Econometric Analysis of the Impact of Value Added Tax on Economic Growth in Nigeria

Ezeji E. Chigbu, Peter Ifeanyichukwu Ali
Department of Financial Management Technology, Federal University of Technology Owerri, Imo State, Nigeria
E-mail of corresponding author: frpeterali@yahoo.com

Abstract

The importance of value added tax (VAT) as a source of government revenue in both developed and developing countries has been subjected to serious examination in recent decades. The objective of this paper is to empirically analyse the relationship between VAT and economic growth in Nigeria. Using the Engle and Granger cointegration technique on annual data sample covering 1994 to 2012, this paper shows that VAT has positive effect on economic growth proxied by real GDP. The results also show absence of both long-run and short-run relationship between VAT and GDP. The government should therefore put in place measures to enhance productivity so as to increase the contribution of VAT to economic growth in Nigeria.
Keywords: Value added tax, economic growth, gross domestic product, Nigeria
JEL Classification: H24, 24, O10

1. Introduction

The linkage between value added tax (VAT) and economic growth has attracted the attention of academics and policy makers in recent years. Over the last few decades, VAT has swept the world. VAT was first introduced by France in 1954. It has been embraced by well over seventy countries all over the world. These include the entire organization for Economic Co-operation and Development of countries, Japan, Canada, the state of Michigan in the USA and many African Countries (Olatunji, 2009). The principal reasons for the rapid spread of this form of taxation were, first, the early adoption of this form of taxation in the European Union and, second, the key role played in spreading the word to developing and transitional economies by the International Monetary Fund in particular and by international agencies and advisors more generally (Bird, 2005).

The introduction of VAT in Nigeria through Decree 102 of 1993 marks the phasing out for the Sales Tax Decree No. 7 of 1986. The Decree took effect from 1st December, 1993, but by administrative arrangement, invoicing for tax purpose did not commence until 1st January, 1994. VAT is tax on the supply of goods and services which are eventually borne by the final consumer but are collected at each stage of production and distribution chain. With VAT, government reasoned, it will be virtually impossible to evade tax. In majority of the developed countries, value added tax system is a substitute for, tax on consumption and other taxes, especially company taxes. By using the VAT, it is expected that this substitution will have positive effects on production and economic growth (Iranian National Tax Administration, undated). It is instructive to examine what happens when nations implement this tax. Do they grow faster or slower?

Empirical studies have shown the interrelationship between the VAT revenue of a country and its level of economic development. The revenue gains from VAT are likely to be higher in an economy with higher level of per capita income, lower share of agriculture, and higher level of literacy (Ebrill, et al. 2001).

The major objective of this study is to answer this question by empirically examining the impact of VAT on economic growth. The remainder of the paper is organised as follows. Section 2 presents the review of related literature. Section 3 provides the data and methodology. Section 4 presents the empirical results, and section 5 provides the conclusions.

2. Literature Review

Value Added Tax (VAT) is now the most common form of consumption tax system used around the world. This analysis covers VAT and equivalent sales tax systems implemented in 145 different countries. Although the principles of the tax are broadly the same everywhere, the rules can be enacted and implemented differently in different countries so that the compliance burden on business varies considerably. There are many previous studies examining either the relationship or impact of Value Added Tax (VAT) on revenue generation as well as on economic growth in Nigeria.

Hence, Bakare (2013) investigated the enormity of the impact of the value added tax on output growth in Nigeria. Ordinary least square regression analytical technique (OLS) was employed for the empirical study. The a priori expectation is that value added tax will impact positively on output growth in Nigeria. The study found that a positive and significant relationship exist between value added tax and output growth in Nigeria. The results of the finding showed that; the past values of value added tax could be used to predict the future behaviour of output growth in Nigeria. The main conclusion of this study therefore is that Value Added Tax has the potential to assist in the diversification of revenue sources, thereby providing enough funds for economic growth and

development and reducing dependence on oil for revenue.

Secondly, Umeora (2013) investigate the effects of Value Added Tax (VAT) on Economic Growth (GDP) and total tax revenue in Nigeria. In pursuit of this, two hypotheses were proposed namely H_{01} VAT does not have significant effect on GDP. Secondly we have H_{02} VAT does not have significant effect on Total Tax Revenue. Simple Linear Regression method was used to analyze time series data relating to VAT, GDP and Total Revenue for period 1994 – 2010 and computation done with the assistance of SPSS. The results of regression analysis show that VAT has significant effect on GDP and also on Total Tax Revenue. That means that both Null Hypotheses (Ho) are accepted. The government is encouraged to sensitize the people to enable it increase the tax rate so as to enlarge its annual revenue for economic development.

Komal (2013) focused on the impact of VAT on Business Enterprises, Wholesalers, Retailers, Chartered Accountants, Tax officials and Consumers in Delhi and to come up with practical and viable suggestions for better implementation of VAT. The primary data is collected from the Business Enterprises, Tax Officials, Chartered Accountants, Wholesalers, Retailers and Consumers with the help of Questionnaire. A questionnaire with three sections was developed and finalized. The first part of the questionnaire comprises demographic factors with optional questions. The study reveals that the requirement of transparency in VAT is needed in all the states of India. It is found that equal channel of distribution of VAT is prevailing among Wholesalers, Retailers and Consumers.

Unegbu and Irefin (2011): examined the impact of value added tax (VAT) on economic and human developments of emerging Nations from 2001 to 2009. The scope of study centered on Adamawa State of Nigeria. Data were collected from both primary and secondary sources. Regression, discriminant analysis and ANOVA were used in testing the hypotheses. We found out that VAT allocations alone accounts for 91.2% of the variations in expenditure pattern of Adamawa State from and that VAT allocations to the State within the said periods were very significant. The facts obtained via secondary data attest to a very significant VAT impact on economic and human development of the State from 2001 to 2009 but data obtained from primary sources suggest minimum VAT impacts. Thus study concludes that VAT allocations to the state within the said periods were very significant when compared with the total revenues of Adamawa State within the same period. The perceptions of VAT impact on economic and human development across the administrative areas of Adamawa State are not significantly different.

Naibei, Momanyi and Oginda (2012): in their study seek to establish the relationship between the size of income of taxpayers, inspection by tax authorities and VAT compliance among private firms in Kenya. Both quantitative and qualitative techniques were used to analyze the data. A combination of the techniques was used because descriptive methods tend to be strong in validity but weak in reliability while quantitative methods are strong in reliability but weak in validity. Findings revealed that there is no significant relationship between the size of the taxpayer's income and VAT compliance. However, the study revealed that VAT non-compliance is high among mid-income sized private firms with turnover ranging five million-hundred million shillings per annum. The study furthers a significant positive relationship between inspections by tax authorities on VAT compliance. The study concluded by recommending that stringent compliance measures and close monitoring should be observed among the mid-sized private firms. Tax authorities should also encourage effective use of tax registers through regular but impromptu inspections.

Also, an empirical investigation into the relationship between Value Added Tax (VAT) and Gross Domestic Product (GDP) in Nigeria by Denis (2010) shows that VAT is significant for planning and policy formulation as regards revenue generation. Data based on VAT revenue figure and GDP figure from 1994 to 2008 obtained from Central Bank of Nigeria's statistical bulletin, 2008 was collected and used. GDP and VAT figures for the period of study are tested for correlation. The test revealed a strong Pearson's Product Moment Correlation (PPMC) at about 96 per cent strength. Further, a test of significance confirmed that VAT revenue is significantly different at 99 percent confidence level in relation to GDP. The study suggests the maintenance of the status quo as it could suggest support to the economy and convenience principles of taxation.

Similarly, Olatunji (2013), in his work determined the impact of VAT on the revenue generation in Nigeria and the perception of the citizen on VAT and Inflation. He adopted the descriptive research approach for the study. Accordingly, data gathered were; Primary data from oral interviews and structured questionnaires, while secondary data were obtained from Federal Inland Revenue Service (annual reports), Nigerian Tax news, Value Added Tax Decree, Federal office of statistics. The study concludes that for a success of any fiscal policy, VAT must be properly planned, the duration depending on the level of the development of the country, also effective communication should be used to improve the quality of its implementation and increase the revenue collected.

Adereti, Sanni, and Adesina (2011), in analyzing Value Added Tax and Economic Growth of Nigeria, used Time series data on the Gross Domestic Product (GDP), VAT Revenue, Total Tax Revenue and Total (Federal Government) Revenue from 1994 to 2008 sourced from Central Bank of Nigeria (CBN) were analyzed, using both simple regression analysis and descriptive statistical method. Findings showed that the ratio of VAT

Revenue to GDP averaged 1.3**%** compared to 4.5% in Indonesia, though VAT Revenue accounts for as much as 95% significant variations in GDP in Nigeria. A positive and significant correlation exists between VAT Revenue and GDP. Both economic variables fluctuated greatly over the period though VAT Revenue was more stable**.** No causality exists between the GDP and VAT Revenue, but a lag period of two years exists. This paper therefore recommends that all identified administrative loopholes should be plugged for VAT Revenue to continue to contribute more significantly to economic growth of the country. This should be done on the realization that any action taken on either VAT Revenue or the GDP will take two years to become effective Ruebling, (1973) discussed the concept of Value Added Tax and Factors Affecting Its Economic Impact. Its main purpose, however, was to illustrate some of the necessary, but often overlooked, ingredients for analysis of any tax proposal. Two basic points made in this article are: (1) the consequences for income distribution, economic growth, and the international balance of payments of a VAT substitution in the tax structure depend largely on what happens to prices; (2) the effects on prices of the imposition of a VAT in place of another tax depend to a considerable extent on monetary conditions — the rate of growth of the money supply and the velocity of money — and on the price-impact of an alternative tax or other use of funds. In contrast to some widely alleged consequences of a VAT, it is noted that a VAT need not be followed by inflation or greater inequality of income distribution.

3.   Research Methodology
3.1   Model Specification
To investigate relationship between value added tax (VAT) and economic growth as proxied by real GDP, we adopt the following structural model:

$$RGDP_t = \beta_0 + \beta_1 VAT_t + \mu_t \qquad\qquad (1)$$

The *a priori* expectation of the slope coefficient is: *VAT > 0*.
Where *RGDP* is the dependent variable and is the observations of yearly real gross domestic products, VAT_t denotes the yearly observations of value added tax, β_1 is the coefficient and its effect on real GDP and μ_t is the stochastic error term at time *t*.

3.1   Description of Data
The data for this study are yearly series of real GDP and yearly series of value added tax in Nigeria. The Real GDP series were obtained from Central Bank of Nigeria (CBN) statistical bulletin for various years and VAT series were obtained from the National Bureau of Statistics (NBS) website. The period under consideration for the variables ranges from 1994 to 2012.

3.1   Techniques of Analysis
The technique of analysis of the relationship between stock market returns and macroeconomic indicators are the Engel-Granger cointegration model. Basically, in cointegration method, even though two time series may not themselves be stationary, a linear combination of the two non-stationary time series may be stationary. If this is the case, the two original non-stationary time series are said to be 'cointegrated'. Usually, for co-integration, the two time series have to be stationary after the same number of differencing. If a given time series becomes stationary after first differencing, it is said to be integrated of order one *I*(1). If the time series becomes stationary after second differencing, it is integrated of order two *I*(2). If the original time series is stationary, it is integrated of order zero *I*(0). When a linear combination of two *I*(1) series is stationary, then the two time series are cointegrated. Cointegration implies a long–run relationship between them. Once cointegration is established, the short run adjustment dynamics can be usefully described by the error correction model (ECM). The ECM involves using the lagged residual to correct for deviations of actual values from the long-run equilibrium values. To check for the order of integration we follow the Augmented Dickey-Fuller (ADF) (1981) test for unit roots. The ADF is generally regarded as the most efficient test from among the simple tests for integration and is at present the most widely used in practice. The ADF can be stated thus:

$$\Delta Y_t = \alpha_o + \alpha_1 Y_{t-1} + \sum_{i=2}^{k} b_1 \Delta Y_{t-1} + \varepsilon_t \qquad\qquad (2)$$

The testing procedure follows an examination of the student-t ratio for α_1. The ADF test is conducted to determine whether the estimate of α_1 is equal to zero (i.e., $\alpha_1 = 0$) – the time series is nonstationary. The alternative hypothesis is that $\alpha_1 < 0$; that is, the time series is stationary. Fuller (1976) provides cumulative distribution function of the ADF statistic. If the computed absolute value of the coefficient of α_1 exceeds the ADF critical tau values, reject the null hypothesis that $\alpha_1 = 0$, in which case Y is stationary. Otherwise do not reject the null hypothesis, in which case Y is not stationary.
After determining the order of integration, the next step is to obtain the cointegrating vector in the regression equation as stated in Equation (1), and then test if the residuals μ_t are stationary. We can test whether the real GDP and VAT are cointegrated by testing whether the residuals μ_t are stationary. Since we cannot observe μ_t we instead test the stationarity of the least squares residuals using a Dickey-Fuller test. We estimate the residual-

based unit root test thus:

$$\Delta\mu_t = \alpha_1\mu_{t-1} + \varepsilon_t \qquad\qquad (3)$$

Where $\Delta\mu_t$ is the first difference of μ_t, and examine the t (*tau*) statistic for the estimated slope (α). Because we are basing this test upon estimated values, to test the hypothesis of a unit root, we estimate by least squares and examine the *t-statistic* for the hypothesis that $\alpha = 0$. The t-statistic must be compared to special critical values taken from Davidson and Mackinnon (1993). If the *tau* statistic is less than the critical value at 5% level of significance, we reject the null hypothesis that the least squares residuals are nonstationary, and conclude that they are stationary. Thus we conclude that the variables are cointegrated, indicating that there is a long-run, equilibrium relationship between the variables.

Given stationary residuals, and hence cointegration among variables, the next step is to estimate the error correction model (ECM). The ECM captures the extent of disequilibrium between the dependent and explanatory variables. For $I(1)$ variables, the error-correction model relates changes in a variable, say ΔY_t, to departures from the long-run equilibrium in the previous period ($y_{t-1} - \beta_1 - \beta_2 x_{t-1}$). The ECM can be stated thus:

$$\Delta RGDP_t = \beta_0 + \beta_1\Delta VAT_t + \beta_2\mu_{t-1} + \varepsilon_t \qquad\qquad (4)$$

Where, Δ denotes the first difference operator, β_1 is the coefficient of the VAT, β_2 is coefficient of the one period lagged value of the error term from the cointegrating regression in equation (1), and ε_t is a random error term. The β_1 measures the short-run effect of VAT on real GDP. The β_2, which is the error correction term, captures the rate at which real GDP adjusts to the equilibrium state after a shock (Emenike and Nwankwegu, 2013). The coefficient of β_2 should be negative in sign for the series to converge to long-run equilibrium. Negative and statistically significant α_2 coefficient is regarded as a convincing evidence and confirmation for the existence of cointegration found in the cointegrating regression (Engle and Granger, 1987). More so, the size of β_2 is an indication of the speed of adjustment towards equilibrium. Small coefficient of β_2, tending to -1, indicate that the speed of adjustment is fast; larger values, tending to 0, indicate that adjustment is slow; and positive values would imply that the series diverge from the long-run equilibrium path.

4.   Empirical Results
4.1.   Graphic Presentation and Descriptive Statistics
The level relation as well as the relation between the changes in the VAT and GDP series is presented in Figure 1 and 2. The key feature of Figure 1 is the northward movement in the level series of the VAT and GDP. The northward drift of the series are clear signs of unit root. On the contrary, the second difference[1] series in Figure 2 appear not to have unit root. These indicate that the levels of the series are trending and appear non-stationary, whereas their logarithmic second differences are stationary.

Table 1 shows descriptive statistics of VAT and GDP for the sample period (1994-2013). Notice that the annual mean of the natural log transformed VAT and GDP series are 4.84 and 13.12 respectively. The distributional characteristics of the two level series appear to be consistent with the normality assumption. In a normally distributed series, the skewness is zero (0), Kurtosis is three (3), and Jarque-Bera is equal to zero (0). Positive or negative skewness and J-B indicate evidence against the normality assumption. Also, Kurtosis greater than or less than 3, suggest deviation from normality (Emenike and Nwankwegu, 2013). Table 1 suggests that the levels of the variables are normally distributed whereas only the GDP is normally distributed in differenced form.

4.2   Stationarity Test
Table 2 presents the results of unit root tests performed on first difference and second difference of VAT and GDP series. All the variables are not stationary at first difference but are stationary at second difference. Thus, indicate that the variables require second differencing to achieve stationarity, that is they are $I(2)$ variables.

4.3   Testing the Long-run Relationship
This section presents the results of the relationship expressed in equation (1). Table 3 shows the estimates of the cointegrating regression and Table 4 shows the results of the Engle-Granger cointegration test. We see from Table 3 that VAT has a positive and significant relationship with GDP. This evidenced in the marginal significance level (0.000). Because the marginal significance level is lesser than our significance level of 5% (0.05), we reject the null hypothesis that VAT does not impact GDP.

It is clear from Table 4 that we can reject cointegration (i.e. long-run relation) between VAT and GDP. The residual-based unit root test results presented in Table 4 show that the computed *tau* (r) statistic (-2.478) is more than the 5% critical tau (r) value (-3.658). Since the computed r value is more than the conventional critical *tau* values, we accept the null hypothesis of no cointegration. This result, therefore, indicate evidence of no long-term relationship between VAT and GDP in Nigeria.

4.4   Testing the Short-run Relationship
This section presents the results of the error correction model (ECM) specified in Equation (4), which embodies

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[1] VAT and GDP are not stationary at first difference. They are integrated of order 2.

the estimates of the short-run and long-run movements, as well as the error correction term, which proxies speed of adjustment. Notice from Table 5 that short-run changes in VAT have a negative and statistically insignificant impact on short-run changes on GDP. This suggests that VAT does not impact GDP in the short-run in Nigeria. Table 5 also shows useful long-run information. The equilibrium adjustment coefficient, (β_2) -0.003, enters with a correct sign (negative) but not significant. This suggests that GDP and VAT series does not converge to long-run cointegrating equilibrium. This result supports the evidence of no long-run relationship between VAT and GDP presented in Table 4.

This study has shown that although VAT contributes to GDP growth but that the magnitude of its contribution is small. The magnitude of the changes in the two variables is far apart. A major economic implication of this study is that positive changes in GDP will be reciprocated with positive changes in VAT but with different magnitude.

5. Conclusions

The major objective of this paper is to analyse the relationship between VAT and economic growth in Nigeria using the Engle-Granger two steps cointegration method. The ADF unit root test shows that VAT and real GDP which proxy economic growth are both integrated of order two ($I(2)$). The estimates of the cointegrating regression show that the VAT has positive impact on economic growth. The analyses of residuals from our cointegrating regression show that VAT and economic growth are not cointegrated, that is, they share no long-run relation. Similarly, estimates from the error correction model provide evidence to show that VAT and real GDP series do not converge to a long run cointegrating equilibrium. The ECM results also show that short-run changes in VAT have a negative but statistically insignificant impact on short-run changes in real GDP. We therefore conclude that the government should therefore put in place measures to enhance productivity so as to increase the contribution of VAT to economic growth in Nigeria.

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Lists of Tables:

Table 1: Descriptive Statistics

	Mean	Std. Dev.	Skewness	Kurtosis	J-B Tests
	Level series				
VAT	4.839	1.381	-0.394 (0.50)	-0.88 (0.50)	1.165 (0.55)
GDP	13.12	0.314	0.423 (0.47)	-1.188 (0.36)	1.775 (0.41)
	Differenced Series				
VAT	-0.04	0.565	1.290 (0.04)	6.721 (0.00)	38.88 (0.00)
GDP	0.003	0.017	0.944 (0.13)	1.402 (0.32)	4.151 (0.12)

Note: *p* value is reported in the bracket.

Table 2: Stationarity Test Results

First Difference			Second Difference	
Variables	Critical Value 5%	Computed Value	Critical Value 5%	Computed Value
VAT	-3.040	-1.284	-3.065	-5.467**
GDP	-3.040	4.477	-3.040	-5.865**

Table 3: Cointegrating Regression Results

Variable	Coefficient	Std Error	T-Stat	Significance
Constant	12.084	0.084	142.26	0.000
VAT	0.215	0.016	12.761	0.000

Table 4: Engle-Granger Cointegration Test

Variables	Critical Value 5%	Test Statistic
ε_t	-3.658	-2.478

[1] VAT and GDP are not stationary at first difference. They are integrated of order 2.

Table 5: Error Correction Estimates

Variable	Coefficient	Std Error	T-Stat	Significance
β_o	0.001	0.004	0.379	0.709
β_1	-0.003	0.008	-0.377	0.711
β_2	-0.064	0.059	-1.075	0.298

Lists of Figures:

Time Series Plot of VAT and Real-GDP in Nigeria
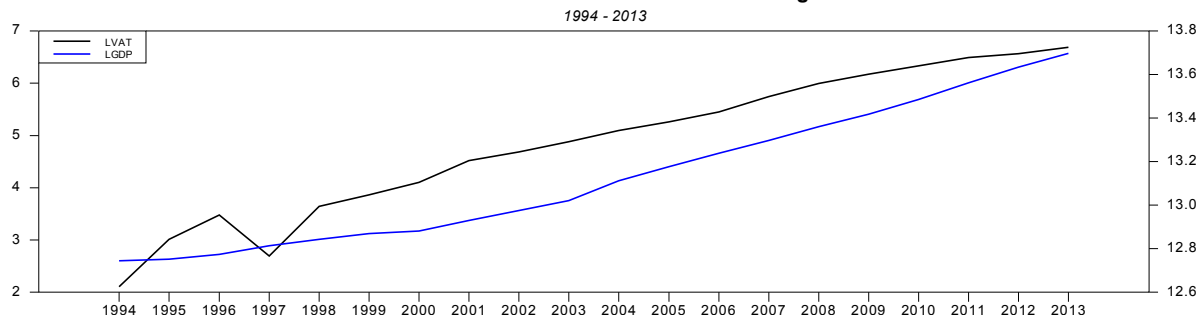*1994 - 2013*

Figure 1

Time Series Plot of VAT and Real-GDP in Nigeria
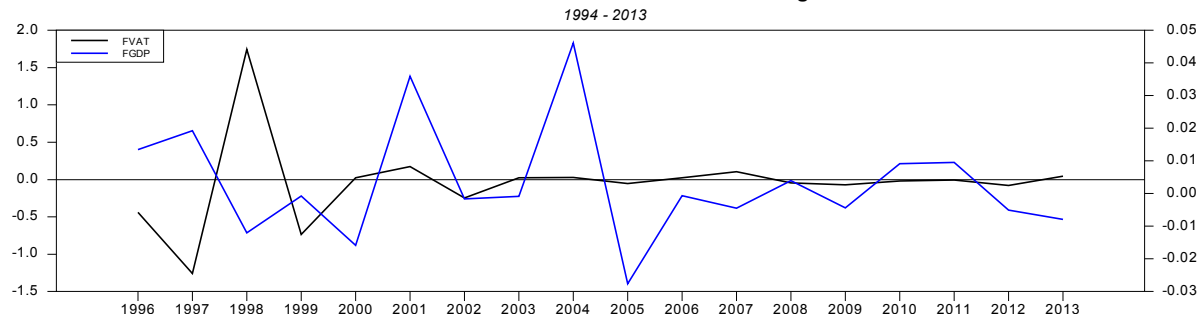*1994 - 2013*

Figure 2

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