

Granger Causality Effect of Taxation on Economic Growth in Nigeria

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Abstract

This study examines the extent to which revenue from taxation has improved the growth of Nigerian economy. An Ordinary Least Square (OLS) model was specified where Company Income Tax (CIT), Petroleum Profit Tax (PPT) and Value Added Tax (VAT) are employed as pre-determined variables for economic growth measured by Real Gross Domestic Product (RGDP). Prior to model fitting, Jarque-Bera test for normality revealed that all variables employed showed normality and therefore suitable for the specified function. However, a logarithmic transformation was required to reduce levels of variability among the observed variables. Different model's validity checks such as Coefficient of determination (R^2), Multiple Correlation Coefficient(r), Durbin-Watson, Akaike info Criterion (AIC), Bayesian Information Criterion (BIC) and F-statistic were used to validate the model. Hypotheses were formulated and tested using statistical tools to validate theoretical backgrounds on economic growth as it is influenced by taxation. The results indicated that taxation had impacted positively on the growth of Nigerian economy and the study therefore recommended that VAT and CIT collections should be further encouraged and developed while more political efforts should be made towards ensuring stable business environments in the oil producing areas of the nation to improved collection of PPT.

Keywords: Taxation, Economic Growth, Granger Causality, Nigeria.

1. Introduction

The duties of government is increasing on a daily basis especially in Nigeria due to growing population, technological development and the resources available as relied on by the government continue to dwindle from year to year. Nigeria 1999 Constitution states in Section 16(1b) that “the government has the responsibility of ensuring the maximum welfare, freedom and happiness of its citizens”. To carry out this primary function effectively, government needs to find means of increasing her revenue. Nigeria government relied heavily on money accrued to government purse through petroleum sector of the economy to finance its activities (Ofoegbu, Akwu & Oliver, 2016; Ibanichuka, Akani & Ikebujo, 2016). The income derived from petroleum sector has reduced drastically these days due to persistent fall in the exchange rate of crude oil in the world market (Anyachie & Areji, 2015; Uzonwanne, 2015; Nwaiwu & Macgregor, 2018). The persistence decrease in crude oil price has significantly reduced government revenue that ought to be used to sustained economic growth and development of Nigeria. Due to insufficient fund to finance government activities, it becomes a source of concern to government functionaries, academia, captain of industries, economists and financial experts to fashion an alternative source of generating revenue into government coffer and reduce government reliance on crude oil revenue.

There was a call from economic experts that government should look critically into taxation in order to boost her revenue generation (Okoli, Njoku & Kaka, 2014; Ogbuma, 2017). This term “taxation” refers to all terms of compulsory levies, imposed by government to citizens on income, profit, consumption, and capital gains (Ofurum, Amafulé & Amafulé, 2018). McLure (2015) defines taxation as a coercive financial charge forced upon an individual or corporate body by a government so as to finance several government projects and programmes.

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In essence, individuals and corporate bodies are required to meet their legal requirements on tax compliance as provided in the law (under the social contract) in order to provide the government with the required financial resources, which is one of the reasons for taxation (Ibadin & Oladipupo, 2015; Omodero, Okafor, Azubuike & Ekwe, 2016; Ofurum *et al*, 2018). Using taxation to stimulate the economic growth in Nigeria, the Nigerian government introduced taxes like: Company Income Tax (CIT), Petroleum Profit Tax (PPT), and Value Added Tax (VAT) to generate revenue for the government. Despite the introduction of these categories of taxes in Nigeria, the revenue generation by government is not better than when government focused on oil. The study investigates the effect of Company Income Tax, Petroleum Profit Tax and Value Added Tax to the nation and its granger causality effect on the economic growth.

This paper is limited to the revenue generated from tax through CIT, PPT and VAT under the supervision of the Federal Inland Revenue Service (FIRS) and the Gross Domestic Product for the period 1999 to 2016. The choice of the period is to determine the impact of CIT, PPT and VAT on economic growth of Nigeria since democratically elected government took over in 1999.

2. Empirical Review

Ofoegbu, Akwu & Oliver (2016) found a positive and significant relationship between revenue generated by Nigeria government through tax and her economic development. The study uses time series analysis to covers the period of 2005 to 2014. The study recommended revenue generated from tax as a panacea to economic development in Nigeria.

Nwadiolor & Ekezie (2016) investigated the effect of tax policy on economic growth in Nigeria using yearly time series data for twenty years (1994-2013) sourced from the published financial reports of the Federal Inland Revenue Service of various years. Ordinary Least Square regression analysis was employed in investigating the nexus that exists between the dependent variable (economic growth) and independent variable (tax revenue). The results showed that tax has a significant effect on the economic growth of Nigeria and that the ratio of indirect tax to total tax has risen over the period. The paper recommended that the tax policy of government should tilt more towards indirect tax as a result of the expansionary and non-distortionary nature of indirect tax.

Adegbite & Shittu (2017) evaluate the impact of Corporate Income Tax (CIT) on investment in Nigeria using secondary data that covered 25 years period from 1991-2015 sourced from Central Bank of Nigeria Statistical Bulletins and National Bureau of Statistics. Pearson Product Moment Correlation and Multiple Regression were used to examine the nexus between the dependent variable (investment) and explanatory variables (Corporate Income Tax, Import, Exchange Rate and Interest Rate). Findings revealed that Corporate Income Tax (CIT) has impacted negatively on investment for the period of study; Interest Rate also has negative effect on investment in Nigeria. The study recommends that the government of Nigeria should endeavour to curtail the corporate income tax on companies and work on how interest rate would be minimized in order to encourage more investment in Nigeria.

Usman & Adegbite (2015) study the impact of Petroleum Profit Tax (PPT) on economic growth in Nigeria. The study employed Johanson Co-integration and the Granger Causality tests using data collected for the period 1978 - 2013. Data was collected from Central Bank of Nigeria Statistical Bulletins and National Bureau of Statistics. Regression analysis technique was used to estimate the nexus between economic growth and PPT and the results of the study indicated that Petroleum Profit Tax has positive significant impact on Gross Domestic Product. The study also recommended that the government of Nigeria should ameliorate the rampant corruption that exists in the Petroleum Profit Tax collection and administration.

Adegbie, Jayeoba & Kwabai (2016) ascertain the impact of VAT on the growth and development of Nigeria between its introductions to 2015 in order to determine the necessity of its reform. Ex-post-facto research design was adopted with data on VAT and GDP generated from 1994 - 2015, and evaluated to ascertain the relationship between the variables. It was ascertained that VAT has a positive relationship with GDP since the study shows a perfect positive correlation between VAT and GDP according to them. It then recommended that the present VAT rate of 5% should be reviewed to a minimum of 10% and that integrated tax offices be reinforced for improved efficiency and effectiveness.

3. Theoretical Framework

The theory upon which this study is hinged on is the Benefit-Received Theory. This theory is developed by Cooper (1994) and it opines that taxes should be levied on taxpayers based on the benefit derivable from them. This theory believed that taxpayers should be requested to pay taxes in pro rata to the utilities or satisfactions they received or are to receive from the amenities supplied by the administration. The theory's basic assumption is hinged on the fact that there is fundamentally a legitimate relationship that exists between taxpayers and the nation.

Consequently, the higher the benefit a taxpayer receives from the affairs of the nation, the higher the amount of tax he should pay to the authority. Therefore, a 'quid pro quo' relationship is presumed to subsist. The nation supplies definite public goods and render necessary services to the inhabitants of the society while they subscribe to the cost of delivery or supply of those goods and services in ratio to the satisfaction received or utility derived. Hence, the distribution of tax burden is dependent on the benefits received by the taxpayer.

4. Materials and Methods

The basic methodology employed to generate data relevant to the objective of this study was ex-post facto research method. The research instruments used in data collection were mainly secondary data from Central Bank of Nigeria (CBN, 2010), Federal Inland Revenue Service and National Bureau of Statistics Bulletins respectively and analyzed using Ordinary Least Square Model and conclusion drawn accordingly. Research variables in this study are CIT, PPT, VAT and the economic growth in Nigeria for the periods under consideration. The study is therefore testing the impact of CIT, PPT and VAT (independent variables) on the economic growth in Nigeria (dependent variable) for the periods under review proxied as Real Gross Domestic Product.

The study formulated the following hypotheses;

- i. Ho: Company Income Tax does not significantly impact on the Real Gross Domestic Product of Nigeria.
- ii. Ho: Petroleum Profit Tax does not contribute significantly to the Real Gross Domestic Product of Nigeria.
- iii. Ho: Value Added Tax does not impact significantly on the Real Gross Domestic Product of Nigeria.

Model/ Analytical Method

The analytical techniques adopted in this research are regression and granger causality analysis. The classical linear regression model (CLRM) may be shown in terms of the k-variable population regression function (PRF) model using the dependent variable Y and k-1 independent variables X_2, X_3, \dots, X_k as:

$$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + \dots + \beta_k X_{ki} + u_i, \quad i = 1, 2, 3, \dots, n \quad (1)$$

Where, β_1 = the intercept

β_2 to β_k = slope coefficients

u = error term

And $i = i^{\text{th}}$ observation, 'n' being the size of the population.

This equation identifies k -1 explanatory variables (regressors) namely X_1, X_2, \dots, X_k and a constant term that assumed to influence the dependent variable. The essence of regression in econometrics is to generalize for the population from what we get from the sample.

Consideration was also made on the associated validity tests such as Coefficient of determination (R^2), which evaluates the ability of the regression in forecasting the values of the dependent variable within the sample.

$$R^2 = 1 - \frac{SSE}{SST} \quad (2)$$

The adjusted R^2 (\bar{R}^2) penalizes R^2 for the introduction of regressing variables that do not add value to the explanatory power of the model.

The adjusted R^2 is calculated as:

$$\bar{R}^2 = 1 - (1 - R^2) \frac{T-1}{T-K} \quad (3)$$

The Akaike information criterion (AIC)

$$AIC = -2l/T + 2K/T \quad (4)$$

The Schwarz criterion (SC) is an alternative to the AIC that surcharge extra penalty for extra regressing variables and it is shown as

$$SC = -2L/T + (K \log T)/T \tag{5}$$

F-statistic is from a test of the hypothesis that all of the slope coefficients (excluding the constant or intercept) in a regression are zero

$$F = \frac{R^2/(K-1)}{(1-R^2)/T-K} \tag{6}$$

Granger Causality

Correlation and causation does not fundamentally mean the same thing in the real sense of it. The econometric literature has a lot of magnificent correlations that are sometimes of no meaning or misleading. This implies that any other relationship that exists among the variables outside the ones presented by the Ganger Causality test is spurious.

The econometric model specified for this research is given as;

$$GDP = f(VAT, CIT, PPT) + \varepsilon \tag{7}$$

The transformation of the model can be explicitly written as;

$$GDP = \beta_0 + \beta_1VAT + \beta_2CIT + \beta_3PPT + \varepsilon \tag{8}$$

Where GDP is Gross Domestic Product, VAT is Value Added Tax, CIT is Company Income Tax, and PPT is Petroleum Profit Tax.

5. Data Analysis, Results and Discussions

The results of the e-view analysis conducted are shown as follows;

Table 1: Descriptive Statistics

	CIT	PPT	RGDP	VAT
Mean	482684.4	11016900	45707.46	433144.4
Median	347950.0	1924800.	44467.46	347050.0
Maximum	1370000.	35343000	69023.93	1065800.
Minimum	46200.00	164300.0	22449.41	47100.00
Std. Dev.	419980.2	14476524	16060.07	338801.5
Skewness	0.596210	0.794422	0.043234	0.465531
Kurtosis	2.104278	1.730202	1.638460	1.786475
Jarque-Bera	1.668138	3.102608	1.395951	1.754640
Probability	0.434279	0.211971	0.497592	0.415896
Sum	8688320.	1.98E+08	822734.3	7796600.
Sum Sq. Dev.	3.00E+12	3.56E+15	4.38E+09	1.95E+12

Source: Extracted from Econometric Views, Version 17 Output

Table 1 presents the descriptive nature of data employed for this research. The average values of RGDP, CIT, PPT and VAT as well as the maximum and minimum values of the variables were analyzed over time. In addition, the variables were subjected to normality test to know their pattern of behaviours. The Jarque-Bera test for RGDP (1.395951), CIT (1.668138), PPT (3.102608) and VAT (1.754640) with their corresponding P-vale of 0.497592, 0.434279, 0.211971 and 0.415896 indicates that we can assume normality of both the dependent and independent variables since their P-values > 0.05 level of significance. Thus the data is assumed normal for model fitting after taking the natural logarithms of each variable to reduce variability from the observed values.

Table 2: Model-Regression Results

Variable	Parameter	Coefficient	t-Statistic	P-Value
Constant	α	6.080765	28.65699	0.0000
CIT	β_1	0.048155	0.080435	0.5589
PPT	β_2	0.012148	0.013121	0.3702
VAT	β_3	0.301755	0.099708	0.0091
R-squared = 0.990910		Adjusted R-squared = 0.988962		Durbin Watson = 1.5175
F-statistic = 508.7084		P-value =0.0000		AIC = -3.418871
				BIC = -3.221010

Source: Extracted from Econometric Views, Version 17 Output

The model specification of table 2 is written as:

$$\text{LOG(RGDP)} = f(\text{CIT}, \text{PPT}, \text{VAT}) \quad (9)$$

The OLS model of this functional relationship is given as;

$$\text{LOG(RGDP)} = \alpha + \beta_1 \text{LOG(CIT)} + \beta_2 \text{LOG(PPT)} + \beta_3 \text{LOG(VAT)} + \varepsilon_i \quad (10)$$

Substituting the coefficients, we have;

$$\text{LOG(RGDP)} = 6.080765 + 0.048155 \text{LOG(CIT)} + 0.012148 \text{LOG(PPT)} + 0.301755 \text{LOG(VAT)} \quad (11)$$

The model specified from table 2 above is given by equation (11). This model gives a reasonable projection of economic growth for a unit increase in the three explanatory variables (CIT, PPT and VAT) which are equally jointly statistically significant based on the computed 'F' values of 508.7084 with P-values of 0.000 which is lower than 0.05% and this equally attest to the overall goodness of fit of the postulated model. In fact, the relationships exhibited by the predictor measure of economic growth (RGDP) is in line with prior expectations as the combinations of CIT, PPT and VAT are all expected to have impacted positively on economic growth as exhibited in the estimates. This comes from the fact that the three regressors (CIT, PPT and VAT) have shown a positive relationship with the dependent variable (GDP) within the period under review. Moreover, its strong coefficient of determination ($R^2 = 0.9909$) which implies that 99.09% of the variation in measure of economic growth is accounted for by the predictors variables; (CIT, PPT and VAT) clearly shown that the model is adjudged a best fit. Thus, 98.89% of the variation in RGDP can be accounted for when other predictor variables are added to the model as evidenced from the adjusted R-squared value of 0.9889. However, the presence of multi-collinearity among the econometric variables considered may not be overruled as a result of the excellent value of coefficient of determination (R^2) recorded. But it is pertinent to note that multi-collinearity investigations are not within the context of this research work.

Furthermore, the model was adjudged to be correctly specified based on its Durbin Watson (which measures the specifications and fitness of model) value of 1.5175 which practically lies within an acceptable range of -2 and 2. The fitted model thus accounts for an estimate of ₦6,080,765,000 (six billion, eighty million, seven hundred and sixty five thousand naira only) autonomous value of RGDP at a constant value of the explanatory variables CIT, PPT and VAT. This means that if all the explanatory variables are held constant, RGDP will accounts for an estimate value of ₦6,080,765,000 autonomous values. Also, a unit increase in each of the explanatory variables (CIT, PPT and VAT) will brings respectively an added value of ₦48,155,000, ₦12,148,000 and ₦301,755,000 to the RGDP. The lower values of AIC (-3.418871) and BIC (-3.221010) of the fitted model further confirm its validity as it captured a goodness of fit and can be best adopted in predicting the effect of taxation on economic growth in Nigeria.

Table 3: Pairwise Granger Causality Tests Result

Null Hypothesis:	F-Statistic	Probability
PPT does not Granger Cause CIT	0.04001	0.8443
CIT does not Granger Cause PPT	7.21455	0.0177
RGDP does not Granger Cause CIT	2.14741	0.1649
CIT does not Granger Cause RGDP	0.82678	0.3786
VAT does not Granger Cause CIT	0.62153	0.4436
CIT does not Granger Cause VAT	6.14245	0.0266
RGDP does not Granger Cause PPT	5.20999	0.0386
PPT does not Granger Cause RGDP	0.16255	0.6929
VAT does not Granger Cause PPT	6.94878	0.0196
PPT does not Granger Cause VAT	3.06194	0.1020
VAT does not Granger Cause RGDP	0.81248	0.3826
RGDP does not Granger Cause VAT	4.15780	0.0608

Source: *Extracted from Econometric Views, Version 17 Output*

Thus a pairwise Ganger Causality test results presented in table 3 above shows that there are no two way ganger-cause effects between any of the adopted variables while a one way ganger cause effect only exist between CIT/PPT, CIT/VAT, RGDP/PPT and VAT/PPT.

From Table 3 above, the Granger Causality test results show that the probability value of 0.0177 is less than the critical value of 0.05; hence the study came to conclusion that there exists a causal relationship running between CIT and PPT.

Also, the probability value of 0.0266 is less than the table value of 0.05 signifying that there is a causal relationship between CIT and VAT. The same applied to the probability value of 0.0386 which is less than the critical value of 0.05 signifying that there exist causal relationship between RGDP and PPT. This happens between VAT and PPT with the probability value of 0.0196 showing a causal relationship between them. Thus among the three variables considered in this research, only petroleum profit tax has really established a pushing effect on economic growth as measured by the real GDP within the years under review.

6. Conclusion and Recommendations

The study determines the Granger Causality effects of taxation on economic growth in Nigeria between 1999 and 2016 using secondary data collected from CBN and analyzed. According to the model's results, a unit increase in the explanatory variables which are equally statistically significant based on the computed 'F' values brings about a positive increase in the economic growth of Nigeria. A pairwise granger causality test results carried out shows that there are no two way granger-cause effects between any of the adopted variables while a one way granger cause effect only exist between CIT/PPT, CIT/VAT, RGDP/PPT and VAT/PPT. Thus among the three variables considered in this research work, only Petroleum Profit Tax has really established a pushing effect on economic growth as measured by the GDP within the years under review. The effects of the other variables have not had a granger cause effect on economic growth of Nigeria.

It was then recommended by the study that;

- i. Value Added Tax and Company Income Tax collections should be further encourage and developed to bring more goods and services under the tax net as well as the companies responsible for their productions. This is based on the fact that both VAT and CIT have had no granger cause effects on economic growth, which is contrary to expectations.
- ii. More political and concerted efforts should be geared towards ensuring more stable business environments especially in the oil producing areas of the nation. This becomes necessary in order to sustain continuous and steady inflows of Petroleum Profit Tax which has been established to have fully granger caused economic growth in Nigeria.

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