The Effects of Value Added Tax (V.A.T) on the Economic Growth of Nigeria.

Umeora Chinweobo Emmanuel
Qualification: B.Sc Economics, M.B.A (Banking and Finance), A.C.I.S (London), PhD Candidate at Anambra State University
Rank: Senior Lecturer in Banking and Finance Department, Anambra State University, Igbariam Campus

ABSTRACT
The study sets out to investigate the effects of Value Added Tax (VAT) on economic growth (GDP) and total tax revenue in Nigeria. VAT was introduced in the country in 1994 and one wants to estimate its contributions to GDP and total Revenue. In pursuit of this, two hypotheses were proposed namely First: H$_0$ that VAT does not have significant effect on GDP. Secondly we have H$_0$ 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 (H$_0$) 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.

Keywords: Value Added Tax, Gross Domestic Product, Total Revenue, Maxims of Taxation, Developing and Transitional Economies, Cascading treatment

SECTION 1
1.0 INTRODUCTION/BACKGROUND OF STUDY

Value Added Tax (VAT) is a tax on estimated market value added to a product or service at each stage of its manufacture or distribution and the additions are ultimately added to the final consumer. End users of products and services bear the tax burden or the incidence because they cannot recover the tax paid on consumption of goods and services. On the other hand businesses can recover VAT they pay on goods and services because those goods and services are like intermediate goods and services. They use them to produce further goods and services that will be sold to other business in the supply chain or directly to final consumers. Value added tax is levied at each stage on value added in the economic chain of supply and it is a constant rate. In Nigeria the VAT rate is 5%. An attempt to raise to 10% met stiff resistance from Nigerian Labour Congress (NLC). The cost of VAT collection is most often borne by the business organizations and individuals rather than the state.

Wilhelm Von Siemens (1918) was the first person to advocate for Value Added Tax followed by Maurice Laure (1954) who introduced VAT in France. They argued that Value Added Tax is better than sales taxes because according to them “sales taxes and tariffs encourage cheating and smuggling”.

1.01 VALUE ADDED TAX IN NIGERIA

Nigeria operates a federal system of government hence the fiscal operations also adhere to the same principle. This has serious implications on the same principle. This has serious implications on the tax system as administered in the country. The government’s fiscal power is based on the three tier structure of federal, state and local government each which has different tax jurisdictions.

The tax and revenue system is lopsided and dominated by oil revenue. The Federal Government takes lion share of all taxes and other revenues. According to Odusola (2006) and Philips (1997) as at 1995 the breakdown
of total tax and levy collection of the three tiers was 96.4% for federal Government, 3.2% for states and 0.4% for local governments.

Over the years since the Oil Boom of the early 1970s, revenue from oil has dominated government revenue source. Instead of transforming or diversifying the revenue base, fiscal management has merely changed from one primary product to another. This over dependence on oil makes the economy susceptible to vagaries of the international oil market (Odusola 2006).

The need to address this problem of near mono economy led to tax policy reforms. The reforms as well as the yearly amendments given in annual budget were geared towards addressing the failures of effective tax system. The need for tax reforms in the country has been justified on some of these reasons:

(i) There is compelling need to diversify the revenue based for the country in order to safeguard against volatility of government revenue.

(ii) Nigeria operates a cash expenditure budget system where proposal for expenditure are always anchored on revenue projections.

(iii) The tax system is concentrated on petroleum taxes and less on indirect taxes because of the dominance of the informal sector. Even the formal sector has limits because there are unions that act as pressure groups to deter any appreciable tax increments.

(iv) There has been and continues to recur government annual fiscal deficits over the decades.

(v) The Study Group in 1991 high lighted the need to increase tax revenue base. The Group recommended the establishment of Value Added Tax (VAT).

Value Added Tax (VAT) became a landmark source of revenue as a part of tax reform agenda. It was introduced by Decree 102 of 1993. The VAT implementation started in January, 1994. The rate was fixed at 5% for eligible goods and services. Theoretically VAT was imposed generally on all goods and services but with these Exemptions.

Goods: Medical and pharmaceutical products
- Basic food educational materials
- Baby products
- Agricultural equipments and veterinary medicines
- Agricultural fertilizers
- Goods for export

EXEMPTED SERVICES: medical services
Services by community now Microfinance Bank.
Peoples Bank now defunct and mortgage Institutions.
Plays and performance conducts by educational institutions as part of learning Religious service.

Exported services
All these are found in the Federal Inland Revenue Service (FIRS) Review Paper No 9901 dated 1st January 1999. The Decree states that “no individual, organization or government Agency is exempted from VAT. Only goods and service may be altered by the government periodically”. The importance of this is that any consumer of vatiable goods and services however highly or lowly placed cannot be exempted from paying VAT. At the present total revenue collected under VAT is shared in the ratio of 15:50:35 among the Federal, state and local governments (Odusola 2006). Federal Inland Revenue Service (FIRS) is saddled with the responsibility of collecting VAT on behalf of all three tiers of government.

To ensure Value Added Tax achieve some level of effectiveness, certain amendments were made to the existing tax structure. The amendments were:

(a) Reduction of Personal Income Tax burden through increased tax allowances and reduced tax rate;
(b) Monetization and taxation of foreign benefit;
(c) Deduction of Research and Development (R&D) expenditure from the gross earning of companies;
(d) Extension of tax free status to companies in rural areas and granting of incentives based on the infrastructure available in the areas;
(e) Reduction of company tax rate from 40% to 35% and subsequently to 30% and
(f) Payment of petroleum Profits tax in US Dollar.

Although VAT is consumption tax, a 5% rate is levied on suppliers who are expected to add this amount to invoices for collections from customers and for remittance to VAT authorities by way of regular monthly reforms. VAT is imposed at 5% regardless of the stage of production or distribution.

Odusola (2006) observes that although VAT is enforced by federal legislation, it was omitted from the exclusive list of federal jurisdiction by the 1999 constitution. This is unusual because from inception in 1994 VAT’s collection has been administrated by the Federal Inland revenue Service (FIRS). FIRS appoints Nigeria Customs Service to collect VAT on imports at the ports. Companies, organizations and individuals at points where variable goods and services are bought serve as collection agents. For example, Hotels collect VAT from lodgers and customers and pay same, to FIRS. Proper keeping of records is crucial for proper operation of VAT but we are aware that most operators in the informal sector keep little or no records. The economy is dominated by the informal sector know for poor record keeping.

1.02 STATEMENT OF PROBLEM

Over the years Value Added Tax (VAT) as a form of indirect tax was introduced in France in 1954. From there it spread rapidly to other developed countries except to US where it has not been adopted to date. International Monetary Fund (IMF) was at the vanguard of spreading the concept to developing and transitional economies. Since VAT worked in developed countries IMF gave consistent support and advocacy to this novel form of taxation that has turned out to be goldmine. As stated earlier it was introduced into Nigeria by Decree 102 of 1993 and started functioning in January 1994. Ajakaiye (1999) observed that VAT has become a major source of revenue in many Sub-Saharan African countries including Nigeria. Despite the enormous revenue that flows into the government treasury there are critics who argues that the incidence of VAT like other indirect taxes is regressive. The reason is that poor people spend a large portion of their income on purchases some of which carry VAT. More over in Nigeria the revenue from VAT is routinely shared out according to agreed percentages while not a lot of research has been done to determine the effects(s) of this new revenue source on some aspects of the economy. This paper is therefore to investigate VAT contribution especially to total revenue and GDP.

1.03 OBJECTIVE OF STUDY

The main objective is to find out how VAT has fared in Nigeria since inception more specifically the study will find out VAT contribution to total tax revenue of the nation and contributing to economic growth via the GDP.

1.04 SIGNIFICANCE OF STUDY

Extensive studies have been done on various aspects of the operations of Value Added Tax (VAT) in Nigeria but not much appear to have been done in study VAT contribution to total tax revenue (non-oil) and contribution to GDP. This study is thus undertaken to add to whatever scarce studies already exist in this aspect of VAT. It will help increase awareness of what the government can do to improve operations and utility of VAT. The study will also be a form of update on the existing studies.
1.05 SCOPE OF STUDY

The study limits itself to the period of 1994 (inception) to 2010. Time series data are available for this period of 16 years covered by the study.

1.06 STATEMENT OF HYPOTHESIS

Two hypotheses are proposed for the study
I. $H_0$ (Null) Value Added Tax (VAT) has not made any significant impact to total revenue in Nigeria.
II. $H_0$ (Null) Value Added Tax (VAT) has not made significant impact to the Gross Domestic Products (GDP) in Nigeria.

1.08 PLAN OF STUDY

The study is arranged in five sections. Section 1 deals with all the points discussed so far. Section 2 is on theoretical foundation and review of literature including empirical studies. Section 3 deals with Data Collection, methodology of study and model estimation. Section 4 is on data presentation, analysis and discussion. Section 5 concludes and makes recommendation.

SECTION 2

2.0 REVIEW OF LITERATURE AND THEORETICAL FOUNDATIONS

2.01 REVIEW OF LITERATURE

Since Value Added Tax (VAT) was introduced in France in 1954, it has been adopted in most countries of the world. In developing and transitional countries it has been introduced within the last three decades. Casanegra de Jantscher (1986) commenting on the importance of VAT said that it has assumed added impetus during the 1970s and 1980s during which time many developing and transitional countries have enacted value added taxes (VATs) as part of their Fiscal Structures. During this period, he added, VAT system has formed a major innovation in their tax systems. The emphasis is buttressed by Bird (2005) when he said that few Fiscal issues are more important in developing and transitional countries (DTE) than the value added tax. According to Bird (2005) “over the last few decades VAT has swept the world”. The main reason for the rapid world wide adoption of VAT has been attributed to the early adoption by European Union (following its introduction by France in 1954). The other reason is the key role of International Monetary Fund (IMF) in propagating the message of VAT to developing nations. In the words of Bird (2005) “the consistent support and advocacy of this form of taxation by the International Monetary Fund (IMF) and others in a variety of countries, first in Latin America and then around the world encouraged and facilitated the adoption of VAT by countries with much less developed economic and administrative structures than those in the original E.U member state”.

The then Chairman/Chief Executive Officer of Federal Inland Revenue Service (FIRS) in his First Review (1999) and Numbered 9901 published the following highlight about VAT. The aim was to bring the knowledge of VAT to all and sundry in a summary form:
(a) VAT is a tax on spending which is borne by the final consumer of goods and services. This is so because VAT paid is included in the price paid but if the invoice should indicate the VAT element of the price.
(b) The tax is presently at a flat rate 5%.
(c) VAT is collected on behalf of the government by businesses, organizations and individuals who have registered with FIRS offices.
(d) All businesses, organizations and individuals connected with VAT collection must register with VAT offices (FIRS) nearest to their offices or operating bases. Branch offices of such organizations are to register independently and when such organization registers it is called “registered person”.
(e) A registered person will pay 5% on goods and services purchased but can claim credit for the tax (called input
tax) when sold. The 5% VAT (called output tax) is included in the price of all goods and services supplied by registered persons.

(f) The registered person must make regular VAT returns and either pays to or receive from the FIRS (VAT directorate), the difference of the input and output taxes.

To claim a credit for input tax, a registered person must hold a “Tax Invoice”.

(g) VAT returns (and payment) are normally made month following that in which the supply was made.

(h) Records and Accounts have to be kept on all business transactions.

(i) No individual, business organization or government agency is exempted from the tax. Only goods and services as stipulated from time to time are exempted.

(j) FIRS (VAT Directorate) provides free information and advisory service to help anybody comply with VAT.

The Review of 9901 (1999) gave further reasons for replacing Sales Tax with VAT. The main reasons are:

(a) The tax base of sales tax as operated under Decree No 7 of 1986 was narrow. It covered only nine categories of items of goods and services in registered hotels, motels and similar establishments. The narrow base of Sales Tax negates the fundamental principle of consumption across all consumable goods and services. VAT is broader than Sales Tax and includes most professional services and banking transactions which are high profit generating sectors.

(b) Only locally manufactured goods were targeted by Sales Tax while VAT applied to most imports.

(c) Since VAT is based on general consumption, the expected high yield will boost government revenue with minimum cost of collection and without resistance from payers.

The review listed the offenses as failure to register, failure to furnish required information, making false claims, obstructing VAT officials and failure to submit requisite returns.

Ajakaiye (1999) studied the macroeconomic effects in Nigeria: a computable general equilibrium analysis. His study showed evidence that VAT revenue is already a significant source of revenue in Nigeria. For example he stated that in 1994 (the year of inception) actual VAT revenue was ₦8.19 billion as against a projection of ₦16 billion. In 1995 actual VAT revenue was ₦21 billion as against a projection of ₦12 billion. In the study Ajakaiye used three scenarios to approximate the presumed Nigerian situation. First, he assumed that the government pursed an active fiscal policy involving the reinjection of the VAT via increased government spending in combination with a presumed non-cascading treatment of VAT. Then he assumed two other simulations considered as active fiscal policy combined with a cascading treatment of VAT and a passive fiscal policy combined with a non-cascading treatment. The result of the study, as it turned out, was that the scenarios of a cascading treatment of VAT with active fiscal policy not only had the most harmful effects on the economy; it was also the one that most closely approximated to the Nigerian situation.

Adereti et. al (2001) empirically investigated the contribution of Value Added Tax (VAT) to GDP in Nigeria 1994-2008. They used time series data of GDP and VAT revenue for the period and did simple Regression analysis and descriptive statistical method. Their findings show that VAT revenue to Total Tax Revenue averaged 12.4% which they considered low compared to 30% on Ivory Cost, Kenya and Senegal and 19.71% Mexico. VAT Revenue to GDP averaged 1.3%. Their study also shows that a positive and significant correlation exist between VAT revenue and GDP. The study also observes that there is no causality existing between GDP and VAT revenue. The report concludes by recommending that the government should plug up all identifiable administrative loopholes for VAT Revenue to contribute more significantly to Nigeria’s economic growth.

Owolabi and Okwu (2001) made empirical study of contribution of Value Added Tax (VAT) to the development of Lagos State economy. They employed the tools of simple Regression Models to evaluate the effect of the contribution of VAT revenue to the economic growth of Lagos State economy. Development indicators are infrastructural development, environmental management, education sector development, Youth
and social development, Agricultural sector development, health sector development and transportation sector development. The state economy was disaggregated into seven strategic economy sectors and simple regression models were specified to enhance isolated analysis of each sector. The analysis showed that VAT revenue contributed positively to the development of the respective sectors. However, the positive contributions were statistically significant only in Agricultural sector development. The study concludes that various sectors are yet to benefit significantly from the state government’s expenditure of VAT Revenue.

Olaoye (2009) studied the administration of VAT in Nigeria with the objective of seeking ways of improving government revenue generation base in order to improve the economy. The study among other things, recommended on the need for government to increase awareness of people on the existence VATS

Feldstein and Krugman (1990) were the pioneers on research about international trade and VAT (Adereti et. al 2001). Their research was based on the wide spread belief that VAT, because it is levied on imports and rebated on exports, act as a combination of protection and export subsidy, giving the traded goods sectors of countries with VAT an advantage over the corresponding sectors of countries that rely on income taxation. Their study used simple Regression model and showed that belief is almost entirely wrong. VAT is not a protectionist measure because the assumed pro competitive device of export rebates is necessary if VAT is not to act as an export tax, which in turn is actually a protectionist measure that would reduce both imports and exports. Their study further stated that VAT would almost surely fall more heavily on traded rather then non-traded goods, which would constitute a bias against both exports and imports. Desai and Hines (2002) also studied about VAT and International Trade in effort to advance the work of Feldstein and Krugman and others. They examined the effect of VATs on international trade. They assumed the usual popular view that destination-based VAT encourages exports which are exempt from Vat is paid on imports. They also assumed that exchange rate adjustment prevents destination based VATs from affecting exports and imports since appreciation completely undoes the effect of introducing VAT. Their study states that there are negative effects of introducing VAT on international trade most on low income countries using Vat to control imports and encourage exports. The study posits that VATs impede international trade because they tend to be imposed most heavily on traded sectors of the economy. Also governments often fail to actually provide rebated for exports. Ekeocha (2010) did a simulation study advocating VAT rate from present 5% to 15%. He justified the study by noting that for most countries the tax system wants to shift emphasis from direct to indirect taxation by “gradually increasing VAT to a rate that will not affect aggregate consumption”. He further argued that increasing the rate will upward effect of increasing the country’s revenue base.

On the issue of VAT exemptions, Thisen (2003) noted that many African countries lack the administrative ability to handle the large volume of returns and refunds for zero-rated transactions. Because of this, lots of items are exempted. Such exemptions allowed by international best practices cover items as water and sewerage services, books and newspapers, transportation.

2.02 THEORETICAL FOUNDATIONS

Taxation forms the most important sources of revenue to the government. Tax is a compulsory payment imposed by various tiers of government on individuals and corporate organizations. The most basic things about taxation are that taxation is compulsory and, imposed by authority of government on people within a territory. Since it is compulsory, any person who is within the jurisdiction must pay or be given some form of punishment. Also there is no ‘quid pro quo’ between tax payer and how the government spends the tax paid. In other words, the governments need not to explain to a payer how his own particular payment will be utilized.

Adam Smith the father of Economics gave it as four canons of taxation in his book the Wealth of Nations (1776). The canons or maxims are:-

(a) The subjects of every state ought to contribute towards the support of the government, as nearly as possible in
proportion of his ability.

(b) The tax payable must be certain and devoid of arbitrariness or capriciousness.

(c) Tax should be levied at the time it is convenient for the payer to pay.

(d) There must be efficiency in tax administration.

Lambert (1992) amplified Adam Smith’s four canons into sixteen modern principles of taxation. They are:

(i) Simplicity is essential.
(ii) Certainty of what to pay must be there.
(iii) Neutrality to payer’s savings and spending must be maintained.
(iv) Low cost of collection.
(v) Net beneficiaries according to him are exempt from tax- although the meaning of net beneficiaries is not clear.
(vi) Double taxation should be avoided.
(vii) PAYE should be at source as it is the practice.
(viii) There should be the ability to pay.
(ix) Tax paid should not be affected by varying circumstances.
(x) Tax should be based on economic power not legal form.
(xi) Basis of Taxation should be realistic.
(xii) Convenience of the payer is paramount.
(xiii) Tax payer should get adequate advice.
(xiv) No discretion of tax exemption is allowed.
(xv) Tax is a compulsory levy not fine or penalty.
(xvi) Tax is compulsory and there is no ‘quid pro quo’ between when the payer pays and benefits he gets from government.

Lambert (1992) concludes that his modern principles of taxation “constitute the bedrock of a system of taxation which is simple, just and lasting, for it should command the support of everyone, all parties and all nations”.

Other theories are cost of Service theory, the Benefit theory, Ability to pay theory. Cost of service theory states that the cost of running government and provision of social services and infrastructure should be collectively met by the people who are the ultimate receivers of the services. It is an indirect tax which must be paid on consumption of vatable goods. However, as indirect tax is criticized as being regressive. Regressive tax is where the incidence (tax burden) falls relatively more on the low income earners. They spend a large proportion of their income on consumption.

SECTION 3

3.00 METHODOLOGY OF STUDY

The study deals extensively on review of previous works relating to Value Added Tax in Nigeria. Time series data from inception of 1994 to 2010 are collated from Central Bank Statistical Bulletin and CBN Annual Reports and Statement of Accounts, various issues. The data are shown in Appendix 1. The economic growth is proxy by Gross Domestic Product (GDP). Value Added Tax (VAT) is represented by VAT as collected by Federal Inland Revenue Service (FIRS) while federal government collected tax revenue is proxy for Total Tax Revenue. Simple regression techniques are used to analyze the data.

3.01 MODEL SPECIFICATION

In order to analyze the contributions of Value Added Tax (VAT) to economic growth (GDP) and Total Tax Revenue, we use linear regression method for the analysis. Two equations are used:

\[ \log GDP_t = a + \beta \log VAT_t + e_t \]  

(1)
Log TTR = a + β Log VAT + µ

Where a in the equations stand for the intercepts of relationship in the models
β stands for the regression coefficients for the models.
ε and µ stand for the error terms
t is Tth of the observation of the time series data. Log is the natural log.

Here in equation (1), GDP is used as the dependent variable with VAT as independent variable. In equation (2), Total revenue is the dependent variables while as in remains the independent variable.

SECTION 4

4.0 DATA PRESENTATION, INTERPRETATION AND ANALYSIS

4.01 CONTRIBUTION OF VAT TO GDP

The Regression Results are presented on Appendix 2.
The Regression equation is log GDP = -1.56 + 1.47 log VAT
R² – Sq 83.6%
R² – Sq (Adjusted) = 82.5%
T – stat = 8.75 (P. value = 0.000)
Durbin-Watson Statistic = 1.04
Standard Error of the Estimate s = 0.8139

The above statistics measure the contribution of VAT to economic growth in Nigeria using the GDP and Federal Government collected VAT Revenue between 1994 to 2010. Simple regression results produce an equation that explains the nature of relationship between VAT and GDP over the years. The equation (1) above suggests coefficient of VAT (1.47). The coefficient of determination r² is used to explain the strength of the relationship between VAT and GDP. The r² statistic is used to show the extent to which variation in economic growth is explained by VAT revenue. The value of Adj. r² is 82.5% suggesting that 82.5% of variation in GDP is explained by VAT. That means that VAT has a significant effect on GDP. This also implies that increasing the rate will have very significant increase on economic growth.

The t-statistic tests that the hypothesis that VAT does not have significant contribution to GDP. Since the t-value is statistically significant at value below 0.05 significance level, we reject the Null hypothesis and accept the alternative hypothesis and conclude, that VAT has significant effect to GDP

4.02 CONTRIBUTION OF VAT TO TOTAL TAX REVENUE

Again refer to Appendix 2 for the Regression Results.
The regression equation is log TTR = 3.88 + 0.922 log VAT
R² – Sq = 92.9%
R² – Sq (Adj.) 92.5%
T-stat = 14.06 (P. value = 0.000)
Durbin-Watson Statistic = 1.08
Standard error of the estimate s = 0.3186

The contribution of VAT to Total Tax Revenue (TTR) of revenue of Nigeria is measured from the above stated statistic. The regression equation shows that the coefficient of the equation is 0.922 log VAT. This suggests that there is positive relationship between Total Tax Revenue and VAT in Nigeria. The extent to which the equation explains variations in Total Tax Revenue are determined by VAT is given by Adjusted Coefficient of Determination (Adj. r²). The value of adj. r² is 92.5% which suggests that a variation is TTR can be explained by changes in VAT. In other words, increasing VAT rate will have very large contribution to Total Revenue.
The test of hypothesis 2 of the study that VAT does not have significant contribution to Total Tax Revenue is done with the help of t-test. The t-stat is shown as 14.06 with a probability value 0.0000. Since the probability of the t-value is below 5% level of significance, we reject the Null hypothesis and accept alternative hypothesis and conclude that VAT have significant contribution to Tax Revenue Nigeria.

**SECTION 5 CONCLUSION AND RECOMMENDATION**

This paper arrives at the views of other research works that VAT contribute significantly to GDP and also Total Tax Revenue. One would expect that an increase in VAT should have been effected a long time ago. The 5% rate introduced in 1994 and inception to raise that rate to 10% in 2007 was met by stiff opposition led by Nigeria Labour Congress (NLC). Naturally people are tax averse and are prepared to resist any increase. Ifueko Omoigui-Okauru (2008) adduced reasons for an increase. According to her the increase “is to be in compliance with our neighbouring West African Countries”. According to her Nigeria has the lowest VAT rate in ECOWAS. The lowest other countries have is 15%. Moreover, the simulation work of Ekeocha (2010) has tried to justify increasing the rate from 5% to 15%.

Harmon (2007) writing on the aborted increase of VAT rate from 5% to 10% argued that the increase will empower the government by increasing the revenue available to the government. He however observed that “from a social viewpoint, bearing in mind the absence of an institutional welfare system in Nigeria, it would be morally unjust to tax the unemployed indigent masses”. The increase is considered as regression in that the poor are taxed more since they spend more of their income on purchases of goods and services.

By way of recommendation, one can say that FIRS can carry out some enlightenment campaign to sensation the populace about long overdue increase in VAT rate. Perhaps it would be instructive that the government can not easily raise that VAT from 5% to 15% as canvassed by FIRS; increasing of 100% from to 10% may be grudgingly accepted by the impoverished populace after some serious sensitization exercise. It is hardly conceivable that people will accept an increase from 5% to 15%. The argument that other ECOWAS countries have much higher rates may not be convincing.

Moreover the there is need to try to isolate the projects specifically tried to VAT spending. Presently it is not easy to pin point actually benefits accruing to the people as a result of the introduction of VAT. People generally tax averse and the government if people should try to isolate the gains to the people. If this is done, perhaps resistance to VAT rate increase will reduce. Perhaps, the government of Nigeria will need to find out from Ghana where the VAT is 17.5% out of which 2.5% is used to finance free medical care on a national level.

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## Appendices

### Appendix 1: Data

<table>
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<th>SN</th>
<th>YEARS</th>
<th>GMP at Current Market Price (N'Million)</th>
<th>TOTAL TAX REVENUE (TTR) (N'Million)</th>
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**Sources:**

1. CBN Statistical Bulletin, 2010
2. CBN Annual Reports and Statement of Accounts, various issues
Regression Analysis for Model 1

The regression equation is
\[ \text{LogGDP} = -1.56 + 1.47 \times \text{LogVAT} \]

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coef</th>
<th>StdDev</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.559</td>
<td>1.931</td>
<td>-0.81</td>
<td>0.432</td>
</tr>
<tr>
<td>LogVAT</td>
<td>1.4652</td>
<td>0.1675</td>
<td>8.75</td>
<td>0.000</td>
</tr>
</tbody>
</table>

\[ S = 0.8139 \quad R-Sq = 83.6\% \quad R-Sq(adj) = 82.5\% \]

Analysis of Variance

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1</td>
<td>50.704</td>
<td>50.704</td>
<td>76.54</td>
<td>0.000</td>
</tr>
<tr>
<td>Error</td>
<td>15</td>
<td>9.936</td>
<td>0.662</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>60.640</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Unusual Observations

<table>
<thead>
<tr>
<th>Obs</th>
<th>LogVAT</th>
<th>LogGDP</th>
<th>Fit</th>
<th>StDev</th>
<th>Fit</th>
<th>Residual</th>
<th>St</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>10.3</td>
<td>11.840</td>
<td>13.90</td>
<td>0.273</td>
<td>-1.750</td>
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</tr>
</tbody>
</table>

R denotes an observation with a large standardized residual

Durbin-Watson statistic = 1.04

Regression Analysis for Model 2

The regression equation is
\[ \text{LogTTR} = 3.88 + 0.922 \times \text{LogVAT} \]

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coef</th>
<th>StdDev</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>3.8814</td>
<td>0.7589</td>
<td>5.13</td>
<td>0.000</td>
</tr>
<tr>
<td>LogVAT</td>
<td>0.9217</td>
<td>0.0655</td>
<td>14.06</td>
<td>0.000</td>
</tr>
</tbody>
</table>

\[ S = 0.3186 \quad R-Sq = 92.9\% \quad R-Sq(adj) = 92.5\% \]

Analysis of Variance

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1</td>
<td>20.066</td>
<td>20.066</td>
<td>197.63</td>
<td>0.000</td>
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<tr>
<td>Error</td>
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<td>1.523</td>
<td>0.102</td>
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</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>21.589</td>
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<td></td>
</tr>
</tbody>
</table>

Durbin-Watson statistic = 1.08
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