

## **Empirical Analysis of the Relationship between Tax Revenue Components and Economic Growth in Nigeria: 1980-2018**

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### **Abstract**

*The main objectives of the study was to examine the relationship between tax revenue components and economic growth in Nigeria from 1989-2018. The study was motivated by the increase global emphasis on enhancing tax revenues in relation to Gross Domestic Product (GDP) and diversifying the revenue sources of nation's economics. Data on GDP and tax revenue were extracted from Central Bank of Nigeria (CBN) statistical Bulletin and Annual Reports of Federal Inland Revenue Service (FIRS). Data were analysis using descriptive and inferential statistics involving Augmented-Dickey Fuller (ADA) stationary unit root test, Error Correction Mechanism (ECM), Granger Causality tests and correlational statistics. The discrepancies between the long-run and short-run impact of explanatory variables were adjusted using the ECM. The ECM co-efficient indicates a very slow adjustment rate between the short-run and long-run effects among the explanatory variables. The study found a positive and significant relationship between economic growth (GDP) and Personal Income Tax (PIT) (3.7045), Petroleum Profit Tax (PPT) (2.76295) and Company Income Tax (CIT) (3.64429), while Education Tax (EDT) (1.38507), Customs and Excise Duties (CED) (1.91470) were not statistically significant at 0.05 level of significance. The result of the Granger Causality Test shows that EDT, CIT, PIT, PIT PPT and VAT cause economic growth and that economic also causes EDT, CED and PPT. It was concluded that tax revenue components play vital role in economic growth in Nigeria and recommended that government policies on taxation issues should be handled with tact to encourage intervening activities to boost economic growth*

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**Keywords:** *Economic Growth, Tax Revenue Components, Government Policies and Diversifying Revenue Sources.*

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## 1.0 Introduction

The impact of taxation on economic growth and development has been hotly debated both in academic and socio-political circles. At one extreme are proponents of tax cuts who point to the effects that lower taxes have on incentives to work, to save and to invest, and argue that reducing tax rates boosts economic growth (Ergete and Dahlby, 2012). On the other extreme, are researchers who consider that a high level of taxation harms economic growth. As logical as this argument at all levels both for developed and developing economics.

Tax revenues are main revenue channels to government. Government use tax proceeds to discharge their functions such as the provision of public goods, maintenance of law and order, defense against internal and external aggression, regulation of trade and business to ensure social and economic maintenance, and also fiscal instrument geared towards stability of the economy. The taxes are levied on individuals, groups, corporate entities and other institutions changeable to tax, and play vital role in economic planning and development of nations.

Until the early 1990s, literature on economic growth focused on modeling the economy with a long-run equilibrium where output is exogenously determined by technological progress, assumed to be determined outside the system with the instruments of government policy having no permanent impact on the growth rate. As argues by Solow (1956), the underlying fact behind the reasoning is that the Neo-classical economist view assigns economic growth to increase in physical and human capital where the law of diminishing returns to scale is applied (Chiumia and Siwaka, 2012).

Romer (1986) and Lucas (1990) hold a divergent viewed, reflected in their endogenous growth theories. They argue that government policy, for example, level of taxation and tax composition can affect economic growth. This implies that direct government intervention may induce economic growth. However, taxation is a toll by government in designing various aspects of economic growth framework and policies. Tosun and Abizabeh (2005) states five possible mechanisms taxes as instrument of fiscal policy affects economic growth. First, taxes can inhibit investment rate through such taxes as corporate and personal income, capital gain taxes. Second, taxes can slow down growth in labour supply by distorting labour-leisure choice in favour of leisure. Third, tax policy can affect productivity growth through its discouraging effect on research and development expenditures. Fourth, in a Harbenger Framework, taxes can lean to a flow of resources to other sectors that may have lower productivity. Finally, high taxes on labour supply can distort the efficient use of human capital high tax burdens even though they have high social productivity.

Engen and Skinner (1996) argue that a number of recent theoretical studies have endogenous growth models to stimulate the effects of a fundamental tax reform on economic growth. Gale and Samwick (2014) examine impacts of taxes on the expansion of the supply side of the economy and of potential Gross Domestic Product (GDP). The expansion could be an increase in the annual growth rate, a one-time increase in the size of the economy that does not affect the future growth rate but puts the economy on a higher growth path, or both. They focus on the supply –side of the economy and the long run is in contrast to the short-term phenomenon, also called “economic growth”, by which a boost in aggregate demand, in a slack economy, can raise GDP and help align actual GDP with potential GDP.

Therefore, the dynamics of tax revenue – GDP relationships can either be analysed from the demand-side or supply-side or both of the economy giving the income tax’s central role in

revenue generation, its impact on the distribution of after-tax income, and its effects on a wide variety of economic activities.

## 1.2 Statement of the Problem

Several studies in the two to three decades have tried to analyze the impact of public expenditures on economic growth (such as Barro, 1997; Tanzi and Zee, 1997; Nubukpo, 2007; Nantob, 2014, etc) and arrive at the contradictory results making it difficult to establish with certainty the logic, nature and significance of the impact of public expenditures on economic growth of countries. The implication is that empirical investigations fail to provide a conclusion about the economic growth effect of taxation. The empirical evidence is mixed across economics, data and methodologies, with some finding a negative impact, while others find little or no significant growth effect of taxation. Also, the pattern of flow and the intervening relationship between taxation revenue and economic growth has remained an inconclusive discourse particularly for developing and emerging markets such as Nigeria, where most studies conducted make use of aggregated data of tax revenue or total government revenue as against disaggregated tax revenue components which this study seeks to examine.

## 1.3 Objective of the study

The main objective of this study is to investigate the relationship between tax revenue components and economic growth in Nigeria from 1980-2018. Specifically, we will examine the direction of causality between the variables of study.

## 1.4 Research Questions

The research questions raised are:

- i. What is the relationship between tax revenue components and economic growth in Nigeria?
- ii. What is the direction of causality between tax revenue components and economic growth in Nigeria.

## 1.5 Hypotheses of the study

The hypotheses are stated in null form as follows:

- H<sub>01</sub>:** Tax revenue components (PPT, CIT, PIT, VAT, EDT and CED) have no significant effect on economic growth in Nigeria.
- H<sub>02</sub>:** There is no specific direction of causality between tax revenue components and economic growth in Nigeria.

The significance of this study lies in the application of its outcomes to provide guidelines to policy makers in the area of fiscal policy framework as well as contributing to existing evidence on the literature for further research and knowledge enrichment to the general public.

The rest of the paper is structured into review of related literature, methodology of the study, result, and discussions and conclusion.

## 2.0 Review of related literature

This section is divided into conceptual issues, theoretical framework and empirical review.

### 2.1 Conceptual Issues

#### Taxations and Taxes

In a more generic sense, taxation is concerned with the administration of tax policy framework of a government with a view to generating revenues for the government. It involves the act of assessing, imposing and collecting the various taxes from individual, corporations and institutions chargeable to tax. The National Tax Policy (NTP) defines tax as “a financial

change or levy imposed upon an individual or legal entity by a state or a legal entity of the state, it is a pecuniary burden laid upon individuals or property to support government expenditure” (NTP, 2010). It goes on to the state that tax is not a voluntary payment or donation, but an enforced/compulsory contribution, exerted pursuant to legislation authority and is any contribution imposed by the government, whether under the name of duty, custom, excise, levy or other name”.

Taxes may be imposed for several reasons, these include: (i) to generate revenue (most important) to finance government activities (ii) to control or regulate the economy, as economic stabilizer (iii) to redistribution income (iv) to discourage the consumption of certain goods and perfect domestic industries (v) to stimulate domestic production, creating employment for the teeming populace, (vi) to correct balance of payment deficits (Aguolu, 2010; Addegbie and Fakile, 2011; Okafor, 2012; Etim and Nweze, 2015).

Taxes may be direct or indirect depending on who bears the final burden of the payment. When the incidence and burden is borne by the tax payer, such a tax is described as direct tax. The examples in the case of Nigeria include Personal Income Tax (PIT) Company Income Tax (CIT), Petroleum Profit Tax (PPT) Capital Gains Tax (CGT). On the other hand, when the incidence and burden of the tax can be shifted from to initial payer to the final consumer, such is refers to as indirect taxes. Examples of indirect taxes in Nigeria include: excise duties, custom duties, Value Added Tax (VAT) stamp duties, casino tax, among others.

The classical economists, mercantilists and physicians articulated the canons or basic principles of taxation lead by Adam Smith, J. S. Mill, J. B. Say and A. C. Pigou. These canons in passive include equality, certainty, convenience, economy, simplicity, flexibility and diversity. The canons constitute the barometer for assessing a good tax system and policy. The canons are supposed to form the basis of designing an appropriate tax structure that encourages compliance and enhance tax revenue yield at optimal levels thereby strengthening the fiscal framework of governments.

### **Structure of the Nigerian Tax System**

The structure of the Nigerian Tax System has undergone several changes over the last two decades. However, the tax structure is systematically structured in such a way as to contribute to economic growth through revenue generation. The tax system companies both direct and indirect taxes. The different components of direct components of direct taxation include as noted earlier Personal Income Tax (PIT) regulated under Personal Income Tax Act as amended 2011, Petroleum Profit Tax (PPT) regulated by the Petroleum Profit Tax Act (PPTA) of 1990 as amended in 2009, and charged on the profits of petroleum companies engaged in the upstream sector of the Nigerian Oil and gas industry; Companies Income Tax (CIT) regulated by the companies Income Tax Act as amended 2007 for companies operating in Nigeria. The administration of CIT is vested (ET) regulated under the Education Tax Act No.7 of 1993 as amended to date. Education tax is payable by all companies at the rate of 2 percent of the assessable profit as defined in the company income tax act; and is assessed concurrently with the company income tax. The various prominent components of indirect taxes in Nigeria are: Value Added Tax (VAT), regulated by the Value Added Tax Act (VAT) amended in 2007. It is levied on VaTable goods and services and chargeable at 5 percent until early 2020 when the rate was increases by 2.5% to peg it at 7.5 percent; Custom and Excise Duty (CED) regulated to date. The duty is chargeable on all goods imported and exported into and out of Nigeria. The tax is administered by the Nigerian Custom Services and currently charged at a rate ranging between 2.5% to 100% depending on the nature of the product or goods being imported or exported.

From the review of the Nigerian tax structure, we have six classes of taxes as follows: PIT, PPT, CIT, ED, VAT and CED identified and used in this study to examine the relationship and effects on economic growth in Nigeria over the period of the study.

Economic growth has long been seen as an important goal of economic policy and reforms programme with a substantial body of research dedicated to examining how the goal can be achieved (Fadare, 2010; Etim and Nweze, 2015), hence, has received much attention among economic and social scholars. Economic growth represents the expansion of a country's potential GDP or output.

Conceptually, therefore, economic is the steady process of increasing the National Income through governments' conscious effort of influencing economic variables through fiscal policy or monetary policy measures. According to Divivedi (2004), economic growth is a sustained increase in per capita national output or net national product over a long period. It implies that the rate of increase in that output must be greater than the rate of population growth. Another qualification economic growth is that national output should be composed of such goods and services which satisfy the maximum want of the maximum number of people. World Bank (2011) stated that:

“GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes minus any subsidies not included in the value of the product. It is related without making deductions for capital consumption of fabricated assets or for depletion and degradation of national resources”. P.70

The Inland Bank Development Report (2010) reveals that Nigeria's per capita income stood at US\$2,748. This amount falls behind those of Ghana and Cameroun with US\$ 10,748 and US\$10,758 respectively. There is therefore the need to study the relationship between tax revenues and economic growth in the country with a view to recommending policy measure to improve the growth rate.

## 2.2 Theoretical Issues

The applicable theories this study anchor on are the socio-political theory of taxation arguing that social and political objectives should be the deciding ingredients in selecting appropriate taxes. Wagner did not believe in individualist approach to a problem and noted that each economic problem should be examined from its social and political context and an appropriate solution developed there from. The society is made up of individuals, but was more than the sum total of its individual members. It had an existence and entity of its own which needed preservation and taking care of. Accordingly, a tax system should not be designed to serve individuals in the society, but should be used to cure the ills of society as a whole (Chigbu, Akujuobi and Appah, 2012). Wagner, in other words, was advocating a modern welfare approach in evolving and adopting a tax policy aimed at reducing income inequalities.

Economic growth models can be traced back to classical economists following Adams Smith wealth of nations. Leading is the Harrod and Domar theory of growth. The models are based on economic growth on the experiences of developed economies. They are primarily addressed to an advanced capitalist economy and attempt to analyse the requirements of steady growth in such an economy. Harrod-Domar assigns a key role to investment in process of economic growth, laying much emphasis on the dual effect of investment. Firstly, it creates



income and second, it augments the productive capacity of the economy by increasing its capital stock. The former is assessed from the demand effect while the later supply effect of investment. The implication being that as long as net investment is taking place, real income and output will continue to expand or increase. However, as explained by Chigbu et-al (2012), maintaining full employment equilibrium, level of income and output should expand at the same rate at which productive capacity of the capital stock is expanding. Ultimately, the growth pattern between the income and output variables can be from both demand-sides to supply-side and vice versa depending on the government fiscal policy framework and the objective being pursued at any point in time, implying both short and long-runs relationship and effect between taxation and economic growth.

### 2.3 Empirical Studies

Several empirical studies have been conducted on the impact of taxes on economic growth. Engen and Skinner (1996) in their study of taxation and economic growth using the United States of America (USA) economy, large sample of countries and the use of evidence from micro level studies of labour supply, investment demand and productivity growth find modest effects among variables of study in the order of 0.2 to 0.3% points difference in growth rates in response to a major tax reform. They concluded that such small effects may have a large cumulative impact on living standards.

Anyanwu (1997) conducted a study on the effects of taxes on Nigeria's GDP/Economic Growth from 1981 to 1996 and found that company's income tax positively and significantly affects GDP just as customs and excise duties. However, petroleum profit tax is positively and insignificantly affects Nigeria's GDP. The other direct taxes- capital gains and stamp duties also had the same signs as the petroleum profit tax, however, in his study, all direct taxes positively and significantly affect Nigeria's GDP.

Tosun and Abizadeh, (2005) in their study of effects of tax changes on economic growth in OECD countries, from 1980 to 1999. Results reveal that economic growth measured by GDP per capita was significantly impacted by the tax mix of the OECD countries. The analysis reveals that growth in the GDP per capita respond to taxes changes. They reported that the share of personal income tax responded positively to economic growth which was somewhat at variance with existing empirics on personal income tax and economic growth nexus.

Arnold, *et-al* (2011) conducted a study titled "Tax policy for Economic Recovery and Growth" and found that short term recovery requires increase in demand while long term growth requires increase in supply. As short term tax concessions can be hard to reverse, this implies that policies to alleviate the crisis compromise long run growth.

Ogbonna and Appah (2012) investigating the impact of tax reform and economic growth of Nigeria using time series data from 1994 to 2009, utilizing petroleum profit tax, company income tax, value added tax, education tax, personal income tax and customs and excise duties as proxy for tax reforms and Gross Domestic Product (GDP) as proxy for economic growth explained that there exist a positive relationship between tax revenue and economic growth. They explained that 54% variation in economic growth (GDP) was attributed to change in tax revenue and that there exists long-run equilibrium relationship between the variables of study.

In a study by Okafor (2012) on tax revenue generation and economic development of Nigeria from 1981 to 2007 using multiple regression and correlation analysis, it was found that there exists significant relationship between gross domestic product, the proxy for economic development and the dependent variable and the various tax components selected for the studies as independent variables. The results reveal that 99 percent of changes in the total GDP was influenced by changes in the independent variables of PPT, CIT, Customs and excise duties and VAT.

Also, Success, Success and Ifurueze (2012) studied the impact of petroleum profits tax on economic of Nigeria from 2000 to 2010 employing the ordinary least squares (OLS) method of analysis and posited that petroleum profits tax has significant and positive impact on the country's GDP. Their results shows coefficient of determination ( $r^2$ ) of 0.72 (72%) of variation in GDP is attributed to oil revenue and PPT as regressors. They concluded that PPT and oil revenue are determinants of growth in GDP which will subsequently lead to economic development via the multiplier effect. They showed no evidence of unit root test conducted for the time series data collected to determine the stationarity effect.

The study by Worlu and Nkoro (2012) on tax revenue and economic development in Nigeria applying least squares regression analysis found that tax revenue stimulates economic growth through infrastructural development but that tax revenue has no independent effect on growth through infrastructural development and foreign direct investments.

Another study by Ogbonna and Appah (2012a) on the causal link between petroleum income and Nigerian economic growth using time series data from the year 2000 to 2009 involving simple regression model to analyse the data found significant positive relationship between the variables studied at 0.05 level of significance. They suggested that an increase in petroleum income in the form of increasing petroleum profits tax and oil royalties would result in an increase in the value of goods and services produced in the economy improves economic growth. The study does not indicate a unit root test on the time series data which span a period of 10years. Therefore, the discrepancies associated with time series data may not be adjusted for in the empirical analyses conducted.

In a similar study, Abdul-Rahamoh, Taiwo and Adejare (2013) examined the effect of petroleum profits tax on Nigeria economy for the period 1970 to 2010 and concluded that petroleum profits tax has a significant effect on the economic growth of Nigeria within the study period with adjusted  $R^2$  value of 86.3%. They employed multiple regression and correlation analyses in the study using time series data collected. Their variables of study were Gross Domestic Profit (GDP), Petroleum Profits Tax (PPT), inflation and exchange rate. As was applicable to the study of success et-al (2012), they do not show evidence of unit root test.

Ihendingidu, Jones and Ibanichuka (2014) applying Autoregressive Distributed Log (ARDL)/Bound Test General-to-Specific Approach to Co-Integration to assess the long-run equilibrium relationship between tax revenue and economic growth in Nigeria (1986-2012) found that total tax has significant effect on economic growth with about 73.4% of the total variations in the Real Gross Domestic Product (RGDP) explained by aggregate changes in all the tax revenue components in the model. The study, however, identified no significant causal link between Petroleum Profit Tax (PPT) and economic growth in Nigeria both on the short and long runs equilibrium position. Their study collaborated the Central Bank of Nigeria (CBN) report that the industrial output fell by 2.2 percent due mainly to the poor performance of the oil sector. Also, they posited that the mean value of the percentage point growth of PPT was -9.36% during the period of their study and that the bane of the poor performance could be attributable to the unstable growth rate in the oil and gas sector, allusion of fiscal indiscipline, corruption and financial mismanagement in the oil sector of the Nigeria economy. This current study improves upon the earlier studies on the fact that the reliability of the results will be determined using three criteria: (i) economics apriori criteria (ii) statistical criteria (1<sup>st</sup> order test) and (iii) Econometric criteria (2<sup>nd</sup> order test). Thus, pre-estimation test, estimation test and post-estimation test would be carried out on the data for the study.

### **3.0 Methodology**

This section describes the research methods adopted for the study using data obtained from the Central Bank of Nigeria (CBN) and the Federal Inland Revenue Services (FIRS).

### 3.1 Research Design

The study was based on descriptive research method as well as application of inferential statistics. The descriptive statistics used are tables, percentages and annual growth rates trends of the variables. Inferential statistics uses patterns in sample data to draw inference on the population presented (Creswell, 2002). It was adopted in order to arrive at valid answers to the research questions. The inferential statistics used are correlation and regression. To ensure the regressions are not spurious, staturiarity test involving Augmented Dickey-Fuller (ADF) unit root test was applied on the time series data. To identify the presence of long-run relationships, among variables, Johanson Co-Integration test was adopted. In order to correct the short-run disequilibrium among variables, their short-run behaviour was tied to their long-run values using the Error Correction Mechanism (ECM) (Gujarati and Sangeetha, 2007). Finally, Granger casualty test was used to determine the direction of casualty between tax revenue components and economic growth.

### 3.2 Model Specification and Description of Variables

The general econometric form of the study model is stated as:

$$GDP = f(PPT, CIT, VAT, EDT, PIT, CED) \dots \dots \text{model 3.1}$$

Where;

GDP = Gross Domestic Product, proxy for economic growth

F = functional notation.

PPT = Petroleum Profit Tax; denoting taxes charged on companies engaged on petroleum activities downstream.

CIT = Company Income Tax; taxes charged on companies from their annual profits.

VAT = Value Added Tax; charged net of input and output on value added on the production of goods and services.

EDT = Education Tax; charged on companies assessable profits before allowance for other taxable items.

PIT = Personal Income Tax; charged on residents of Federal Capital Territory (FCT) Armed Forces Personnel, Police Personnel and staff of Foreign Affairs Ministry as well as non-resident individuals.

CED = Customs and Excise Duties; Taxes change on imports and exports into and out of the country.

To transform the general model to an estimation form, we converted the model into a logarithm functions to include the stochastic error term as follows:

Log = Logarithm of variables

$a_0$  = Intercept Parammeter (Constant)

$a_1 - a_2$  = The various parameters to be estimated (coefficient of the independent variables).

$U_0$  = Stochastic error term or unexplained variables.

The aprior expectation is that the model parameter is expected to be positively signed (that is  $a_0 > 0$ ).

All data are expressed in logarithms term in order to reduce Hetroasca-dasticity and non-stationary effect of time series variables.

Models 3.3 and 3.4 which follows are used to confirm the direction of causality between the dependent and independent variables using Granger-Causality tests. It is bivanate causality.

$$Y_t = \delta_0 + \sum_{i=1}^3 Y_{t-i} + \sum_{j=1}^2 \delta_j X_{t-1} + U_t \dots \dots \dots \text{model 3.3}$$

$$X_t = \delta_0 + \sum_{i=1}^2 \beta_i X_{t-1} + \sum_{j=1}^3 w_j Y_{t-1} + U_t \dots \dots \dots \text{model 3.4}$$

Where;

$Y_t$  and  $X_t$  are the variables investigated for Granger Causality.



If any  $\delta_j = 0$ , then  $X_t$  Granger Cause  $Y_t$

Similarly, if any  $W_t = 0$ , then  $Y_t$  granger cause  $X_t$ . Thus, there is a bidirectional causality.

But if, any  $\delta_j = 0$  and  $W_j = 0$ , then  $Y_t$  granger cause  $X_t$ , thus there is a unidirectional causality running fro,  $Y_t$  to  $X_t$  and vice versa.

The basis for rejection or acceptance of the null hypothesis depends on;

- i. Unidirectional causality from the tax component to GDP: is indirected if the estimated coefficients on the lagged tax component are statistically different from zero as a group and he set of estimated coefficient on the lagged GDP is not statistically different; accept  $H_0$ .
- ii. Conversely, unidirectional causality from GDP to Tax components exists if the set of lagged tax component coefficients is not statistically different from zero and the set of lagged GDP coefficients is statistically different from zero; accept  $H_0$ .
- iii. Bilateral causality, is suggested when the sets of tax revenue components and GDP coefficients are statistically and significantly different from zero in either of the regressors (Gujareti and Sangeetha, 2007).

#### 4.0 Result and Discussions

The descriptive and inferential results of the data analysis are presented in this section followed by discussions.

##### 4.1 Descriptive Analysis of the Variables

The descriptive analysis of the variables covers the growth rate of key variables involving the use of mean, median, maximum, minimum, standard deviation, skewness, kurtosis, Jarque-Bera and probability values and the correlation matrix for the variables.

**Table 4.1: Descriptive Statistics for the Log Variables**

	GDP	PPT	CIT	VAT	EDT	PIT	CED
Mean	8.0998	60.5070	17.1912	14.9935	21.5588	8.0126	76.9139
Median	27.0558	67.6300	30.5500	33.9000	3.0500	0.4000	33.2900
Maximum	47.1897	32.0130	99.8400	80.2700	27.9400	51.6000	28.4162
Minimum	30.3547	10.6000	3.0000	1.0000	1.0000	1.0000	16.1600
St. Dev.	10.8170	92.0261	27.3545	23.3292	63.5924	15.2974	92.2232
Skewness	1.1061	1.6792	1.7614	1.5900	2.5021	1.8857	1.0284
Kurtosis	2.6245	4.7080	4.8596	42.4364	8.8619	5.0678	2.5631
Jarque-B	7.1327	20.1109	22.4780	16.5173	84.1568	26.2080	6.2978
Probability	0.0283	0.0000	0.0000	0.0003	0.0000	0.0000	0.0429
Observations	39	39	39	39	39	39	39

**Source:** Authors Computation, using Eviews 4.0 software.

Table 4.1 shows some basic descriptive statistics of the variables used in this study. It indicate that the average GDP was 8.0998%, PPT (60.51%), CIT (17.19%), VAT (14.99%), EDT (31.56%), PIT (8.01%) and CED (76.91%). The maximum and minimum values were GDP (47.62% and 30.35%), PPT (32.01%and 10.60%), CIT (99.84% and 3.00%), VAT (80.27% and 1%) EDT (27.94% 1%), PIT (51.60% and 1%), and CED (28.42% and 16.16%). The standard deviations are GDP (10.82) PPT (92.02), CIT (21.35), VAT (23.33), EDT (63.59), PIT (15.29) and CED (92.22), indicating that the period experienced wide fluctuations in all the variables studied. The fluctuation in the variables under the study were also confirmed by the positive skewness for all variables of: GDP (1.10), PPT (1.68), CIT (1.76), VAT (1.59), EDT (2.50), PIT (1.89) and median in the set of data studied all have different variables. Also,

the kurtosis value indicates a high peak (Leptokurtic) value for VAT (42.43), while other variables show neither very peak nor very flat topped (Mesokurtic) values, indicating normality of the distribution of variables over the period studied. The Jarque-B value, which is also a test of normally distributed. The probability values were all statistically significant.

**Table 4.2: Correlation Matrix for the Log Variables**

	<b>GDP</b>	<b>PPT</b>	<b>CIT</b>	<b>VAT</b>	<b>EDT</b>	<b>PIT</b>	<b>CED</b>
<b>GDP</b>	1.0000	0.9344	0.9461	0.9710	0.8560	0.9189	0.4823
<b>PPT</b>	0.9344	1.0000	0.9207	0.9447	0.8559	0.9305	0.3159
<b>CIT</b>	0.9461	0.9207	1.0000	0.9918	0.9626	0.9822	0.2532
<b>VAT</b>	0.9710	0.9447	0.9918	1.0000	0.9439	0.4743	0.3216
<b>EDT</b>	0.8560	0.8559	0.9626	0.9439	1.0000	0.9446	0.1839
<b>PIT</b>	0.9189	0.9305	0.9822	0.4743	0.9446	1.0000	0.1889
<b>CED</b>	0.4823	0.3159	0.2532	0.3216	0.1839	0.1889	1.0000

**Source:** Authors computation, using Eviews 4.0 software.

Table 4.2 depicts the relationships among the variables used in the study. Generally the correlation matrix has many important attributes, some of which are either rectangular or triangular and have 1.0000 along the main diagonal. Specifically, the relationship among some of the key variables are further highlighted. The correlation coefficient of GDP is PPT (0.9344), CIT (0.9491), VAT (0.9710), EDT (0.8560), PIT (0.9189) and CED (0.4823), showing pair-wise correlations that are quite high with all strong perfect positive relationship except for CED (48%). PPT to CIT (0.92), VAT (0.95), EDT (0.86), PIT (0.93) and CED (0.32). the strong perfect positive relationship may have been attributed to the fact most of the different tax revenue components are derived from oil and gas activities such EDT of 2%, CIT of 30% on companies engaged in marketing and distributing and distribution services as well as VAT charged at 5% on the different between input of value added in the production process. On the other hand, weak but positive relationships are recorded for CED to GDP (0.48). The implication is that the nation has a weak industrial and productive base with restrictive export and import activities.

Although the dependent and independent variables have a positive correlation this is in contrast with the apriori negative sign shown by most other studies and to our a priori expectations. Since there may exist severe collinearity, further analysis involving regressions to establish the cause-effect relationship.

#### **4.2 Analysis of Integration Properties**

The first step involved in the estimation of a linear relationship is the time series variables. The pre-testing procedure and the regression results will now be presented and analyzed.

**Tables 4.3 Augmented Dickey Fuller – Unit Root Test.**

Variables	ADF Statistics Computed		50% Critical Value		Remarks
	Level	1 <sup>st</sup> Difference	Level	1 <sup>st</sup> Difference	
Log (CED)	-1.624562	-	-2.9558	-2.9591	1 (0)
Log (CIT)	1.026320	-4.226309	-2.9558	-2.9591	1 (1)
Log (EDT)	-0.312123	-5.651240	-2.9558	-2.9591	1 (1)
Log (GDP)	0.979297	-3.371442	-2.9558	-2.9591	1 (1)
Log (PIT)	0.870419	-3.192205	-2.9558	-2.9591	1 (1)
Log (PPT)	0.074219	-6.23447	-2.9558	-2.9591	1 (1)
Log (VAT)	2.227924	-3.024704	-2.9558	-2.9591	1 (1)

**Source:** Authors computation, using Eviews 4.0 software.

The results of the integration tests conducted on all the variables are presented on Table 4.3. Augmented Dickey Fuller (ADF) unit root test was applied in all the variables. The result of the unit root test indicates that one out of the variables was stationary at level. That is, it was integrated in the first order or 1(0) stationary. The variable that is stationary is CED. Implying that the variable is integrated of order zero, while other variables CIT, EDT, PIT, PPT, VAT and GDP are integrated of order one-1(1). Therefore, a co-integration test was carried out to confirm and determine the existence of a long-run relationship among the variables in each equation. The Johansen Co Integration Test procedure was adopted. Both Trace Test Statistics and Maximum Eigen Value criteria were used to draw the conclusion on the rank of cointegration relationships. The decision criterion is that when the Trace Statistics is greater than the 5% critical value, we reject the hypothesis of no cointegrating relationship among the variables and conclusion that there is cointegrating relationship among them.

The cointegration test result presented on Table 4.3 are carried out in a systematic manner, test are run for variable constituting the regression equation before the equation is estimated.

**Table 4.4: Unrestricted Co-integration Rank Test (Trace and Eigen) on GDP, EDT, CIT, CED, PIT, VAT.**

EIGEN VALUE	Likelihood Ratio	5 Percent	1 Percent	
Hypothesis (Trace Statistic)	5 Percent Critical Value	1Percent Value	Critical Value	No. of (ECS)
Hypothesized				
0.999431	572.2495	146.75	158.49	None**
0.979049	333.1496	114.90	124.75	At most 1**
0.957725	209.4507	87.31	96.58	At most 2**
0.816439	108.2165	62.99	70.05	At most 3**
0.611168	53.96984	42.44	48.45	At most 4**
0.319582	23.74242	25.32	30.45	At most 5**
0.300160	11.42090	12.25	16.26	At most 6**

\*(\*\*) Denote rejection of hypothesis at 5% (1%) significant level L.R. test indicates 5 cointegrating equation at 5% significant level.

**Source:** Authors computation, using Eviews 4.0 software.

The likelihood ratio (trace statistic) indicates that at 5% level of significance, there are 5 cointegrating variables. From this, the conclusion can be drawn that a long-run relationship exists between these variables. The conclusion is robust, because the unrestricted cointegration test using the maximum Eigen value confirmed the existence of five cointegrating equations. Since the existence of one cointegrating equation is enough to confirm a long-run relationship, the presence of five in this case establishes this. The identified cointegrating equation can then be used as an Error Correction Term (ECM) in the error correction model. This series will form the error correction variable, similar to the residuals generated when using the Engle Granger two-stage method.

Having established the extent and form of co-integrating relationship between the variables of the model, an over-parameterized error correction model as shown on Table 4.5 was estimated. At this level, the over-parameterized model is difficult to interpret in any meaningful way. Its main function is to allow us identify the main dynamic patterns in the model.

**Table 4.5 Result of the Over-parameterized model for Gross Domestic Product(GDP).  
Dependent Variable: Log (GDP).**

Variables	Coefficient	Std. Error	t-statistic	Prob.
D (LOG(GDP(-1)))	1.009462	1.0813419	0.556938	0.6765
D (LOG(PIT))	6.239941	1.526229	4.088471	0.0007
D (LOG(PIT(-1)))	0.363656	0.783474	2.464159	0.0003
D (LOG(PPT))	0.067763	0.239151	2.283850	0.0002
D (LOG(PPT(-1)))	0.152639	0.410863	-0.371507	0.7736
D (LOG(VAT))	20.69725	3.715153	5.571036	0.0001
D (LOG(VAT(-1)))	30.35608	6.217127	4.963077	0.0006
D (LOG(EDT))	5.363191	0.865594	6.195966	0.0019
D (LOG(EDT(-1)))	3.670195	0.711354	5.159450	0.0019
D (LOG(CIT))	8.192647	3.932727	2.083197	0.0049
D (LOG(CIT(-1)))	7.979482	2.076267	-3.843036	0.0021
D (LOG(CED))	1.937879	0.430666	-4.499724	0.0092
D (LOG(CED(-1)))	1.304437	0.407816	-3.298590	0.0029
ECM (-1)	-0.15047	0.032222	-3.570408	0.0001
C	10.17107	1.832162	5.551402	0.0005
Adjusted R-square	0.821812			
R-square	0.988121			
Prob. (F. Statistic)	0.0001			
Durbin-Watson Sta.	2.272150			
F-statistic	5.941490			

**Source:** Authors computation, using Eview 4.2 software

### 4.3 Estimation of Regression Equation and Hypothesis Testing

In the previous section, the existence of long-run relationship among variables in the specified model was confirmed. This implies that regression can be run with the variables at level without the fear of obtaining spurious results. The logarithm form of the model used for the study is as stated here:

$$\text{LogGDP} = \text{log}a_0 + a_1\text{logPPT} + a_2\text{logCIT} + a_3\text{logVAT} + a_4\text{logEDT} + a_5\text{logPIT} + a_6\text{logCED} + U_1$$

The model was further broken down into six linear sub-models for each tax revenue component to determine the individual effects of the explanatory variables on the dependent variables as follows:

$$\begin{aligned} \text{Log GDP} &= \text{loga}_0 + \text{loga}_1 \text{PPT} + U \dots\dots\dots 2a \\ \text{Log GDP} &= \text{loga}_0 + \text{loga}_2 \text{CIT} + U \dots\dots\dots 2b \\ \text{Log GDP} &= \text{loga}_0 + \text{loga}_3 \text{VAT} + U \dots\dots\dots 2c \\ \text{Log GDP} &= \text{loga}_0 + \text{loga}_4 \text{EDT} + U \dots\dots\dots 2d \\ \text{Log GDP} &= \text{loga}_0 + \text{loga}_5 \text{PIT} + U \dots\dots\dots 2e \\ \text{Log GDP} &= \text{loga}_0 + \text{loga}_6 \text{CED} + U \dots\dots\dots 2f \end{aligned}$$

The study is concerned with the parsimonious model that is more interpretable as shown on Table 4.6, as against the result on Table 4.5 of the Over-parameterized error correction model which has less meaningful application.

**Table 4.6: Parsimonious Model for Gross Domestic Product (GDP).**

Variables	Coefficient	Std. Error	t-statistic	Prob.
D(LOG(PIT))	0.683842	0.970672	3.704504**	0.0015
D(LOG(PIT(-1)))	1.827925	1.459066	1.252805*	0.2569
D(LOG(PPT))	0.360590	0.472622	2.762956**	0.0004
D(LOG(VAT))	2.845995	4.045041	4.703576**	0.0001
D(LOG(EDT))	-1.550418	1.119379	1.385070*	0.2153
D(LOG(CIT))	2.940964	4.6350609	3.634429**	0.0042
D(LOG(CIT(-1)))	2.286043	3.554049	0.643222*	0.3209
D(LOG(CED))	0.511542	0.627890	1.914700*	0.0064
D(LOG(CED(-1)))	-0.236908	0.573915	-0.412793*	0.6941
ECM (-1)	-0.033045	0.022750	-2.452452*	0.0066
C	17.38039	1.421629	12.22569	0.0000
R-square	0.732006			
Adjusted R <sup>2</sup>	0.727985			
F-statistic	42.82064			
Durbin-Watson Stat.	1.947024			
Prob. (F. statistic)	0.00003			
* not significant at 5 percent level.				
** Significant at 5 percent level.				
Dependent variable: Log (GDP)				

**Source:** Authors computation, using Eview 4.0 software.

From Table 4.6, the lagged value of PIT is positive for both the current and previous years and conforms to economic theoretical value. This implies that a one percent increase in economic growth brought about by 0.683842 percent increase in PIT, ceteris paribus. Also, the coefficient of the lagged PIT is statistically significant at 5% level for the current year, as against the previous year's figure. We, therefore, reject the null hypothesis and accept the alternative which is that PIT has a significant effect on economic growth in the period under study. This is premised on the overall F-statistic of 42.82 and the possibility of 0.0015, which indicates that this conclusion is robust and the result significant. This is in contrast to the findings of Klemm and Parys (2009), which recorded the negative effect for the Caribbean and OECD countries.

Also, the lagged value of PPT has a positive sign that is in line with economic theoretical expectation. The coefficient is statistically significant at five percent level. The implication of this result is that a one percent rise in economic growth rate is accounted for by a 0.360590 percent rise in the PPT, all things being equal. We, therefore, reject the null hypothesis and accept the alternative which is that the Petroleum Profit Tax influences economic growth in Nigeria. This result is further collaborated by Ilaboya and Mgbame (2012); Worlu and Nkoro (2012); and Ifurueze and Ekezie (2014) who investigated tax revenue and



economic development in Nigeria and concluded that growth in GDP is enhanced by the taxes generated from petroleum profit.

The coefficient of the Value Added Tax (VAT) is correctly signed and significant at five percent level. This means that an increase in economic growth is accounted for by 2.845998 percent changes in VAT, *ceteris paribus*. The coefficient is significant at five percent level, hence the null hypothesis is rejected and the alternative accepted that the Value Added Tax affects economic growth in Nigeria. The result is further corroborated by the findings of Adereti, Sanni and Adesina (2011) who studied the Value Added Tax and Economic Growth in Nigeria and found that VAT revenue and GDP in Nigeria are positively and significantly correlated.

The lagged value for the Education Tax (EDT) is not correctly signed and is not also statistically significant at five percent level. This means that an inverse relationship exists between the dependent and independent variable, Economic Growth and Education Tax lagged as indicated by negative coefficient. We, therefore, uphold the null hypothesis that the Education Tax does not impact significantly on economic growth in Nigeria. This may be attributed to the fact that it takes longer time and the indirect effect educational training takes to translate to growth in terms of employees' productivity. It may also mean that the tax proceeds from this tax source are not properly channeled to development of educational infrastructure and activities.

The value for CIT and its one-year lagged value are statistically significant at five percent level for the current year, but statistically insignificant at one percent for the previous one year. The positive sign confirms to a priori economic theory expectation, but the result contradicts the findings of Gale and Samwick (2014) who investigated the effects of CIT changes on economic growth and observed a negative relationship. From our result, we reject the null hypothesis and accept the alternative that there is a significant relationship between the company income tax and economic growth in Nigeria. The implication of the result is that a one percent rise in economic growth is brought about by 2.94 percent increase in the previous year's CIT.

Also, the value of Customs and Excise Duties and its one-year lagged value are only marginally positive for the current year, but negative for the previous year. The result is also not statistically significant at five percent level. We, therefore, uphold the null hypothesis that there is no significant relationship between CD and Economic growth in Nigeria. The implication is that CED impacts negatively on the dependent variable. This may also be attributed to the weak industrial base and import dependent economy which cause balance of payment deficits positions which the country has recorded over the years. The call for boosting the economy and discouraging excessive importation through diversification of the various sectors like agriculture, mining and solid minerals, tourism, among others.

On the whole, since the analysis is done based on the parsimonious result, it is imperative we review the overall regression results. The strong significance of the Error Correction Mechanism (ECM) supports our earlier argument that the variables are, indeed, cointegrated. The ECM shows a relatively low speed of adjustment (about 3 percent) between the short-run and long-run equilibrium behaviour of economic growth and the explanatory variables.

The adjusted  $R^2$  shows that about 73 percent of the total variation in gross domestic product is determined by changes in the explanatory variables. Thus, it is a good fit. The F-statistic (42-82) indicates that all the variables are jointly statistically significant at five percent level. The Durbin-Watson Statistic of 1.9 reveals that it is within the acceptable bounds, thus, it is good for policy analysis. The probability (F-statistic of 0.0000) indicates that this conclusion is robust and the result significant.

#### 4.4 Granger Causality Test

The pairwise granger causality test is conducted for all the variables to explain the direction of causality and to authenticate the second hypothesis of the study. The result is shown on Table 4.7 which follows.

**Table 4.7: Pairwise Granger Causality Test**

Null Hypothesis		Obs.	F-statistics
<b>Probability</b>			
EDT does not Granger-cause GDP	39	3.56486	0.06872
GDP does not Granger-cause EDT		0.18204	0.34971
CIT does not Granger-cause GDP	39	13.6786	0.00087
GDP does not Granger-cause CIT		1.66730	0.20186
CED does not Granger-cause GDP	39	58.3709	1.6E.08
GDP does not Granger-cause CED		0.30032	0.587763
PIT does not Granger-cause GDP	39	26.8079	1.4E.05
GDP does not Granger-cause PIT		1.19549	4.24405
PPT does not Granger-cause GDP	39	9.38386	0.000159
GDP does not Granger-cause PPT		0.29221	1.82305
VAT does not Granger-cause GDP	39	14.7614	0.00059
GDP does not Granger-cause VAT		1.23958	1.33208

**Source:** Authors Computation, using Eviews 4.0 software.

The results of the Granger Causality test on Table 4.7 indicate that the hypothesis that tax revenue does not Granger-cause economic growth, cannot be rejected as well as economic growth does not Granger-cause tax revenue. The results for the variables EDT, CIT, PIT, CED, PPT and VAT show that there is unidirectional causality between economic growth and the independent variables and the direction of causality runs from the explanatory variables to economic growth. This is because all the estimated coefficients of the lagged tax revenue components are statistically different from zero. This conversely applies to EDT, CED and PPT, indicating that the direction of causality also runs from GDP to these variables.

Granger causality results, in the case of a developing countries like Nigeria, have to be interpreted with caution because there is a lot of distortion and imperfection in the system. It must be noted here that, to take care of the distortions and imperfections in the system (the Nigerian Economy), the time series data were log and the Error Correction Model (ECM) introduced into the series to address these.

The above stance is premise on the fact that most of the prior studies conducted particularly in developed economies have shown that some tax revenue components like CIT and PIT to be poor economic growth indicators. The result of this study is at variance with the result of McBride (2012); Arnold and Schwellnus (2008) and Vartia (2008) which found CIT and PIT to have had negative effect on economic growth in the study of OECD countries.

#### 5.0 Conclusions and Recommendations

The study analyzed the relationship between tax revenue components and economic growth in Nigeria from the long-run perspective. The study applied the contemporary econometric methods of stationary test, co-integration test, Granger casualty test and ordinary least squares. One strong outcome of the study is that CIT, PIT and VAT do not granger-cause economic growth. No doubt, information disclosed in this study will help policy recommendations on efforts toward effective tax system in Nigeria and other developing countries.

Furthermore, as the results of the analysis have shown, the rate of fluctuation in the independent variables which ultimately affects the dependent variable is wide. This shows either policy inconsistency and/or weakness in the institutional framework in respect of tax matters.

It is therefore, recommended that, since tax revenue components play vital role in the growth of the country's economy, a position which the granger casualty test upholds, policy formulation should analyze the various intervening activities that can boost tax compliance and expansion of the tax base considering the vast informal sector of the economy. There is also an urgent need to diversify the economy by exploring the agriculture sub-sector, mining, industrial processing as well as infrastructural development. If purposely carried out by the government, these will jump-lead economic activities vis-à-vis tax revenues.

It must be noted here that, a further study can be conducted using a non-linear model to establish the subsisting relationship between tax revenue components and economic growth in Nigeria.

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