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EVALUATION OF THE EFFECT OF VALUE ADDED TAX ON TAX REVENUE STABILITY IN NIGERIA

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Abstract
Value Added Tax (VAT) was introduced into the Nigeria's tax system as a means of increasing government tax revenue given the steadily rising cost of governance on one hand and the dwindling returns from petroleum(main source of revenue) sector. The study evaluated tax revenue stability in Nigeria from January 2010 to December 2018. The methodology used in the study was descriptive statistics. The conclusion reached from descriptive statistics and GARCH (1,1) model estimated revealed that tax revenue is highly volatile in Nigeria. Petroleum Profit tax contributes more to the volatility of tax revenue than Value Added Tax. Also, other non-oil taxes (Company Income tax, Personal income Tax etc.) accounts for more volatility of tax revenue than Value Added Tax. The study recommends widening of the tax base in order to stabilize tax revenue and diversification of tax revenue away from Petroleum Profit Tax to other taxes in order to attain tax revenue stability.

Keywords: Value Added Tax, Tax Revenue Stability, GARCH, Nigeria

Introduction

Value Added Tax (VAT) was introduced into the Nigeria's tax system as a means of increasing government tax revenue given the steadily rising cost of governance on one hand and the dwindling returns from petroleum(main source of revenue) sector (Okoli & Afolayan, 2015). The need for optimal tax revenue yield in Nigeria cannot be over emphasized in view of the growing fiscal deficit induced by recurring increases in both recurrent and capital expenditure of governments at different levels overtime (Ohagwa, 2012).

Nathan (2015) contended that volatile government revenue is a challenge for fiscal policy makers because it creates risks to government service provision and can make government planning difficult especially when revenue falls short of expenditure needs frequently and unexpectedly. Such random changes in expenditure plans can be costly by making expenditure (execution) less efficient and may require governments to draw down accumulated savings or dispose assets. Ebeke and Ehrhart (2012) argued that instability of tax revenues is of great concern, especially for developing countries, since it leads to volatility of much-needed public expenditures.

Given the frequent oscillations in oil market, inelastic supply of the OPEC member countries and random hostility in the Niger Delta, non-oil revenue have remained a veritable source of sustainable funding for government and VAT is a key component of non-oil revenue that need to be optimally harnessed for financing government projects and activities (Musa,2015).

Theoretically, there are two main postulations that can explain why the presence of VAT in a country can lead to enhanced tax stability. The first reason derives from the fact that the collection of VAT revenues at numerous stages (multi stage) of the value-added chain can diversify the risk and render VAT revenues less sensitive to shocks and more

stable, than in a situation in which consumption taxes are collected only at the final retail stage (sales tax). Secondly, the presumption that VAT relies mainly on consumption and this component is relatively more stable than exports, imports or investment. A greater reliance on consumption for VAT revenues is expected to stabilize tax revenues (Ebeke and Ehrhart, 2011).

Ohagwa(2012) posited that the inefficiency of VAT collection in Nigeria has wide spread implication for total tax revenue short fall, project execution, non-pay of salaries, budget deficit and government borrowings. The inability to generate a steadily rising and stable VAT revenue has made government to embark on regular treasury bills issuance and other money market instruments so as to augment for revenue shortfall in order to provide funds for critical recurrent and capital expenditures. Also, this condition usually becomes worse when oil revenue fluctuates for a long time as business and economic expectations are distorted overwhelmingly.

The significance of VAT collection optimization cannot be over emphasized because when oil prices crash or when output are cut either due to militancy in Niger Delta or OPEC quota imposition, the government must fall back to non-oil tax in which VAT is a key component for sustainable government financing in order to keep government away from insolvency and irregular borrowings at exorbitant rates either locally or internationally.

To this effect, study on the stability of revenue becomes very important because it helps governments to have plausible spending and borrowing plans. Against this backdrop, the need for a comprehensive study on the impact of VAT revenue on tax revenue stability in Nigeria is of paramount importance so as to decipher whether sustainable tax revenue stability can be achieved. Therefore, this study investigates whether tax revenue is stable or not in Nigeria and whether VAT and Petroleum profit tax contributes to the stability or volatility of the tax revenue? The scope of the study covers monthly data for the period January 2010- December 2018 because VAT is a monthly assessed tax. The study is organized into five sections, section one is introduction, section two is literature review, section three is methodology, section four is results presentation and interpretation and section five is conclusion and recommendations.

Literature Review

Value Added Tax

Value Added Tax is the tax on "value added" (the amount of value a firm contributes to a good or services by applying its own factor of production). The United Kingdom Statement of Accounting Practice (SSAP) No 5 aptly defines VAT as *''a tax on the supply of goods and services which is eventually borne by the final consumer but collected at each stage of the production and distribution chain*''. On the other hand, at the International Tax Dialogues'(ITD) VAT conference (a joint initiative of the IMF, OECD, World Bank and UN as active observers) in Rome, Italy *''VAT was defined as a general consumption tax assessed on the value added to goods and services as they pass through the supply chain''* (ITD, 2005). In Nigeria, the substantive rates are Zero (0) and Five (5) percent as provided in Section 4 of the VAT Act No 102 of 1993.

Tax Revenue Stability

Haughton (1998) defined a stable tax as one that is less sensitive to economic fluctuations and argued that stability of revenue helps governments to have plausible spending and borrowing plans. Wellington, Netsai, & Fungayi(2015) argued that tax revenue stability is a concept concerned with short-run fluctuations in tax revenues over the business cycle; therefore estimates of revenue stability developed on the basis of long-run measures are not appropriate for explaining the short-run dynamics of revenues. Also, Wellington, Netsai, & Fungayi(2015) and Haughton (1998) positioned that a simple measure of stability of tax revenue is the coefficient of variation (CV), which is defined as the standard deviation of a tax revenue divided by its mean.

Theoretical Review

Value Added Tax Model

There are five models of computing VAT which are European model (credit invoice method), Credit without invoice, Japanese model (subtraction), Addition direct models and Addition indirect models.

Under the **European (Credit Invoice Method)** model, a taxable person would calculate VAT to be remitted to the government by a three steps process. First the firm would multiply its sales by the rate of VAT to calculate the output VAT. Secondly, the firm will calculate its input VAT by multiplying the VAT rate with its Vatable purchase and not total purchase because sometimes some purchases are exempted while others may be disallowed for claim as input depending on the type of VAT being operated (Nnaji, 2012). Finally, input VAT will be subtracted from Output VAT to arrive at VAT payable by the taxpayer after substantiating the validity of the input claim with an invoice. In a VAT inclusive system, it is necessary for the firm to calculate its VAT liability before setting its prices in order to shift the burden of VAT to the consumer fully. The European model is also called credit method and this method has been adopted by several

countries including Nigeria. However, the Nigerian credit method is being operated under a VAT exclusive system (Ojo, 2009).

In the case of Credit Subtraction Method without Invoice, Ojo(2009) posits that the difference between the credit –subtraction method without invoice and the method with invoice is in the determination of input VAT. While net tax liability is computed the same way, in the method without invoice, input VAT is determined from the financial records of the company (business) rather than an invoice in the case of method with invoice. To this effect, the without invoice method is VAT inclusive (i.e Vat rate=5/105) while the invoice based method is VAT exclusive (i.e Vat rate = 5/100) (Mtasiwa,2013).

Under Addition Direct Method, the firm calculated the value added by adding all the payment for factor inputs (i.e earnings by four factors of production employed by the taxable entrepreneur) rent for land, interest for capital, wages for labour, and profit for entrepreneurial ability. The total sum of factor income is then multiplied by the VAT rate to get VAT payable to government (Ojo, 2009).

Unlike Addition direct Method, Value added tax is calculated under **the additional indirect** method by multiplying the VAT rate with all the component of the Value added factor inputs (i.e earnings by four factors of production employed by the taxable entrepreneur) rent for land, interest for capital, wages for labour, and profit for entrepreneurial ability. The total of VAT computed for each factor income is then summed up to arrive total VAT payable to government (Mtasiwa, 2013).

The Value Added is arrived at by subtracting taxable purchases from taxable sales which will be multiplied by the VAT rate to arrive at VAT under the Japanese Model .This method is also called the subtraction method (Nnaji, 2012).

Amongst all these methods, the European (credit) method remains the most popular because it attaches liability to transaction thereby making it easy to police through the evidential receipt and creates a good audit trail because of invoicing and Nigeria is operating this method. On the other hand, addition and subtraction methods are accounts based which means determining profit may be difficult where there are multiple rates for different transaction.

Types of Value Added Tax

There are three main types of VAT which are the Consumption, Income and Gross product VAT. Under the consumption VAT, capital purchase are treated the same way as the purchase of any other inputs i.e the treatment of capital input is equivalent to expensing. The main advantages of the consumption method is that taxpayers can claim credit for tax paid on capital assets immediately which will ease cash flows, tax burden is shifted to consumers by way of higher prices and it is easier to compute since taxpayers don't need to separate capital expenditure from revenue expenditure. On the other hand, the disadvantage of consumption VAT is that it creates refund problems perpetually (Ojo, 2009) and (Soyode & Kajola, 2006). All Organization for Economic Cooperation and Development (OECD) Countries that have adopted VAT are practicing Consumption VAT (Nnaji, 2012).

In the case of income VAT, the VAT paid on purchase of capital inputs are not wholly allowed as in the case of consumption tax but are amortized over the expected useful life of the asset. The system is very much like capital allowance but the difference is that the input tax is amortized against output tax rather than assessable profit. The income VAT does not favour taxable firm because it does not take into account the time value of money (Nnaji, 2012).

On the other hand, the gross product VAT has no provision for deduction of input VAT on capital purchases. In other words, taxable persons are treated as final consumer of all capital inputs since it is not allowed for offset against output VAT. Under this situation, the input Vat paid for capital purchases serves as part of cost of that capital input even though the taxpayer is allowed to capitalize the capital input for income tax purpose thereby claiming capital allowance over the expected lifetime of the asset. The main advantage of this system is that it saves a country from perennial refund problems. Soyode & Kajola (2006) argue that gross product VAT seeks to discourage investment in capital assets as input VAT are non-claimable. It is important to note that this is the type of VAT practiced in Nigeria (Nnaji, 2012).

Soyode and Kajola (2006); Ojo(2009) and Nnaji (2012) came to the conclusion that the basic difference among the three (Consumption, Income and Gross product) method is on how they treat input VAT on the purchase of capital assets otherwise the Three method will arrive at the same VAT payable for the taxpayer. Consumption allows the claiming of Input VAT wholly while gross product disallows such claims totally. In between these extreme view lies the Income VAT method which allows for a partial claim by amortizing capital inputs claim over the useful life of the asset.

Empirical Literature

Muthumi *et al* (2019) investigated the volatility of VAT revenue in Kenya for the period January 2016

to March 2019. The Lagrange Multiplier test confirmed the presence of ARCH effects using the residuals of the mean equation. A number of heteroscedastic models were fitted and the TGARCH(1,2) family was preferred to fit the volatility of the returns. The result from T-garch (1,2) showed that volatility persist in the VAT returns in Kenya and recommended that future researchers should examine the effectiveness of other heteroscedastic models like EGARCH, IGARCH and GARCH-M in modeling and forecasting of revenue volatility.

Chimilila (2017) applied GARCH(1,1)model in analyzing the volatility of tax revenue in Tanzania for the period January 2000 to February 2015. The GARCH result showed that tax revenue have high volatility due to heavy reliance on income tax and income taxes are more volatile than VAT.

Nathan (2015) applied a structural model of tax revenue volatility to investigate the positive and Normative aspects of tax revenue volatility using states' data for the period 1970-2014 in the United State of America. Descriptive statistics showed that tax revenue volatility in US states' increased generally after the year 2000 and continues to burden state budgets. The study concludes that a large proportion of the increase in tax revenue volatility can be attributed to differences in tax policy which is higher in sales tax than cooperate taxes. The extent to which VAT has been contributing to federally collected revenue was analyzed by Okoli and Afolayan(2015) between 1994-2012 in Nigeria. Descriptive statistics used revealed that VAT is the Second most significant contributor to total tax revenue along with Petroleum Profit Tax.

Ebeke (2014) examined the impact of international remittances on both the level and the instability of government tax revenue in receiving countries. Using a large sample of developing countries observed over the period 1980-2006. System GMM technique showed that with VAT adoption, the remittances significantly increases both the level and the stability of government tax revenue ratio in receiving countries that have adopted the VAT.

Okwori and Ochinyabo(2014) examined the effect of VAT on revenue generation in Nigeria using a log-linear model. They found that VAT has a tax elasticity of 0.186% and concluded that numerous exemption, generous concession and arbitrary waivers affects VAT base and led to poor fiscal performance.

Dickson and Rolle(2014) studied the impact of tax reform on federally collected revenue between 1981-2011.The granger causality tests showed that VAT granger causes federally collected revenue and concluded that improving VAT collection by way of curbing evasion and avoidance can improve revenue collection.

Onalapo and AJala(2013) analyzed the effect of VAT on revenue generation with the use of step-wise regression whose findings showed that VAT had significant positive effect on revenue generation in Nigeria but more need to be generated in order to meet up with the pressing demand for financing social services.

Ebeke and Ehrhart(2012) examined whether or not the adoption of value-added tax(VAT) in developing countries was an effective way of stabilizing tax revenues. Using a large panel of 103 developing countries observed over the period 1980-2008. Two stage least squares method was used for the study and found robust evidence that the presence of VAT leads to significantly lower tax revenue instability. On average, countries with VAT experience 40-50% less tax revenue instability than countries which do not have a VAT system. These effects decrease with the level of economic development and the openness of trade.

In a similar study, Ebeke and Ehrhart(2011) evaluated the consequences and remedies of tax revenue instability in sub-Saharan Africa using a panel of 39 countries observed 1980-2005. Two step system GMM was used in analysis and found out that countries that relied on trade taxes tend to have unstable revenue than countries with indirect tax (VAT).

Sunjoo(2011) examined the effect of general sales tax and individual income tax on the cyclical volatility of tax revenues using pooled OLS on state panel data over the sample period from 1992 to 2007. Regression results indicated that tax base composition significantly affects revenue volatility. Specifically, tax exemptions for household necessities (food and clothing) and producer goods are found to have statistically significant effects on sales tax volatility.

Aizenman and Jinjawak(2005) evaluated the structural factors explaining the collection efficiency of VAT in a panel of Forty Four (44) countries over the period of 1970-1999. The Gini Coefficient showed that a One standard deviation increase in durability of political regime and in the ease and fluidity of political participation, increase VAT collection by 3.1%. Michael, Norman & David (1995) examines the temporal instability of tax revenues across a sample of developed and less developed countries. Descriptive statistics showed that tax revenue instability is high in LDCs and is highest in open economies with low per capita

income, high output variance and inflationary problems. Cross-section evidence for LDCs confirms that countries with high tax revenue instability tend also to have high expenditure instability.

Summarily, most of the Nigerian studies like Onalapo and AJala(2013); Okwori and Ochinyabo(2014); Dickson and Rolle (2014); Okoli and Afolayan(2015) and other works on VAT evaluated the impact of VAT on GDP and revenue but did not estimate the effect of VAT revenue on tax revenue volatility in Nigeria which this research addressed.

Unlike Chinwe(2013); Okoli and Afolayan(2015) and Charles and Isaac(2014) who studied VAT using annual data, this study will employ monthly data because VAT is a monthly assessed tax and based on the need to avoid data aggregation problems that may arise with annual data. Also, monthly data will generate larger sample size which will improve consistency and efficiency of the model used.

Unlike Sunjoo(2011); Ebeke and Ehrhart(2012) and Ebeke(2014) who estimated tax revenue volatility using the instability index generated in sample of LDC countries with and without VAT. This study will analyze the effect of VAT on tax revenue stability in Nigeria using both instability index and GARCH (1,1) model.

Methodology

This section seeks to justify the methods to be used in this research. The approach deployed includes testing the arch effect prior to estimation in order to avoid spurious results.

Test for Arch effect

Unlike the Goldfield-quandt test which requires reordering the observation with respect to X variable that supposedly caused heteroscedaticity, or the BPG test which is sensitive to normality assumption, the general test of heteroscedaticity proposed by White does not rely on the normality assumption and a corrected standard errors of OLS estimator can be obtained in large sample only with White test (Kemal, Pejam, & Gizen, 2009).

H_o: No heteroscedasticty
H_1: heteroscedasticity exist

Decision rule
If F Fcal is greater than Ftab, reject H_o which implies that arch effect exist. Otherwise, you accept H_o which implies no heteroscedasticty exist.

Generalized Autoregressive Conditional Heteroscedasticity (GARCH model)

The adoption of the GARCH model was precedence on the existing of **Arch effect** and the recognition that the data set were financial and high frequency in which the assumption of homo-scedasticity was more likely to be violated. The Garch model is preferred to Arch model because it is more parsimonious, avoids over fitting and less likely to breach non-negativity constraints. Thus, following Engel (1982); Bollarslev (1986); chimilila(2017) and Muthumi, Anthony and Anthony(2019) to study volatility of stock prices, inflation, tax and VAT revenue respectively, the GARCH specification was adopted to measure the volatility of Non-oil tax revenue and total tax revenue. The GARCH (1,1) process for VAT model can be specified as thus:

$$Y_t = x_t Y + E_t \quad \text{.....(1)}$$

$$\square_t^2 = \square + \square E^2_{t-1} + \square\square^2_{t-1} \quad \text{.....(2)}$$

The mean equation is a function of an exogenous variable (X_tY) and an error term E_t While the conditional variance is a function of mean ($\square$), the ARCH term ($\square E^2_{t-1}$) and the GARCH term ($\square\square^2_{t-1}$).

Non Oil Tax Revenue Model

$$\textbf{NON OIL}_t = F(\textbf{NON OIL}_{t-1}) \quad \text{.....(3)}$$

$$\text{Log } \textbf{NON OIL}_t = \square_0 + \square_2 \textbf{NON OIL}_{t-1} + \square_t \quad \text{.....(4)}$$

.

$$\square^2_t = \square_1 + \square_2 E^2_{t-1} + \square\square^2_{t-1} \quad \text{.....(5)}$$

.

Where: $\textbf{NON OIL}_t$ –NON OIL at time t at time t;
$\textbf{NON OIL}_{t-1}$ -NON OIL at time t-1
$\square_t$-Error term at time t.

Expected signs in eqn (4) $\square_2 > 0$.

Total Tax Revenue Model

TOTAL TAX $_t$ = F(**TOTAL TAX** $_{t-1}$) ……..……..……....(6)

Log **TOTAL TAX** $_t$ = α_0 + α_2 **TOTAL TAX** $_{t-1}$ + ε_t ……..……..(7)

σ^2_t= α_1 + $\alpha_2 E^2_{t-1}$ + $\beta\sigma^2_{t-1}$ .....……..……..……(8)

Where:

Eqn (7) is the mean equation which is a function of a lagged variable total tax $_{t-1}$ and an error term ε_t

Eqn(8) is the conditional variance which is a function of mean (α_1), the ARCH term ($\alpha_2 E^2_{t-1}$) and the GARCH term ($\beta\sigma^2_{t-1}$).

TOTAL TAX $_t$ –**TOTAL TAX** at time t at time t;

TOTAL TAX $_{t-1}$ -**TOTAL TAX** at time t-1 and ε_t-Error term at time t.

Expected signs in eqn (7) α_2>0.

Measures of Instability

In addition to the GARCH (1,1)model estimated for volatility, this study will employ the coefficient of variation (which is the standard deviation divided by the mean) as a measure of instability so as to corroborate the outcome of the GARCH estimation. Ebeke and Ehrhart(2012); Ebeke (2014) and Wellington, Netsai, & Fungayi (2015) used co-efficient of variation to measure the instability of VAT and tax in their studies by generating an instability index over the study period because it averages the spread and it was adopted for this study.

$$\text{Coefficient of Variation} = \frac{\text{Standard Deviation}}{\text{Mean}}$$

Sources of Data

The data used for the study was secondary and sourced from Planning Research and Statistics Department of Federal Inland Revenue Service. High frequency monthly data was used for the study because the bases period for assessing VAT is monthly.

Results and Discussion

This section deals with results presentation, analysis and interpretation.

Graphical plot of total tax revenue with and without VAT in figure 1 and 2 showed similar spikes and oscillations indicating that decomposition of VAT from the total figure has not changed the pattern of volatility implying that VAT has no effect on tax revenue volatility.

Figure 1

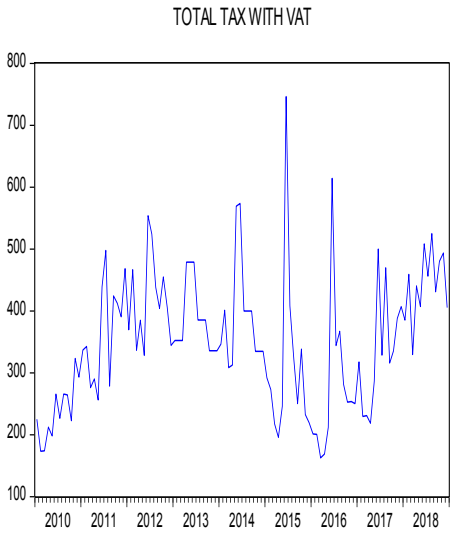
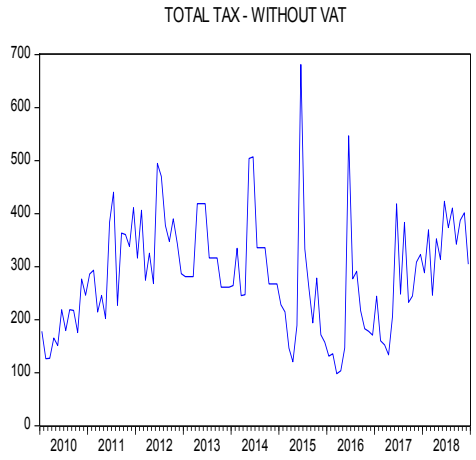


Figure 2



Graphical plot of Non-oil tax revenue with and without VAT in figure 3 and 4 showed similar spikes and oscillations indicating that decomposition of VAT from the total tax revenue figure has not changed the pattern of volatility implying that VAT has no effect on Non-oil revenue volatility.

Figure3

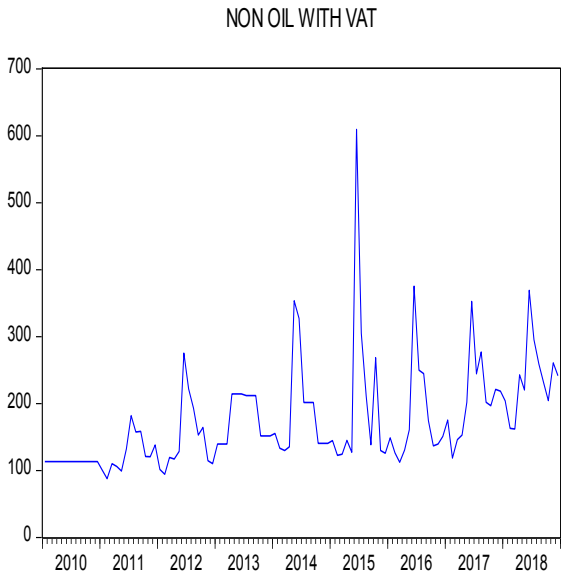
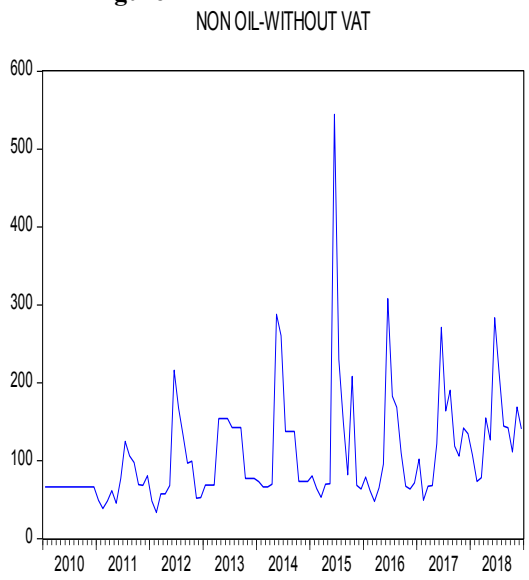


Figure 4



Comparing graphical plot of total tax revenue(figure 1) and non oil revenue(figure 3) showed remarkable changes in the spikes and oscillations indicating that petroleum Profit tax accounts for significant changes in the pattern of volatility implying that petroleum profit tax has significant effect on total tax revenue volatility.

Table 1: Result of Arch Effect Test

Variables	F_{CAL}	F_{TAB}	Decision
NON OIL	1.72	0.1922	Reject Ho
TOTAL TAX	3.99	0.048	Reject Ho

Source: Researcher's computation using E-views 9.0

The above table showed that Fcal is greater than Ftab in Non-oil tax revenue and total tax revenue which implies that arch effect exist thereby justifying the need for GARCH model estimation.

Garch Model Estimation
Non-Oil Tax

$$NON\text{-}OIL_t = \underset{(32.24)}{112.48} + \underset{(2.199)}{0.316}NON\text{-}OIL_{t-1} + \varepsilon_t \quad (9)$$

$$\square^2_t = \underset{(0.69)}{1558.21} - \underset{(1.72)}{0.02}\varepsilon^2_{t-1} + \underset{(1.48)}{0.68}\square^2_{t-1} \quad (10)$$

The sum of the ARCH and GARCH co-efficient α+β (-0.02+ 0.68=0.66) is close to one indicating that volatility is persistent. This implies that the Non-oil tax remain volatile over the estimation period.

Non-Oil Tax-Vat

$$NON\text{-}OIL\text{-}VAT_t = \underset{(3.13)}{73.165} + \underset{(1.89)}{0.28}NON\text{–}OIL\text{-}VAT_{t-1} + \varepsilon_t \quad (11)$$

$$\square^2_t = \underset{(0.78)}{1669.32} - \underset{(2.96)}{0.022}\varepsilon^2_{t-1} + \underset{(1.37)}{0.635}\square^2_{t-1} \quad (12)$$

The sum of the ARCH and GARCH co-efficient α+β (-0.22+ 0.63=0.61) is close to one indicating that volatility is persistent. This means that Non-Oil tax remain volatile over the estimation period despite

decomposing VAT from the Non –oil tax revenue. VAT revenue exert little or no impact on the volatility of non-oil tax revenue as (α+β) changed from 0.66 to 0.61. This implies that other non-oil tax revenue (education tax, Company Income tax, Capital gain tax and personal income tax) are largely responsible for the volatility of non-oil tax revenue other than Value added tax.

Total Tax

$$TOTAL_t = \underset{(60.39)}{5.44} + \underset{(4.86)}{0.0012}TOTAL_{t-1} + \varepsilon_t \quad (13)$$

$$\sigma^2_t = \underset{(1.275)}{0.0090} + \underset{(1.482)}{0.0326}\varepsilon^2_{t-1} + \underset{(2.244)}{0.542}\sigma^2_{t-1} \quad (14)$$

The sum of the ARCH and GARCH co-efficient α+β (0.32+ 0.54=0.86) is close to one indicating that volatility is persistent. This means that total tax remain volatile over the estimation.

Total Tax-Vat

$$TOTAL\text{-}VAT_t = 5.22 + \underset{(53.083)}{TOTAL - VAT}\ \underset{(4.59)}{0.00159}_{t-1} + \varepsilon_t \quad (15)$$

$$\sigma^2_t = \underset{(1.434)}{0.0157} + \underset{(1.560)}{0.343}\varepsilon^2_{t-1} + \underset{(2.061)}{0.5049}\sigma^2_{t-1} \quad (16)$$

The sum of the ARCH and GARCH co-efficient α+β (0.34 + 0.50= 0.84) is close to one indicating that volatility is persistent. This means that TOTAL tax remain volatile over the estimation period despite decomposing VAT from the TOTAL tax revenue. VAT revenue exert little or no impact on the volatility of tax revenue as (α+β) changed from 0.86 to 0.84. This implies that other tax revenue (education tax, Company Income tax, Capital gain tax, petroleum profit tax and personal income tax) are largely responsible for the volatility of tax revenue other than Value added tax.

The ARCH and GARCH co-efficient fell from 0.86 to 0.66 in the case petroleum Profit tax while it fell from 0.86 to 0.66 in the case of VAT. This implies that petroleum profit tax accounts for more tax revenue volatility than Value added tax.

Descriptive Statistics

Table 2: Coefficient Of Variation

Periods	Total Tax With VAT	Total Tax Without VAT	Total Non-Oil	Non-Oil Without VAT
2010	19.5438	24.3608	0.0000	0.0000
2011	22.3528	25.6726	22.6134	36.7565
2012	17.3755	20.3306	37.0320	61.8615
2013	14.9272	19.8142	19.8368	35.9083
2014	23.0027	27.9925	40.5715	63.7017
2015	47.9532	60.1470	69.3439	100.1670
2016	44.9641	59.6953	42.2262	68.6152
2017	27.2497	35.1231	30.0970	47.5232
2018	12.6278	15.3825	23.9115	39.8895

Source: Researcher's computation.

The coefficient of variation became higher when VAT was decomposed from both total tax and non-oil tax revenue indicating that volatility is higher. In addition, the coefficient was equally higher when Petroleum profit tax was decomposed from total tax revenue. This implies that VAT, PPT and other taxes

are all vulnerable and engendering a highly unstable tax system.

Conclusion and Recommendations

The study evaluated tax revenue stability in Nigeria from January 2010 to December 2018. The conclusion reached from descriptive statistics and GARCH (1,1) model estimated revealed that tax revenue is highly volatile in Nigeria and Petroleum Profit tax contributes more to the volatility of tax revenue than VAT. Also, other non-oil taxes (Company Income tax, Personal income Tax e.t.c) account for volatility of tax revenue than Value Added Tax. The study recommends widening of the tax base in order to stabilize tax revenue and diversification of tax revenue away from PPT in order to attain tax revenue stability.

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