

Value Added Tax and Macroeconomic Performance: A Dynamic Modeling of the Nigerian Experience

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Abstract

This research investigates the relationship between value added tax (VAT) and macroeconomic performance in Nigeria. The main objective of the study is to empirically investigate the impact of VAT on the level of economic growth in Nigeria. The study covered the period between 1994 and 2014. The cointegration technique and Short run dynamic analysis were used for the research. The parsimonious ECM result indicates that VAT is statistically significant in explaining the level of economic growth in Nigeria. The result indicates an invalidation of the null hypothesis of no significant relationship between VAT and the level of economic growth in Nigeria. The Johansen cointegration test indicates a long run relationship among the variables. The result recommends, amongst others, an increase in VAT and efficient utilization of the proceeds from VAT.

Keywords: Value Added Tax, Petroleum Profits Tax, economic growth Company Income Tax, Cointegration

1. Introduction

Tax revenue, whether direct or indirect, is a major source of funds to any government in this world. Tax, which is as old as any human society, is one certain source of revenue mobilization besides other roles which taxation plays in modern society. Onaolapo, Fasina and Adegbite (2013) were of the opinion that a tax system is one of the most effective means of ensuring that a nation's internal resources are harnessed in order to create an enabling environment that would promote economic growth. Value Added Tax (VAT), which is one of the indirect taxes, is the most important taxing system in the world presently whether the country is a developed or developing and irrespective of the economic system (Dasalegn, 2014). The major objective of any government is to improve the standard of living of its citizens. Thus, generating sufficient revenue so as to provide the needed infrastructures and social amenities as well as engage in developmental project that would spur economic growth should be of paramount concern to any sensible government (Ugochukwu, & Azubike, 2016). VAT has now been adopted by over 150 countries globally. According to Keen (2013), 150 countries have a VAT of which 26 are from low income, 40 are from low middle income, 46 are from upper middle income and 38 are from high income as of 2012. Many countries which started VAT with the intention of reforming the existing sales tax system eventually found that VAT generated much more revenue than was ever expected (Le, 2003). Thus, VAT has been daubed a 'money machine' because it has generated more money than expected in virtually all countries where it has been introduced (Omokhualé, 2016). Some of the benefits adduced to VAT are that it: is harder to avoid, is neutral and transparent, is most effective instrument of raising revenue, has a lower marginal cost of raising fund, avoids cascading of indirect taxes and can easily be made compatible with international trade. The idea of VAT originated from the writings of the German businessman Wilhelm Von Siemens in 1918. Von Siemen's VAT concept was seen as a technical innovation that brought a key improvement to the turnover tax (Kathryn, 2011). However, France was the first country where VAT was introduced at national level. The French economist, Maurice Laure, initiated the concept of VAT (Taxe sur la Valeur Ajoutée) in France which came into effect on April 10, 1954 although the process started slowly in 1948. France did not move to a full VAT that reached the broader retail sector until 1968. Thus, the first full VAT in Europe was enacted in Denmark in 1967 although the country did not join the European Economic Community until 1973 (Kathryn, 2011). VAT is France's highest-yielding tax, third important source of revenue to government in the world, accounts for 20% of tax revenue globally and affects the lives of about 4 billion people.

In Nigeria, the idea of introducing VAT came from the study group set up by the Federal Government in 1991 to review the entire tax system. VAT was proposed and in January, 1993, Government agreed to introduce VAT but full operation could not start until January 1994. The rationale behind replacing the then sales tax with VAT was informed by the narrow tax base of the sales tax while VAT has a broader tax base. VAT introduction was the consequent of continuing dwindling oil and non-oil revenues, weak exchange rate, mismanagement of earnings over the years etc. The three types of value-added tax are; the gross product type, the income type, and consumption type. There are, again, three alternative methods of calculating consumption type value-added tax which are: the subtraction, the addition and the credit methods. Nigeria adopts the credit method of the consumption type value added tax system. Following this introduction, the rest of the paper is divided into five sections, the second section borders on the problem statement while the third section is on the

literature review. The fourth section is on the methodology while the fifth section is on the results and findings. The sixth section concludes this paper.

2. Statement of the Problem.

The Nigerian government needed money and lots of money after the oil glut of the early 1980s. This led to the Structural Adjustment Programme (SAP) of 1986 in which the diversification of the revenue base was one of its objectives. According to Odusola (2006), "tax reforms are needed to diversify the revenue portfolio for the country in order to safeguard against the volatility of crude oil prices and to promote fiscal sustainability and economic viability at lower tiers of government". He went on to say that the traditional tax revenue from non-oil sources has never assumed its strong role in the management of Nigeria's fiscal policy and that the need to address this problem led to the tax policy reforms of 1991 and 2003 which did not achieve much." However, the tax reform of 2004 led to the passage of the Federal Inland Revenue Service (FIRS) Establishment Act 2007 with the granting of financial and administrative autonomy to FIRS and this dramatically changed the history of tax administration in Nigeria. FIRS (2012) while quoting their immediate past executive chairman (Mrs Ifueko, O.O.) noted that "in the fourth year of the reform alone (that is, in 2008), actual collection of ₦2,972 trillion in taxes was over and above the cumulative collection for the eight years period (1996-2003) preceding the reform which amounted to only ₦2,682 trillion. Table 1 below attest to the impact of the reform on VAT and other non-oil tax revenue collection as VAT contributes about one third of total non-oil taxes.

Table1: VAT and Non-Oil Tax Revenues from 2007 to 2013 Financial Years (Naira Billion)

Years	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
VAT	178.1	221.6	289.6	404.5	468.4	562.9	649.5	710.2	795.6	4280.4
Other non-oil taxes	416.9	451	620.2	745.3	1005.1	1081	1240.5	1538.1	1700.1	8798.2
Total non-oil taxes	595	672.6	909.8	1149.8	1473.5	1643.9	1890	2248.3	2495.7	13078.6
VAT:Totalnon oil taxes	0.2993	0.3295	0.3183	0.3518	0.3178	0.3424	0.3436	0.3158	0.3187	0.3273

Source: Central Bank of Nigeria (CBN) 2009 and 2013 Annual Reports.

The FIRS stated that on Thursday January 29, it generated N4.69 trillion from taxes for the federal government in 2014 in its quarterly revenue report issued in Abuja. The ₦4.69 trillion FIRS claimed surpassed its target for the year by about N400 billion, but was about N106 billion less than that of 2013, which stood at N4.80 trillion. The report also indicated that N2.45 trillion, representing 52.96 per cent, was collected from petroleum profits tax while N2.24 trillion, representing 47.04 per cent, was collected from non-oil taxes during the period. A breakdown of the total collection showed that company income tax contributed N1.18 trillion; N10.83 billion from gas income; N2.59 billion from capital gain tax and N10.94 billion from stamp duty. The VAT, comprising Nigeria Customs Service Import VAT and Non-Import VAT contributed N802.95 billion of the total non-oil taxes collection during the period (Ighomwenghian, 2015). In spite of the above, Nigerian tax revenue as percentage of GDP is among the lowest in Sub-Saharan Africa as shown in Table 2 below.

Table 2: Tax Revenue (% of GDP)of selected Sub-Saharan African (SSA) countries

Country	Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Angola		27.8	26.5	26.4	34.5	25.5	30.5	19.2	19.5	19.9	18.8
Benin		15.7	16.3	15.2	15.5	17.0	17.3	16.2	16.5	15.9	15.6
Cote D'Ivoire		13.4	14.2	13.9	14.7	15.1	15.1	14.6	14.3	10.9	14.3
Ghana		18.5	21.8	21.3	12.8	13.9	13.9	12.6	13.4	14.9	-
Kenya		15.8	17.0	18.7	15.1	15.2	16.0	15.5	15.7	15.9	15.9
Nigeria		1.5	0.9	2.9	2.4	4.0	5.5	5.1	2.3	1.8	1.6

Source: World Bank Group(2014)

This is also reflected in VAT as percentage of GDP as shown in Table 3.

Table 3: VAT as percentage of GDP of selected Sub-Saharan African Counties.

Country	Year	2004	2005	2006	Country	Year	2004	2005	2006
Botswana		3.8	4.5	3.6	Nigeria		1.3	1.2	1.2
Ghana		NA	5.1	5.0	South Africa		6.1	6.7	7.0
Kenya		5.1	5.6	5.0	Tanzania		4.4	5.2	5.3
Mali		NA	5.9	6.5	Uganda		4.0	4.0	4.1
Namibia		5.1	5.0	7.9	Zambia		5.2	5.0	4.6

Source: Volkerink (2008) in Fakile, Adegbe and Faboyede (2014).

VAT as percentage of GDP in Nigeria increased slightly after the reform in VAT administration in 2008, yet it is still below what obtains in Pakistan as shown in Table 4 and Table 5 below.

Table 4: VAT as percentage of GDP in Nigeria (After the reform)

Country \ Year	2007	2008	2009	2010	2011	2012	2013
Nigeria	1.4	1.7	1.9	1.03	1.03	1.0	1.0

Source: Central Bank of Nigeria (CBN) 2009 and 2013 Annual Reports.

Table 5: VAT as percentage of GDP in Pakistan .

Country \ Year	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Pakistan	3.87	3.57	3.68	3.55	3.48	3.79	3.90

Source: Bilal, (2015). Deputy Commissioner, Inland Revenue, Federal Board Revenue, Pakistan

Thus, IMF country report on Nigeria in March, 2015 noted that “non-oil tax revenue to non-oil GDP reached 4.6 percent of GDP in 2013 compared to over 15 percent for low-income economies and 18.5 percent for emerging economies (Mexico-13.5%; Indonesia- 11% and Turkey-22.5%). The information above makes this research timely.

Objectives of the Study.

- I. To evaluate the revenue generation performance of VAT in Nigeria.
- II. To investigate the contribution of VAT on economic growth in Nigeria.

Research Hypothesis.

HO1: VAT has no significant relationship with economic growth.

3 Literature Review

The literature shall be reviewed under conceptual, theoretical and empirical frameworks.

3.1 Conceptual Framework

Black (1968) defined tax as “any contribution imposed by government upon individuals, for the use and service of the state, whether under the name of toll, tribute, tallage, gabel, impost, duty, custom, excise, subsidy, aid, supply, or other names.” Blackwell (2008) defined tax as “a charge imposed by the government on people and businesses on various activities and possessions, such as income, property, purchased goods, or inheritances, used by the government to fund itself and its programs”. Value-added tax (VAT) is a multistage sales tax that is collected at each stage or point in the production and distribution process. It is levied at each stage in the chain of production and distribution from raw materials to the final sale based on the price (value) added at each stage. Although, it is a cost to the producer or the distribution chain members there is a set-off or credit for tax paid on production while its full cost is borne by the final consumer. VAT differs from sales tax because sales tax is levied at the stage where a product is sold to the final consumer, but VAT is levied only on the net increase in price at every point a good or a service moves from one seller to the next purchaser.

Taxation is the entire process through which government raises money from individual persons or corporate body.

Economic growth is the increase in a country’s standard of living over time.

3.2 Theoretical Framework

Ibn Khaldun’s Theory of Taxation: The theory advocated for low tax rates and equity in the distribution of the tax burden. According to the theory, tax yields a large revenue from small assessment at the beginning of a dynasty but at the end of a dynasty, it yields a small revenue from large assessment. This means that when the tax burden upon the subjects is low, they have energy and desire to do things that would make the cultural enterprises grow because the low taxes bring satisfaction. When the cultural enterprises grow, the number of individual imposts and assessments (tax base) increases and consequently the tax revenue, which is the sum total of the individual assessments, increases. However, when the tax burden upon the subjects is high, they have low morale and desire to do things that would make the cultural enterprises grow because the heavy taxes bring dissatisfaction. Thus, an expanded VAT base with low VAT rate is likely going to produce more revenue for government than a narrow VAT base with high VAT rate.

Harrod-Domar Economic Growth Theory: It is a growth model which states that the rate of economic growth in an economy is dependent on the level of saving and the capital output ratio. If there is a high level of saving in a country, it provides funds for firms to borrow and invest. Investment can increase the capital stock of an economy and generate economic growth through the increase in production of goods and services. The Harrod-Domar model provides a framework for economic development and has been an important influence to many developing economies.

3.3 Empirical Literature

Ugochukwu, M. J. & Azubike, J.U.B. (2016) investigated the relationship between VAT and economic development in Nigeria. Data covering the period 1994 to 2012 were used and analysed with the OLS regression

method. Result showed that VAT was negatively related to Gross Domestic Product. Omokhuale (2016) evaluated the contribution of value added tax (VAT) to the Nigerian economy. Data collected for the period 2000 to 2012 from Central Bank (CBN) of Nigeria statistical bulletin and Federal Inland Revenue Services (FIRS) bulletin were analysed using the OLS method of regression technique. Result showed that VAT contributed positively and significantly to the growth of the Nigerian economy. Okoli & Afolayan (2015) examined the extent of VAT contribution to all federally collected taxes with respect to companies income tax (CIT), petroleum profits tax (PPT) and personal income tax (PIT). The study used data from CBN for the period 1994 to 2012 which were analysed with the OLS regression technique. Results revealed that VAT contributed positively and significantly to government revenue and second source of government revenue after PPT. Ibadan & Oladipupo (2015) examined the contribution of direct taxes to the economic growth of Nigeria. Time series data from 1981 to 2014 were analysed using the Augmented Dickey-Fuller (ADF) test for unit root test and Error Correction Model (ECM) for the impact of VAT, Petroleum profits Tax (PPT) and Customs & Excise Duties (CED) on Real gross domestic products (RGDP). The results showed that all the independent variables had a positive and significant impact on RGDP. Bilal (2015) examined the relationship between VAT revenue and economic growth in Pakistan. Using the OLS regression technique, the results showed a strong and positive impact of VAT on the economic growth (GDP) of Pakistan. Onwuchekwa and Aruwa (2014) reviewed the impact of VAT on the economic growth of Nigeria. The OLS technique was employed to test data for 18 years (1994-2011). The result showed that VAT contributed significantly to the total tax revenue of government and thereby enhanced economic growth of Nigeria. Dasalegn (2014) analyzed the role of VAT on economic growth of Ethiopia from 2003 to 2012. The findings revealed that VAT, total tax revenue and non-tax revenue showed a significant and positive contribution to economic growth during the periods under review. Izedonmi and Okunbor (2014) examined the contribution of value added tax (VAT) to the development of the Nigerian economy.. Time series data from 1994 to 2010 were analyzed using simple regression analysis method. Results showed that VAT revenue and total revenue account for 92 percent of variations in the GDP and so these components of VAT revenue and total revenue are important determinants of economic growth in Nigeria. Chigbu (2014) evaluated the impact of value added tax on the economic growth of Nigeria. Secondary data from 1994 to 2012 sourced from CBN and Federal Inland Revenue Service (FIRS) were analyzed using the OLS regression technique. Result showed that VAT positively and significantly influenced economic growth in Nigeria. Yakubu & Sanusi (2013) examined the impact of value added tax on economic growth in Nigeria. Time series data from the period 1994 to 2010 were used in the study and analyzed with OLS regression technique. The result revealed that VAT had a positive impact on economic growth in Nigeria. Onaolapo, Aworemi & Ajala (2013) investigated the impact of value added tax on revenue generation in Nigeria. Secondary data sourced from CBN and FIRS were used to performed the analysis with the aid of OLS regression technique. The result showed that value added tax had positive and significant effect on revenue generation in Nigeria. Okoye and Gbegi (2013) studied the influence of revenue generated through VAT on wealth creation in Nigeria. The hypotheses formulated were tested using Product Moment Correlation Coefficient and Students t-test. The findings revealed that revenue generated through VAT has a significant effect on total tax revenue in Nigeria and this in turn has a significant influence on wealth creation in Nigeria Umeora (2013) set out to investigate the effects of VAT on total tax revenue and economic growth in Nigeria. The OLS method was used to analyze the time series data relating to VAT, GDP and total revenue from the period 1994 to 2010. The results showed that VAT has significant impact on GDP and also on total tax revenue. Bakare (2013) evaluated the impact of VAT on output growth in Nigeria. The OLS regression was employed for the empirical study The results found a positive and significant relationship between VAT and output growth in Nigeria. Asogwa and Okeke (2013) studied the impact of VAT on investment growth in Nigeria. The OLS regression technique was used to analyze the time series data. The results indicated that VAT has a significant effect on investment growth in Nigeria. Onodugo and Anowor (2013) evaluated the contribution of VAT to resource mobilization in Nigeria. The OLS method of simple regression analysis was used to determine the relationship between VAT and Real GDP (RGDP), VAT and Current Revenue(CREV), and VAT and Internal Revenue(INREV). The results showed that there is a strong and positive relationship between VAT and RGDP, CREV and INREV. Rostami, Nourbakhsh & Akbarian (2012) examined the impact of value added tax on Iranian economic growth. Secondary data from 1979 to 2009 were used and analysed with Auto Regressive Distributed Lags (ARDL). Results indicated that VAT had significant impact on real output for Iran. Ilaboya and Mgbame (2012) evaluated the indirect tax-economic growth dynamics in Nigeria. The study adopted a combination of co-integration and error correction mechanism while the Autoregressive Distributed Lag (ARDL) was used to correct the discrepancies between short and long run impact of the explanatory variables. The study found a negative and an insignificant relationship between indirect tax and economic growth in Nigeria. Adereti, Sanni and Adesina (2011) researched on VAT and economic growth of Nigeria. Data from 1994 to 2008 and OLS were used. The findings showed that VAT revenue had a positive and significant correlation with economic growth. Unegbu and Irefin (2011) studied the impact of VAT on economic and human developments of Adamawa State of Nigeria. Data

collected from both primary and secondary sources from 2001 to 2009 were analyzed using regression. The results showed a positive and significant relationship between VAT and economic and human development of the State while the results from primary data revealed the opposite. Olatunji (2009) reviewed the effectiveness of VAT administration in improving government revenue with respect to its contribution to economic growth in Nigeria. 550 questionnaires out of which 443 (representing 86%) were used to obtain information needed and analyzed by simple percentages and Chi-Square test. The result revealed that VAT is properly and effectively administered and has a high impact on government revenue. Go, Kearney, Robinson and Thierfelder (2005) described South Africa's VAT. They used a Computable General Equilibrium (CGE) model with detailed specification of South Africa's tax system. They found that VAT is the most effective instrument for generating government revenue, but VAT for South Africa is mildly regressive as low-income households pay a higher share of their income to VAT than do high-income households. However, when evaluating total taxes paid, including direct taxes on households, it is evident that high-income households pay a larger percentage of their income to taxes than low-income households.

4. Methodology

The cointegration technique and the Error Correction Methodology will be used for the study. This will commence by an analysis of the time series property of the data. This will be followed by the cointegration test. The existence of a long run relationship among the variables will permit us to estimate the overparameterize and the parsimonious Error Correction Models (ECM). The diagnostic checks to be conducted included the Jarquebera normality test to find out whether the residuals are normally distributed or not. The Breusch-Godfrey serial correlation LM test will be used to test whether the residuals are serially correlated while the White heteroskedasticity test will be used to assess whether the residuals are homoskedastic or heteroskedastic. The Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) will be used to assess whether the residuals are normally distributed or not. The results of the diagnostic checks will enable us to estimate the variance decomposition.

Model Specification

The model to be used for the study is thus stated below:

$$RGDP = b_0 + b_1VAT + b_2PPT + b_3INF + Ut$$

$$b_1, b_2 > 0, b_3 < 0$$

Where:

RGDP = Real Gross Domestic Product

VAT = Value Added Tax

PPT = Petroleum Profit Tax

INF = Inflation rate

Ut = Error Term

The data used covered the period between 1994 and 2014. This period is significant since it covered the period of major tax reforms in the country. The Data were collected from various issues of both the Central Bank of Nigeria Statistical Bulletin and the Federal Inland Revenue Service.

5. Results and Findings

The ADF unit root test which has the advantage of correcting for possible serial correlation among the residuals was used to assess whether the residuals are stationary or not and their order of integration. The result of the ADF unit root test result is shown in Table 6 below:

Table 6: Summary of ADF Unit Root test result

Variables	Level data	First Difference	1% Critical Value	5% Critical Value	10% Critical Value	Order of Integration
VAT	-2.51	-4.11*	-3.86	-3.04	-2.66	I(1)
RGDP	1.31	-2.84**	-3.86	-3.04	-2.66	I(1)
INF	-12.97*	-5.53	-3.86	-3.04	-2.66	I(0)
PPT	0.67	-3.06**	-3.86	-3.04	-2.66	I(1)

NB: * & ** indicates significance at the 1 and 5 percent levels respectively

The result of the ADF unit root test indicates that all the variables except the INF were originally non-stationary. They however became stationary after the first difference was taken. Inflation was stationary at the levels probably because it is in percentage. Thus, the variables are mostly I (1). Following Harris (1995) and Gujarati (2004), both I(1) and I(0) variables can be carried forward to test for cointegration which forms the next phase of the analysis.

The Johansen cointegration test which has the advantages amongst others for allowing for more than one cointegrating equation was used to test for the existence of a long run relationship among the variables. The result of the Johansen cointegration test is shown in Table 7 below:

Table 7: Summary of Johansen Cointegration test result

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.973513	129.3163	47.21	54.46
At most 1 **	0.898581	60.32554	29.68	35.65
At most 2 *	0.583771	16.84409	15.41	20.04
At most 3	0.009962	0.190218	3.76	6.65
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.973513	68.99079	27.07	32.24
At most 1 **	0.898581	43.48146	20.97	25.52
At most 2 *	0.583771	16.65387	14.07	18.63
At most 3	0.009962	0.190218	3.76	6.65

The result of both the trace statistic and the Max-Eigen statistic indicates three cointegrating equations. An indication of a long run equilibrium relationship among the variables. This allows us to estimate the overparameterize and parsimonious ECMs.

The result of the overparameterize ECM is shown in Table 8 below:

Table 8: Summary of Overparameterize ECM result. Dependent Variable: LRGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPPT	0.000568	0.035241	0.016108	0.9875
LPPT(-1)	0.264730	0.067058	3.947760	0.0042
LPPT(-2)	-0.002876	0.058685	-0.049011	0.9621
LVAT	0.057490	0.025987	2.212268	0.0579
LVAT(-1)	0.076812	0.019399	3.959561	0.0042
LVAT(-2)	0.027901	0.012553	2.222657	0.0569
INF	1.158280	0.275222	4.208528	0.0004
INF(-1)	-0.000201	0.002520	-0.079681	0.9384
INF(-2)	-0.001625	0.004016	-0.404517	0.6964
ECM(-1)	-0.867789	0.169892	-5.107873	0.0009
C	10.51655	0.244080	43.08655	0.0000

$R^2 = 0.79$, AIC = 2.83, SC = 2.29, DW = 2.22

The parsimonious ECM which was used to test the various hypotheses was gotten by deleting insignificant variables from the parsimonious ECM result. The Akaike Information Criterion (AIC) and Schwarz Criterion (SC) were used to select the appropriate lag length. The result of the parsimonious or preferred ECM is shown in Table 9 below:

Table 9: Summary of Parsimonious ECM Result. Dependent Variable: LRGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPPT(-1)	0.272342	0.007952	34.24891	0.0000
LVAT	0.046359	0.008026	5.776087	0.0001
LVAT(-1)	0.083021	0.009482	8.755735	0.0000
LVAT(-2)	0.029167	0.009437	3.090729	0.0093
INF	-0.891178	0.082011	-10.86659	0.0000
ECM(-1)	-0.404557	0.177988	-2.272941	0.0327
C	10.47003	0.101711	102.9388	0.0000

$R^2 = 0.81$, AIC = -3.23, SC = -2.87, DW = 2.10

The coefficient of determination indicates that 81 percent of the total variation in the level of economic growth has been explained by the Value Added Tax, Petroleum Profit Tax as and inflation taken together. This is a good fit since only 19 percent of the variation was explained outside the model. The result indicates further that VAT has a positive impact on the level of economic growth in Nigeria. The result indicates that an increase in the value of VAT in the current, one period and two period lags by 1 percent increase the level of economic growth by 0.05 percent, 0.08 percent and 0.03 percent. The low elasticities is an indication of underutilization of VAT in Nigeria. The statistical significance of VAT in explaining economic growth suggests an invalidation of the null hypothesis that there is no significant relationship between VAT and economic growth in Nigeria. The result further indicates that the Petroleum Profit Tax has a positive impact on the level of economic growth in Nigeria. The results indicates that an increase in Petroleum Profit Tax by 1 percent increased economic growth by 0.27 percent. This also insinuates a validation of the alternative hypothesis that there is a significant

relationship between Petroleum Profit Tax and the level of economic growth in Nigeria.

The results of the diagnostic checks is as shown in Table 10 below:

Table 10: Diagnostic Checks results

White Heteroskedasticity test			
F statistic	1.12	Probability	0.47
Breusch – Godfrey Serial Correlation LM test			
F statistic	0.37	Probability	0.69
Jarque-bera			
Jarque-bera	0.70	Probability	0.71

The result of the White heteroskedasticity test indicates that the residuals are homoskedastic. The Breusch-Godfrey serial correlation LM validates the null hypothesis that the residuals are not serially correlated. The Jarque_bera normality test with a probability of 0.71 indicates that the residuals are normally distributed. The result of the CUSUM and CUSUMQ stability tests are shown in Figure 1 and Figure 2 below:

Figure1: CUSUM stability test

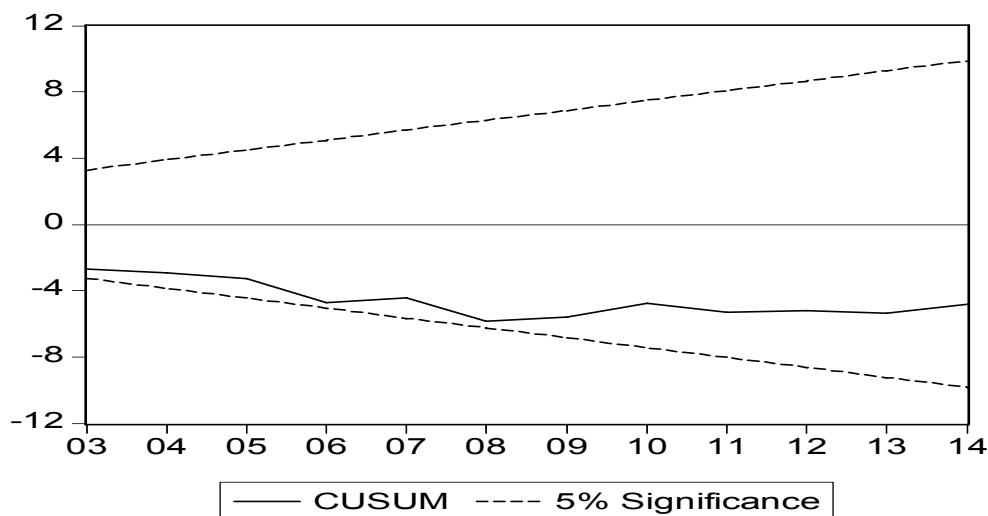
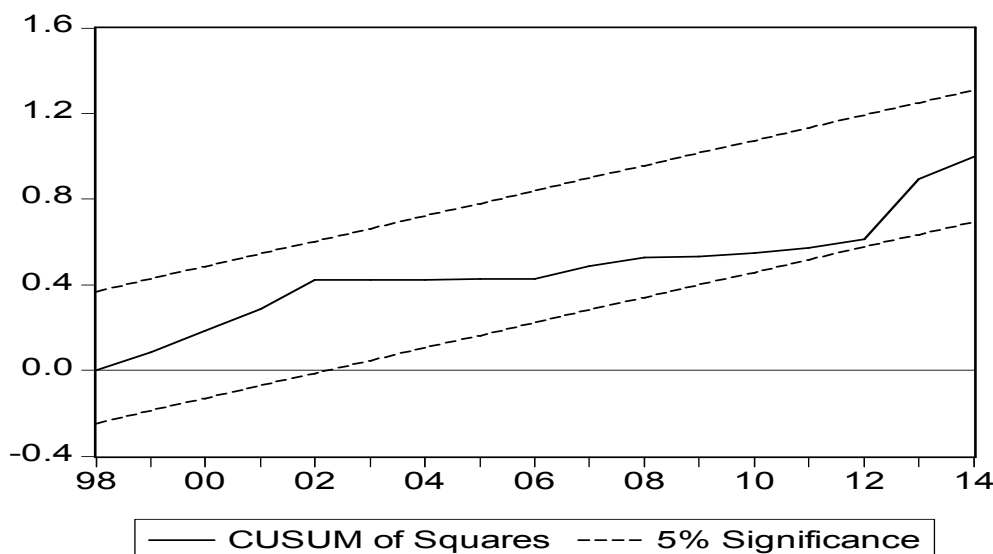


Figure 2: CUSUMQ Stability test



The result of both the CUSUM and CUSUMQ stability tests indicate residual stability since the CUSUM and CUSUMQ lines fell in-between the two 5 percent lines in both cases. The results of the diagnostic checks thus permit the estimation of the variance decomposition which is the next stage of the analysis.

The result of the Cholesky variance decomposition is shown in Table 11 below:

Table 11: Cholesky Variance Decomposition

Variance Decomposition of LRGDP:					
Period	S.E.	LRGDP	LPPT	LVAT	INF
1	0.048290	100.0000	0.000000	0.000000	0.000000
2	0.070610	47.05399	3.218842	49.12313	0.604036
3	0.085938	55.41567	8.119977	34.51442	1.949929
4	0.105916	44.11482	17.26118	35.94714	2.676853
5	0.116543	43.30971	16.95630	37.37624	2.357749
6	0.126176	41.02680	20.54943	36.15873	2.265048
7	0.139077	42.49041	23.69927	31.84603	1.964296
8	0.150406	41.59244	26.12516	30.55540	1.727002
9	0.159617	42.47330	27.12627	28.86695	1.533473
10	0.167637	42.52040	28.00215	28.07231	1.405139

Variance Decomposition of LPPT:					
Period	S.E.	LRGDP	LPPT	LVAT	INF
1	0.487732	24.02374	75.97626	0.000000	0.000000
2	0.714183	40.44212	57.91161	1.592637	0.053635
3	0.765275	39.36969	54.27818	6.281490	0.070641
4	0.782859	41.09039	52.36311	6.442521	0.103987
5	0.798279	40.79875	51.36389	7.679614	0.157746
6	0.813796	41.00267	50.24545	8.596502	0.155377
7	0.833219	40.76762	49.64251	9.437109	0.152754
8	0.855343	41.02081	48.76136	10.05642	0.161423
9	0.874834	40.79635	48.07901	10.94294	0.181697
10	0.892736	40.94441	47.51261	11.35807	0.184914

Variance Decomposition of LVAT:					
Period	S.E.	LRGDP	LPPT	LVAT	INF
1	0.644339	26.87318	1.974436	71.15239	0.000000
2	0.668570	28.54903	2.004418	67.12872	2.317834
3	0.753135	23.82831	3.555693	56.83901	15.77699
4	0.754991	23.72243	3.538229	56.85200	15.88734
5	0.794074	22.16974	9.721095	53.72335	14.38582
6	0.836669	25.22027	12.13578	49.43942	13.20452
7	0.838293	25.14655	12.10337	49.30602	13.44407
8	0.845813	24.72697	12.97255	48.78879	13.51170
9	0.852338	24.99053	13.64170	48.06203	13.30575
10	0.858869	25.15609	14.38981	47.34484	13.10926

Variance Decomposition of INF:					
Period	S.E.	LRGDP	LPPT	LVAT	INF
1	3.038749	3.172617	19.64168	16.47754	60.70816
2	3.450057	3.596571	15.32277	27.04675	54.03391
3	3.868204	5.557930	27.32864	24.12505	42.98838
4	4.918153	20.72945	36.85530	15.81835	26.59690
5	5.161971	22.95688	37.25721	15.38456	24.40135
6	5.208783	23.67113	36.62058	15.10971	24.59858
7	5.217084	23.85939	36.50662	15.09762	24.53637
8	5.232946	23.71525	36.47186	15.42152	24.39137
9	5.239886	23.65646	36.39195	15.62374	24.32785
10	5.252242	23.70464	36.35777	15.70421	24.23339

Cholesky Ordering: LRGDP LPPT LVAT INF

The result indicates that shocks to economic growth explained 100 percent of the changes to itself in the first period which decreased to 42.5 percent in the last period. Shocks to VAT explained 49 percent of the changes in economic growth in the second period which reduced to about 28 percent in the last period. This is an indication of the important role played by VAT in generating the desired level of economic growth in Nigeria. Shocks to Petroleum Profit Tax explained about 3 percent of the changes in economic growth in the first period. This however increased to 28 percent in the last period. Shocks to VAT explained 2 percent of changes in Petroleum Profit Tax in the third period. This increased to 11 percent in the last period. An indication that of a

inefficient VAT mobilization in the oil industry. Shocks to economic growth explained 27 percent of changes in VAT in the first period. This reduced to 25 percent in the last period. Shocks to Petroleum Profit Tax explained 2 percent of the changes in VAT in the first period and this increased to 14 percent in the last period.

6. Conclusion and Recommendations

The study has been on VAT and macroeconomic performance in Nigeria. The cointegration technique and error correction were used. The analysis started with the ADF unit root test which indicates that all the variables except inflation are I(1). The Johansen cointegration test result indicates long run equilibrium relationship among the variables. The parsimonious ECM result showed that VAT has a significant and positive linear relationship with economic growth and this validated the alternative hypothesis of a significant relationship between VAT and the level of economic growth in Nigeria. The low elasticities of VAT at both the level and lags indicate the seemingly underutilization of VAT in Nigeria. This justified the call for an increase in VAT rate in Nigeria. A proper utilization of VAT for particular identifiable projects will facilitate the public's acceptance of the an increment in VAT. The account of the FIRS should be audited to improve efficiency. The Treasury Single Accounts should be further strengthened. The result overall, indicates that VAT matters for the development process in Nigeria. The result also recommends improved and efficient mobilization of the VAT across all sectors of the economy. Particular attention should also be paid in this regard to the petroleum industry. This will increase the total tax and hence the level of economic growth.

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5. Conclusion

A functional structure made up of holons is called holarchy. The holons, in coordination with the local environment, function as autonomous wholes in supra-ordination to their parts, while as dependent parts in subordination to their higher level controllers. When setting up the WOZIP, holonic attributes such as autonomy and cooperation must have been integrated into its relevant components. The computational scheme for WOZIP is novel as it makes use of several manufacturing parameters: utilisation, disturbance, and idleness. These variables were at first separately forecasted by means of exponential smoothing, and then conjointly formulated with two constant parameters, namely the number of machines and their maximum utilisation. As validated through mock-up data analysis, the practicability of WOZIP is encouraging and promising.

Suggested future works include developing a software package to facilitate the WOZIP data input and conversion processes, exploring the use of WOZIP in the other forms of labour-intensive manufacturing (e.g. flow-line production and work-cell assembly), and attaching a costing framework to determine the specific cost of each resource or to help minimise the aggregate cost of production.

The FIRS stated that on Thursday January 29, it generated N4.69 trillion from taxes for the federal government in 2014 in its Quarterly Revenue Report issued in Abuja. The ₦4.69 trillion FIRS claimed surpassed its target for the year by about N400 billion, but was about N106 billion less than that of 2013, which stood at N4.80 trillion. The report also indicated that N2.45 trillion, representing 52.96 per cent, was collected from petroleum profits tax while N2.24 trillion, representing 47.04 per cent, was collected from non-oil taxes during the period. A breakdown of the total collection showed that company income tax contributed N1.18 trillion; N10.83 billion from gas income; N2.59 billion from capital gain tax and N10.94 billion from stamp duty. The VAT, comprising Nigeria Customs Service Import VAT and Non-Import VAT contributed N802.95 billion of the total non-oil taxes collection during the period (Ighomwenghian, 2015). In spite of the above, Nigerian tax revenue as percentage of GDP is among the lowest in Sub-Saharan Africa as shown in the table below.

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