank Test:**

Sample (adjusted): 1984 2019

Included observations: 36 after adjustments

Trend assumption: Linear deterministic trend

Series: D(PI) D(PIT/PC) D(CIT/PC) D(CGT/PC) D(CED/PC) D(ROY/PC)

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.889562	181.5518	95.75366	0.0000
At most 1 *	0.645650	106.6396	69.81889	0.0000
At most 2 *	0.516061	71.36554	47.85613	0.0001
At most 3 *	0.452416	46.68846	29.79707	0.0003
At most 4 *	0.393154	26.21231	15.49471	0.0009
At most 5	0.237741	9.229959	3.841466	0.0724

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.889562	74.91221	40.07757	0.0000
At most 1 *	0.645650	35.27402	33.87687	0.0239
At most 2 *	0.516061	24.67708	27.58434	0.0128
At most 3 *	0.452416	20.47615	21.13162	0.0215
At most 4 *	0.393154	16.98235	14.26460	0.0081
At most 5	0.237741	9.229959	3.841466	0.0724

Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Source: E-Views 10.0 output extract

The results of Johansen's Cointegration on employment of poverty index as dependent variable shown in table 4 above also indicates the presence of 5 significant co-integrating equations for both Trace and Maximum Eigen value criteria. It therefore shows material evidence of a valuable long run relationship between non-oil revenue elements in Nigeria and economic development measured by Poverty Index (PI).

#### **Determination of Lag Lengths Selection Criteria for Employment of Error Correction Model:**

Establishment of lag lengths is essential for error correction estimations, principally because of the fact that previous investments of non-oil revenue proceeds may begin to have effects on economic development in a later period. To ascertain the most suitable lag for the time series, the study proceeded to evaluate the optimal lag length selection criteria. Basically, suitable lag length determination enabled the study to determine the appropriate lag to infuse into the error correction model, the results of which are shown in table 5 below:

**Table 5: Results of Lag Length Selection**

VAR Lag Order Selection Criteria

Endogenous variables: D(PI) D(PIT/PC) D(CIT/PC) D(CGT/PC)

D(CED/PC) D(ROY/PC)

Exogenous variables: C

Date: 08/04/20 Time: 11:44

Sample: 1981 2019

Included observations: 36

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1498.172	NA	8.59e+29	85.95267	86.21930	86.04471
1	-1394.534	165.8209*	1.86e+28*	82.08764*	83.95405*	82.73192*
2	-1355.992	48.45194	1.95e+28	81.94242	85.40862	83.13895
3	-1263.835	84.25778	1.38e+27	78.73345	83.79944	80.48223

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

**Source:** E-Views 10.0 output extract

The results displayed in table 5 above show that a maximum lag of 1 was ideal for the estimated model. The various criteria values suggested that the first (1) lags of D(PI) D(PIT/PC) D(CIT/PC) D(CGT/PC), D(CED/PC) and D(ROY/PC) which represent the respective differenced values of poverty index, per capita personal income tax, per capita company income tax, per capita capital gains tax, per capita customs and excise duties and per capita royalties are ideal and appropriate. In the light of the results in table 5 above, the study thus proceeded to use the first lag (1) of all employed variables in the error correction estimations.

**Presentation of Error Correction Estimates:**

To examine and correct for estimation errors prevailing in the long and short run dynamics of the study, the error correction estimation was executed. The results are shown in table 6 below:

**Table 6: Results of Error Correction Model**

Dependent Variable: D(PI)

Method: Least Squares

Sample (adjusted): 1983 2019

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.009720	0.009143	1.063169	0.2968
D(PIT/PC)	-7.03E-06	1.88E-06	-3.738569	0.0008
D(PIT/PC-1)	0.457903	0.141903	3.226876	0.0033
D(CIT/PC)	-6.15E-07	7.39E-07	-0.833214	0.4118
D(CIT/PC-1)	1.82E-06	1.20E-06	1.513261	0.1418
D(CGT/PC)	-4.70E-05	3.52E-05	-1.335125	0.1926
D(CGT/PC-1)	8.00E-05	4.15E-05	1.924932	0.0648
D(CED/PC)	2.47E-06	8.24E-06	0.299899	0.7665
D(CED/PC-1)	2.10E-05	1.13E-05	1.862038	0.0735
D(ROY/PC)	-1.353469	0.203083	-6.664609	0.0001
D(ROY/PC-1)	1.08E-06	1.70E-06	0.633121	0.5320
ECM(-1)	-0.436118	0.132032	-3.303128	0.0026
R-squared	0.560858	Mean dependent var		0.005165
Adjusted R-squared	0.518958	S.D. dependent var		0.049965
S.E. of regression	0.050437	Akaike info criterion		-2.959346
Sum squared resid	0.071228	Schwarz criterion		-2.648276
Log likelihood	-58.78855	Hannan-Quinn criter.		-2.851964
F-statistic	8.945721	Durbin-Watson stat		2.023863
Prob(F-statistic)	0.019883			

**Source:** E-Views 10.0 output extract

The results of the error correction estimation presented in table 6 above show that this study's explanatory variables jointly explained 56.09% of Nigeria's Poverty Index (PI) in the long run. The ECM has the expected negative sign. The associated F-statistic value of 8.945721 has a probability of 0.019883 which is significant at a 5% level. It confirms a good line of fit. Further Durbin-Watson statistic of 2.023863 is within the acceptable range. The absolute value of the ECM is 0.436118. It implies that 43.612% of the disequilibrium in Nigeria's poverty index (PI) is

offset by short-run adjustments in the study's non-oil revenue elements yearly. The ECM value of 43.612% is also associated with a probability value of 0.0026, which is statistically significant at the 0.05 level. In the long run, the results show that personal income tax and royalties are statistically valuable in predicting poverty index as economic development indicator in Nigeria.

#### Pairwise Granger Causality Estimation:

To ascertain the extent to which the employed variables of this study support, promote and/or re-enforce themselves in the process of growth, this study executed the pair-wise Granger causality tests. The results are shown in table 7 below:

#### Presentation of Pairwise Granger Causality Results:

The results of Pair-wise Granger causality analysis are presented in table 7 below;

#### Table 7: Results for Pairwise Granger Causality Test Output:

Pairwise Granger Causality Tests

Date: 08/04/20 Time: 12:18

Sample: 1981 2019

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
D(PIT/PC) does not Granger Cause D(PI)	36	11.1483	0.0026
D(PI) does not Granger Cause D(PIT/PC)		9.08708	0.0005
D(CIT/PC) does not Granger Cause D(PI)	36	1.64496	0.2105
D(PI) does not Granger Cause D(CIT/PC)		0.14036	0.8696
D(CGT/PC) does not Granger Cause D(PI)	36	1.57076	0.2251
D(PI) does not Granger Cause D(CGT/PC)		0.00116	0.9988
D(CED/PC) does not Granger Cause D(PI)	36	1.69936	0.2005
D(PI) does not Granger Cause D(CED/PC)		0.23156	0.7947
D(ROY/PC) does not Granger Cause D(PI)	36	8.24047	0.0041
D(PI) does not Granger Cause D(ROY/PC)		6.16891	0.0249

**Source:** E-Views 10.0 output extract

The results of Pairwise Granger causality test for poverty index as a proxy for Nigeria's economic development shown in table 7 above confirms prevalence of two significant bi-directional causalities. They prevail between personal income tax and Nigeria's poverty index as well as between royalties and poverty index. These imply that growths in personal income tax and royalties respectively tend to support/promote growths in Nigeria's poverty index. These effects on poverty index by non-oil revenue elements could significantly be attributed to multiplier effects of increased government spending on public/socio-economic activities. These activities are funded from the non-oil related revenue sources with attendant reduction in poverty attributes within the nation.

**Discussions, Conclusions and Policy Recommendations.**

On a specific basis it can be seen that;

Personal income tax shows an inverse and significant influence on Poverty Index (PI) as well as significant bi-directional causality indicating that personal tax income proceeds significantly influence and promote poverty alleviation in Nigeria. These results point to the fact that State governments in Nigeria invest significant portion of their personal income tax proceeds in addressing improvements in education, health, and infrastructural development. This result could have resulted from the fact that poverty index substantially concentrates on significant societal deprivation in terms of the key elements that constitute basis for human development index (HDI)-education, health, standard of living etc.

Company income tax displayed a negative and insignificant influence on Poverty Index (PI). Although, the direction of the relationship is as expected theoretically, but the insignificant nature of the relationship is an issue of concern. The result could have emanated from the fact the Nigeria's federal government has statutory responsibility to collect company income tax. However, the key elements of poverty index which consist of deterioration in the elements of HDI especially at the grassroots level in Nigeria are largely the responsibilities of states and local governments. In this sense, some relatively lower proportions of federal revenues would be allocated for these poverty alleviation elements at the grassroots level in Nigeria. The results of causality analysis in table 7 equally demonstrate the disconnect between Nigeria's company income tax and poverty index as they operate independently. In this instance, they do not support or promote themselves in the growth process. These results agree with Adegbe and Fakile (2011) and are in conflict with the studies Ramot and Ichihashi (2012).

Capital gains tax demonstrates a negative and insignificant influence on Nigeria's poverty index as a development indicator. Although, the result is of the expected sign a priori, the Granger causality results equally show significant independence which also support the ECM results relatively. These results could however, be attributed to the fact that administration of capital gains tax is relatively more difficult in Nigeria as the proceeds accruing from it tend to be relatively less than other forms of non-oil revenues. Further, capital gains tax is statutorily, a federal government revenue entitlement. On the other hand, the elements of poverty index are expected to impact on the grassroots people, whose lives are more significantly affected by actions of local and state governments. These results support those of Okeke *et al.*, (2018) and contradict those of Harelimana (2018).

Customs and Excise Duties demonstrated positive and insignificant influence on Poverty Index (PI) as well as insignificant causality with same. It is even against expected negative relationship a priori. The reasons for inability of customs and excise revenues realised in Nigeria to influence poverty index as a development indicator might have emanated from the obvious leakages in customs revenue. These leakages have remained controversial in Nigeria for years. These results however, disagree with those of Ibanichuka *et al.*, (2016).

Royalty income shows a negative and significant influence on Poverty Index (PI). It demonstrates the effective influence of royalties in reducing the level of poverty in the economy. Further, bidirectional causal relationship was observed between both variables. It demonstrates that royalties promote poverty reduction as an economic development indicator in Nigeria. The results could be attributed to the fact that solid mineral extraction operations

are mostly based in rural enclaves where the grassroots are. In this sense, Nigeria's federal government being the statutory royalty beneficiary may at the same time, be spending a reasonable proportion of such royalties on affected grass root projects like education, health, infrastructure etc., These invariably, improve poverty alleviation efforts in those grass root environments. The results are also in agreement with those of O'Faircheallaigh (1988) and conflict with those of Viccaro *et al.*, (2015), Barreto *et al.*, (2011).

### Conclusion

From the results of this study, it can be ascertained that among the explanatory variables in this study, only personal income tax and royalties are valuable in predicting poverty index as an economic indicator in Nigeria.

### Recommendations

In accordance with the results of this study, the following recommendations are made;

- i) Personal tax revenue collections should be increased through proper linkage of Nigeria's taxable adults' vital information like national identity card, bank verification number and the individual potential payers bank accounts details to aid assessments and minimize
- ii) Tax evasion and avoidance.

Solid mineral extraction firms operating in Nigeria should jointly fund the provision of infrastructure like roads in the operating areas, as well as security. These will enhance contributions of royalties to Nigeria's economic development.

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#### APPENDIX

##### Appendix 1: Poverty Index (PI), Personal Income Tax (PIC), Company Income Tax (CIT), Capital Gains Tax (CGT), Custom and excise duties (CED), Royalties (ROY) in Nigeria, 1981 -2019:

Year	PI %	PIT N'M	CIT N'M	CGT N'M	CED N'M	ROY N'M
1981	0.405	1,997.30	403	4,787.16	2,325.80	4,427.2
1982	0.499	732.5	550	16,265.29	2,336.00	928.1
1983	0.493	710.1	561.5	27,743.43	1,984.10	60.5
1984	0.487	580.9	787.2	9,221.56	1,616.00	143.4
1985	0.481	938.9	1,004.30	20,699.69	2,183.50	1,501.1
1986	0.475	433.7	1,102.50	12,177.82	1,728.20	4,118.9
1987	0.469	407.6	1,235.20	43,655.96	3,540.80	606.1
1988	0.463	540.5	1,550.80	45,134.09	5,672.00	1,269.1
1989	0.457	938	1,914.30	46,612.22	5,815.50	1,922.3
1990	0.451	1,724.00	2,997.30	18,090.35	8,640.90	177.1
1991	0.445	3,040.40	3,827.90	49,568.49	11,456.90	2,016.8
1992	0.639	4,903.10	5,417.20	51,046.62	16,054.80	3,746.2
1993	0.633	5,626.50	9,554.10	52,524.75	15,486.40	896.5
1994	0.571	3,888.20	12,274.80	52,727.00	18,294.60	6,447.0
1995	0.581	20,436.40	21,878.30	40,130.00	37,364.00	3,726.8
1996	0.635	3,407.00	23,100.00	50,696.00	55,000.00	14,931.0
1997	0.631	8,340.00	27,800.00	34,829.00	63,000.00	25,845.1
1998	0.663	11,400.00	33,300.00	25,223.00	577,000.00	216,972.3
1999	0.686	20,100.00	46,200.00	12,608.00	87,900.00	248,475.5
2000	0.58	38,100.00	53,300.00	24,285.00	1,015.00	333,366.8
2001	0.563	44,400.00	69,400.00	39,441.00	1,706.00	409,708.4
2002	0.557	68,100.00	89,100.00	28,615.00	1,814.00	509,478.7
2003	0.535	54,200.00	114,800.00	23,306.00	1,955.00	590,778.9
2004	0.584	58,900.00	113,000.00	19,154.00	2,172.00	646,238.8
2005	0.547	212,100.00	140,300.00	90,152.00	2,328.00	774,395.4
2006	0.527	33,300.00	244,900.00	98,214.00	1,777.00	929,636.2
2007	0.596	268,700.00	275,300.00	24,164.00	2,414.00	1,810,563.8
2008	0.565	178,500.00	450,000.00	97,841.00	2,813.00	2,390,623.5
2009	0.561	227,900.00	630,100.00	63,460.00	2,975.00	2,582,238.0
2010	0.54	712,000.00	712,000.00	94,230.00	3,092.00	2,738,753.0

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**HOW FAR DO NON-OIL REVENUES PROMOTE ECONOMIC DEVELOPMENT IN NIGERIA.....**

<b>2011</b>	0.535	806,000.00	806,000.00	4,344.00	4,383.00	2,270,502.8
<b>2012</b>	0.554	963,200.00	963,200.00	47,073.00	4,394.20	2,865,449.1
<b>2013</b>	0.573	963,200.00	8,270,667.00	10,530.00	3,952.70	3,108,811.1
<b>2014</b>	0.592	973,200.00	334,662.00	16,162.00	4,239.60	3,825,340.6
<b>2015</b>	0.601	976,533.00	4,193,496.00	93,677.00	4,191.70	5,985,684.9
<b>2016</b>	0.72	1,051,800.00	933,537.00	99,403.40	5,903.00	7,261,929.2
<b>2017</b>	0.68	1,079,111.00	1,215,057.00	3,180.30	8,933.50	6,979,107.4
<b>2018</b>	0.537	1,086,042.80	371,317.00	270.70	7119.07	7,890,290.0
<b>2019</b>	0.578	1,122,369.20	357,158.70	3606.8	8227.60	8,087,001.25

**Source:** Central Bank of Nigeria Statistical Bulletin (2019), 2. Federal Inland Revenue Service Board (2019), 3. Knoemia.com (2019), World Bank (2019).