VALUE ADDED TAX AND INFRASTRUCTURAL DEVELOPMENT IN NIGERIA

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Abstract
This study examined empirically, the impact of Value Added Tax (VAT) on infrastructural development in Nigeria. This study adopts ex post facto research design. Secondary data was retrieved from the Central Bank of Nigeria (CBN) statistical bulletin, Federal Inland Revenue Service (FIRS) and National Bureau of Statistics for various years were used for the study. The data covered the period between 1994 - 2017. This study employed Autoregressive Distributed Lag (ARDL) model approach to co-integration. It was found that VAT is generally not characterized with threatening oscillations year-on-year over the period. This is a good sign for policy makers as it implies that over the business cycle, VAT revenue will still maintain some considerable stability and hence it can be depended upon in the forecasting, budget planning and fiscal coordination. Though VAT growth rates have been meshed with a lot of oscillations and this may be expected due to the efficiency and monitoring levels of tax management authorities and the several loop-holes associated with the remittance of VAT revenue. The coefficient and p-values for VAT; 0.5232 {0.000}, reveals that VAT has a positive and statistically significant impact on at 5% level. The result suggests that an increase in VAT has a positive impact on infrastructural development in Nigeria and with a 1% rise in VAT resulting in a 5.232% increase in infrastructural development. The study recommends that the government and tax authorities should consider the VAT- consumption based models in ensuring revenue stability. Also, there are enormous inefficiencies with regards to the way and manner infrastructural development is carried out in Nigeria. The issues of late and slow budget implementation must be addressed alongside effective budget monitoring and evaluation.

Keyword: Autoregressive distributed lag, Budget planning, Economic development, Infrastructural development, Value Added Tax

Introduction

Taxation is recognized globally by governments as a major tool for revenue generation which can be used to drive growth and development. Aside from the revenue generation role of taxation, it is also a useful tool that can address both social, economic and political outcomes. In this regards, we can look at the use of taxes as instrument that can be used to influence consumption and production decisions as well as address welfare issues such as income distribution and resource allocation (Asada, 2011). Basically, taxes working through a number of channels can go a long way in either enhancing infrastructural development which is needed for growth or can even hinder growth depending on the

structure of the tax policy and issues surrounding revenue accountability by the government. It has been recognized that any effort focused at achieving economic growth can only be effective or successful in the presence of adequate public investment in infrastructural development. It is well known that taxes constitute a major revenue source for government in the financing of public infrastructural investment. In Nigeria, there is huge dependence on tax revenue and thus the structure of the Nigerian tax system consists of company income tax, personal income tax, custom and excise duties, petroleum profit tax and Value Added Tax (VAT). Value Added Tax (hereafter referred to as VAT).

In this study, VAT is the focus it is an indirect tax that is levied on goods and services and thus it is such that the final burden is totally on the consumer. It is imposed only on the value added at every level in the chain of production. It was introduced in 1994 in Nigeria as a replacement for sales tax and the intent as with other taxes was to improve government revenue to facilitate the amongst other things the financing of infrastructural development which provided the impetus that drives economic performance. Most developed and emerging markets have begun re-directing tax policy towards more consumption based models rather than income based models and at best having an efficient combination of both models. The reason is not far-fetched as consumption taxes have been credited with having less distortionary effects on investment and less volatile because consumption expenditure appears more stable. The tax is also quite equitable as the burden is the same irrespective of income. The tax collection is highly cost effective as it is charged at point of consumption and importantly, the loop-holes for evasion or avoidance is less when compared to direct taxes. In this regards, Ajakaiye (1999) is of the view that the sterling performance of VAT in virtually all the countries that has incorporated it into their tax policy motivated the decision to introduce it in Nigeria. Statistical evidence suggests that revenue from VAT has been increasing in Nigeria, but it remains unclear whether VAT has a positive impact on economic growth and development. The World Bank (2010) notes that the rapidly growing economies, such as China, provide support for the view that higher levels of efficient tax expenditure have been important contributors to infrastructural development and poverty reduction (World Bank, 2014). On the other hand, evidence from Latin America and developing economies in Africa over the past decade has shown the crowding out of infrastructure spending by governments in favor of entitlement spending, revenue sharing, and in some cases debt service, with a resulting in misappropriation of tax revenue which impacts negatively on the build-up of critical infrastructure (World Bank, 2014) expected to drive and sustain economic growth performance. Consequently, the objective of this study is to empirically examine the impact of VAT on infrastructural development in Nigeria.

Statement of the Problem
Empirical investigation into the relationship between VAT and its effect on infrastructural development has been looked into by some scholars. For example, Oladipupo and Ibadin (2016) covering the period, 1981-2011 found positive and significant relationships between the infrastructural development and some tax revenue

components. However, the study failed to test the data for stationarity and this is important because unstationary data will yield spurious regression results. Again, Ayanduba and Aronwman (2015) investigated the impact of tax revenues collected by the government on infrastructural development in Nigeria for the period 1980-2014. VAT have non-significant impact. However, the study period stopped at 2014 and thus there is the need to also consider the more recent periods. Oliver, Edeh and Chukwuani (2017) study examines the effect of Federal Government of Nigeria's Tax resources on infrastructural development of Nigeria. The study covered ten year period (2006-2015). The result reveals that VAT had positive and insignificant effect on Infrastructural Development in Nigeria. However, the study failed to test the data for stationarity and this is important because unstationary data will yield spurious regression results and the study stopped at 2015.

Key limitations observed in these studies cited above includes; firstly, the stationarity conditions of the data was not ascertained for the necessary measures to then be employed. This study address this limitation by conducting unit root testing for the data to address the stationarity issues and thereby avoiding the case of spurious regression. Secondly, knowing fully well that VAT only come into motion in 1994, most prior studies often begin their time period from 1981 and this leaves a lot of empty data for VAT variable and this may affect the estimation result. Hence this study avoids such potential weakness by beginning the study period from 1994. Thirdly, the study employs the relatively recent auto-regressive distributive lag (ARDL) approach in the estimation of the data unlike prior studies that have simply utilized the Ordinary least squares (OLS) regression and non The main advantage of this procedure is that it can be applied regardless of the stationarity properties of the variables in the sample and allows for inferences on long-run estimates which are not possible under alternative co-integration procedures. In other words, this strategy may be applied irrespective of whether the series are stationary at levels I (0) or at first order I (1). Based on the limitations and gaps identified in prior studies, the study re-visits the relationship between VAT and infrastructural development in Nigeria.

Objective of the study
The specific objective of the study is to examine the impact of VAT on infrastructural development in Nigeria

Hypothesis of the study
$H_{01:}$ VAT has no positive significant impact on infrastructural development in Nigeria

Literature Review

Concept of Infrastructural development
No better time in the history of economic thought than now has the idea been deeply enshrined that investment in infrastructural development is germane to any attempt at achieving growth in a sustainable manner in developed and developing countries alike. However, what is often the case for many developing economies is both a deterioration in the existing stock of infrastructure and lowered or poorly accounted public funding for

infrastructural development. Hence closing the 'infrastructure gap' will require both a deliberate attempt to maintain quality of already existing infrastructural capital and also accountability in the financing and execution of current infrastructural development projects and initiatives. What matters for growth is the sustained flow of productive capital services that the public capital stock provides to private factors of production, which in turn requires that the capital stock is efficiently operated and maintained.

Infrastructure are usually the main components in a nation's public sector capital stock and studies on public capital mainly focus on infrastructure impacts on growth and productivity. Thus we can conclude that infrastructural investment and development provides the enabling environment that drives economic growth and progress (Isaksson, 2009). The World Bank (1994) has strongly pushed for countries to focus on infrastructural development as they hinted that that countries that spend more of their budget on public investment tend to grow faster in comparison with countries that invest less (UNCTAD, 2006).

Fourie (2006) looked at the definition of infrastructure from two perspectives. Firstly is by using the features and this defining it in the light of the characteristics and the second perspective involves identifying all infrastructural elements rendering services to the public such as transport, communications, education, energy and water supply. Going by the first perspective, Fourie (2006) defines infrastructure as capital goods that produce public services and this is because in essence infrastructure exhibits the main features of public good such as non-excludability and positive externalities (Fedderke and Garlick, 2008). Though strictly, infrastructures do not necessarily reflect these features in the same degree and thus in some cases, infrastructure could also be public goods that are not necessarily infrastructure and for example, we have military equipment. There may also be private owned infrastructure which may not necessarily be subjected to such features of infrastructure such as non-excludability (Fourie, 2006).

Srinivasu and Srinivasa-Rao (2013), defined infrastructure as the stock of all basic facilities including capital equipment that are critical for the sustenance of productive activity and for the proper functioning of a country. It is an "umbrella" term for several elements both social and economic covering "Social Overhead Capital", "Economic Overheads", "Overhead Capital" and "Basic Economic Facilities" (Srinivasu and Srinivasa-Rao, 2013). Hirschman (2008) is of the view that an activity can be seen as being a component of infrastructure if it aids the continuity and sustenance of other social and economic processes, if it is such that the provision is by public agencies, or where its ownership is private, it is under public control and if it is technically indivisible (Srinivasu and Srinivasa-Rao, 2013). Although there is yet no universally accepted definition of infrastructure, a common thread going across almost all of the definitions is the idea that infrastructure refers to capital goods provided with a long-term perspective, facilitated by either government or the private sector (Baldwin and Dixon, 2008; Snieska and Simkunaite, 2009).

Snieska and Simkunaite, (2009) in their perspective distinguished between two components of infrastructure, namely, economic and social infrastructure. Economic infrastructure is depicted as the type of infrastructure that is responsible for driving and

stimulating economic activity, such as, roads, telecommunications, electrical lines, highways, railroads, airports, seaports, supply and sanitation (Fourie, 2006). On the other hand, social infrastructure refers those types of infrastructure that related to the improvement of human welfare and living standards. It is believed that such social infrastructure promotes health, educational and cultural standards of the population. They include; hospitals, schools, universities, libraries, clinics, hospitals, parks and statues.

According to the Economic policy Institute (2012), infrastructural development deals with the improvement of the country's capital stock by financing investment in core basic physical infrastructure such as rail lines, roads, airports, bridges and water distribution, and human capacity development. On the overall, these investments drives economic performance positively for the country, encourages the inflow of foreign direct investment, stimulates local entrepreneurship and small scale businesses which results in economic growth and the improvement of the country's productive capacity and welfare.

IMF (2015),defines infrastructural investment as the overall public gross fixed capital formation (GFCF) and covers the "total net value of general government acquisitions of fixed assets during the accounting period, plus variations in the valuation of non-produced assets (e.g., subsoil assets)". Furthermore, the IMF also conceptualizes public capital stock as the accumulated value of public investment covering both social and economic investment over a time period and then not forgetting to adjust for depreciation. The IMF (2015) notes further that following three decades of steady decline, infrastructural investment as a share of GDP has begun to recover in some parts of the world. In advanced economies (AEs), average public investment has steadily decreased from a high of just under 5 percent of GDP in the late 1960s to a historic low of just over 3 percent of GDP in 2012. In contrast, in emerging markets (EMs) and low-income developing countries (LIDCs), public investment rates peaked at over 8 percent of GDP in the late 1970s/early 1980s, declined to around 4-5 percent of GDP in the mid-2000s, but have since recovered to 6-7 percent of GDP. Hence, public investment rates in AEs remain at historic lows, but have partially recovered in EMs and LIDCs over the last decade

Anderson, de Renzio and Levy (2006) defines *infrastructural investment* using an expenditure paradigm. The authors opine that infrastructural investments are in themselves public or budget expenditure which may be done annually to develop infrastructure in certain areas and hence increase the already existing public physical capital stock. This includes building of roads, ports, schools, hospitals etc. This view is similar to the definition of public investment in national accounts data, namely, capital expenditure. The authors are of the view that one of the factors that have put more focus on the need for countries to accelerate their infrastructural drives is the renewed emphasis on achieving the MDGs through "big push" strategies built around increasing the levels of investment.

Truger (2015) using the lens of the "golden rule of public investment" referred to infrastructural investment as government expenditures channelled into developing infrastructures that will generate positive impacts on the economy by fostering

economic growth. However, Välilä and Mehrotra (2005) tries to conceptually distinguish between "infrastructure investments" and "public investment" as these two terms are often quite misunderstood and misplaced. The authors note that while it is true that a large chunk of public investment is infrastructure investment, however, it may be wrong to say that all infrastructural investments are public investment and this is logically so because there is a whole lot of infrastructure investment that is undertaken by commercial entities and in most cases it mistakenly believed to be public investment. In the author's view, the categorization of infrastructural development should be limited to only the investment whose financing is done directly from the government.

Value Added Tax (VAT)

A very notable tax policy in Nigeria was the introduction of the value-added tax (VAT) in January through the VAT Act No. 102 of 1993 though the proper administration of the tax started in January 1994 to replace the Sales Tax. Taxable persons are obliged to register under VAT Act. The tax is at a single rate of 5 percent of taxable goods and services. Supply of all goods and services except those specifically exempted are subject to VAT. Non-resident companies, which transact business in Nigeria, are also required to register for VAT and render VAT returns using the address of the company in Nigeria with whom they have subsisting contract. From the beginning of the tax, 15 of the 42 sections of the Act have gone through amendment stages and though historically VAT was originally imposed on 17 categories of goods and 24 service categories. The revenue coming from VAT was to be divided on the 20:80 principle between the federal and state government though now the sharing pattern is 15:50:35 among the federal/state/local levels. Some scholars such as Owolabi and Okwu (2011), Okoye and Gbegi (2013) and Umeora (2013) submit that VAT acts as a means for promoting infrastructural development which can lead to economic growth as a result of its contributions to sectoral performance, government tax revenue and wealth creation in Nigerian. They realized a positive correlation between VAT, total tax revenue and gross domestic product. However, Van-Beek (2007) claims that imposing of VAT could possibly lead to loss of economic efficiency and a decrease in economic activity because of its influence on production and consumption of goods and services.

The behaviour of collectible taxes to developments has also been examined by scholars. Owolabi and Okwu (2011) assess the involvement of Value Added Tax in the development of Lagos State economy. The findings point out that revenue arising from VAT was positively contributory to the improvement of the economic sector but with greater significance in the agricultural sector. Its influence on infrastructural development was not statistically significant. Again, in studying value added tax (VAT) effect on economic developments of budding Nations from 2001 to 2009, Unegbu and Irefin (2011) discovered that during the study period the effects of VAT allocations was significant to expenditure pattern of the states studied. A study of company income tax and Nigeria's economic development shows a significant association between company income tax and economic development of Nigeria (Adegbie & Fakile, 2011). This view was supported by Adereti et al. (2011) who reveal that even with a positive association between VAT revenue and gross domestic product, there remains no evidence of causality between both variables.

Empirical Review

Ayanduba and Aronwman (2015) sought to examine the effect of federally collected tax revenues Nigeria's infrastructural development. As already indicated the study examined just taxes collected by the federal government and excludes that of the states or local government. The methodological approach used in the study involves the use of a longitudinal research design was because of the time series nature of the variables. The Error Correction Model was used in the estimation of the specified models. Looking at the findings, it is proven empirically that CIT exerts a significant impact infrastructural development in Nigeria though same could not be said for VAT as a non-significant effect was observed. The major recommendation of the study is that there is need for proper restructuring in the way VAT is administered putting into perspective the need to ensure that collection and remittance is done in the most efficient manner possible. However, the study period stopped at 2014 and thus there is the need to also consider the more recent periods.

Oladipupo and Ibadin (2016) conducted a study to investigate how non-oil taxes impacts on the level of Nigeria's infrastructural development. The scope of the study was for the time frame; 1981-2011 and the amongst other explanatory variables examined, VAT was also examined. The methodological approach adopted by the study involves the use of the OLS multiple regression analysis in the estimation of the relationships between the major components of tax revenue and infrastructural development in Nigeria. The findings of the study revealed that amongst other variables, VAT has a positive and significant effect on the level of infrastructural development in Nigeria and this gives credence to the conclusion that increases in VAT revenue can improve infrastructural development in Nigeria. However, one weakness of the study failed is that it failed to test the data for stationarity and this is important because unstationary data will yield spurious regression results.

Oliver, Edeh and Chukwuani (2017) study looked critically into the effect of tax revenue on infrastructural development of Nigeria. Particularly, the study looked at revenue from Value Added Tax (VAT) and company income tax (CIT). The methodological approach used in the study includes the adoption of the ex-post facto research design, use of secondary data covering the period 2006-2015. The Data were sourced from the Central Bank of Nigeria Statistical Bulletin and the Federal Statistical Bureau. The analysis of the data was done using the multiple linear regression technique. The outcome of the study reveals that no significant relationship was found between Value added tax and Infrastructural Development in Nigeria. Again just like in the case of Oladipupo and Ibadin (2016), the study failed to test the data for stationarity and this is important because unstationary data will yield spurious regression results.

Ofoegbu, Akwu and Oliver (2016) investigate the impact that tax revenue has on the economic development in Nigeria and to also see if using the human development index (HDI) and using GDP as measures of development will yield significantly different results. The methodological approach of the study involves the adoption of the annual time series design with a data coverage for the period 2005 -2014. The method of data

analysis used for the estimation is ordinary least square (OLS) regression technique and two separate estimations were done to reflect the HDI and GDP measures. Findings show a positively and significantly relationship between tax revenue and economic development. The result also reveals that measuring the effect of tax revenue on economic development using HDI gives lower relationship than measuring the relationship with GDP. However, the study failed to test the data for stationarity and this is important because unstationary data will yield spurious regression results.

Looking at the state level, Owolabi and Okwu (2011) sought to empirically identify the impact of Value Added Tax to the infrastructural development of Lagos State. Lagos state is arguably Nigeria's economic capital due to the level of trade and economic activities in the state. The methodological approach used in the study includes the use of a time series research design for the study and the use of the simple regression models for the estimation of the data gathered. In terms of the measures of infrastructural development examined in the study, a number of areas were examined ranging from, agricultural sector development, environmental management, education sector development, youth and social development, health sector development and transportation sector development. The results supports the view that VAT revenue has a significant positive impact on infrastructural development in the respective sectors although this effect was only observed in agricultural sector development. However, a limitation of the study is the focus on just one State and the failure to employ standard econometric approaches in the data analysis.

Still on State analysis, Unegbu and Irefin (2011) conducted a study to examine the impact of value added tax (VAT) on economic and human development. The methodological approach used in the study incorporates the use of secondary data covering the period from 2001 to 2009. The analysis method used includes regression, discriminant analysis and ANOVA. The findings of the study shows that VAT revenue goes a long way to affect the expenditure pattern of the states and thus determined the investments made on infrastructural development.

Nwosu and Okafor (2014) investigated if a significant relationship exist between tax revenue and the government expenditure profile in Nigeria. The study used a times series data ranging from (1970- 2011). The analysis of the data was conducted using the Variance autoregressive model and the findings show that total expenditure by government on infrastructures exhibit a long run unidirectional relationships with tax revenue. Basila (2010) also tried to examine the effect of VAT on the economy using data for the period 1994-2008. The outcome of the study was that between VAT and gross domestic product, there is the presence of a significant relationship. Adereti et al (2011) investigate the link among VAT revenue, total tax revenue and gross domestic product using both simple regression analysis and descriptive statistical method for the 1994-2008 sample period. The findings from their study support a positive and significant correlation between VAT revenue and gross domestic product, though VAT revenue as a proportion of total revenue was relatively low. Okoye and Gbegi (2013) in their own study sought to examine the existence of a statistically significant impact of VAT on

wealth creation in Nigeria with results confirming the view that a statistically significant relationship exist.

Umeora, (2013) investigated the relationship between VAT and economic growth through infrastructural development. The methodological structure for the work involved the use of secondary data for the period covering 1994-2010. The OLS was employed in the estimation of the results and the findings appear not to support the view point that there is a pass through mechanism from infrastructural development to growth resulting from tax revenue.

Theoretical Framework

Political Economy Theory of Fiscal Policy

The theoretical underpinning for this study builds on the political economy theory of fiscal policy. The theory develops the perspective that governments raise tax revenues and then use the collected resources for the financing of infrastructural investment to improve the availability of public goods and services and pursue the provision of specific quality public infrastructure. The theory outlines quite clearly, that the reason for the collection of tax revenues is chiefly to improve the "fiscal capacity" of the state to undertake infrastructural development spending and investment that can then go a long way to stimulate growth and economic performance. Empirical evidence have shown that it is often the case that in periods of low tax revenues, one area that is worst hit is that of public spending on infrastructure (Palley, 2006; Schade, 2005; Kumar et al. 2007; Gupta et al. 2014). A plausible reason for this may be because the positive gains from investment in infrastructure may not be immediate and comes with a long lag as compared to other direct spending by government such as transfers and wage raises which tends to have immediate gains and benefits that affects the generality of the people. However, it suffices to note that the level of the effect of revenue generation on public investment spending may differ, given differences in macroeconomic structure and conditions of the economy and level of development (Drether, et al. 2006; Kumar, et al. 2008). Therefore, within the context of the political theory of fiscal policy, the challenge now especially for developing economies like Nigeria is regarding policy decisions made by the government, which decides on how best to allocate the collected limited resources into alternative competing sectors (Battaglini and Coate, 2008).

Methodology

This study adopts an ex-post facto research design was adopted for this study. In this study, secondary data retrieved from the CBN statistical bulletin, Federal Inland Revenue Service (FIRS) and National Bureau of Statistics for various years will be used for the study. The data will cover the period between 1985-2017. The data analysis methods deals with the various statistical analysis involved in the description of the collected data and consequently, making decisions and possible inferences about the phenomena represented by the data. For the estimation of the models, the method of data analysis that will be employed in this study is the co-integrated regression. It is well-known that if the series are cointegrated, ordinary least squares estimation (static OLS)

of the cointegrating vector is consistent, converging at a faster rate than is standard (Hamilton 1994). One important shortcoming of static OLS (SOLS) is that the estimates have an asymptotic distribution that is generally non-Gaussian, exhibit asymptotic bias, asymmetry, and are a function of non-scalar nuisance parameters. Since conventional testing procedures are not valid unless modified substantially. In this regards, the dynamic OLS has been developed as one of the methods for estimating cointegrating vectors.

Model Specification
The Model for the study examines the impact of custom and excise duties on infrastructural development in Nigeria. The model adapts Ayanduba and Aronwman (2015) and the model for the study is presented below;

$$INFDEV_t = \lambda_0 + \lambda_1 VAT_t + \lambda_2 DEBT_t + \mu \text{-------------- (1)}$$

Where:
    INFDEV = Infrastructural development measured using Capital expenditure
    VAT = Value added tax
    DEBT = Total federal government Debt
    FDI = Foreign direct investment
    $\lambda_0 - \lambda_2$ = slope coefficients
    μ = error term
    t = time

Diagnostic Tests
The following diagnostic tests was conducted to ensure robustness of the estimations;

i.   **Testing for Normality:** The regression variables were tested for normality, that is, a condition in which the regression variables followed a standard normal distribution. The Jarque-Bera statistics was used to test and check normality of the data series. Where the residuals were said to be normally distributed, the histogram should be bell-shaped. If the variables were normally distributed, the probability of the Jarque-Bera statistics should be less than 0.05.

ii.   **Testing for Stationarity:** The Augmented Dickey-Fuller (ADF) unit roots test are used to test for stationarity. A variable is said to be stationary when the calculated test statistic is greater than the critical value in absolute terms, and the critical value is read at a certain level of significance. However, where the variables are non-stationary, they would have to be differenced. The use of a non-stationary variable in regression analysis results in a spurious relationship. This would lead to poor forecasts. For the purpose of this study, the ADF test was used.

iii.   **Testing for Multicollinearity:** Multicollinearity is a situation in which an exact or almost exact linear relationship exists between some or all the explanatory variables, that is, that they are perfectly correlated (Iyoha, 2004). If this relationship exists, the parameter co-efficient will be indeterminate, and there will be large standard errors of the estimated coefficients. However, the study used the variance inflation factor test to examine multicollinearity status of the variables.

iv. **Serial Correlation Test:** Serial correlation occurs when there is a model misspecification or where the static error term correlates with itself overtime. When this happens, the estimators are no longer referred to as Best Linear Unbiased Estimators (BLUE). The R^2 may be overestimated standard errors, underestimated and t-statistics overestimated. The Breusch-Godfrey Lagrange Multiplier test of serial correlation was adopted in this study. The LM test is generally used to test the null hypothesis that the errors are serially independent.

v. **Co-integration Tests:** Once the stationarity properties of the individual series are established, linear combinations of the integrated series are tested for co-integration. Should a linear combination of individual non-stationary series produce a stationary data series, then the variables are co-integrated and hence they describe equilibrium relationships. If a linear combination of variables is stationary, then the relationship between a dependent variable and a linear combination of these variables can be assumed to be co-integrated. The test for a long run relationship between the dependent variable and each of the independent variables is the co-integration test.

Table 4.1: Definition and Measurement of Variables

Variable	Measurement	Source	Aprori sign
Dependent variable			
Infrastructural development (INFDEV)	Annual budget on Capital expenditure	Oladipupo and Ibadin (2016), Oliver, Edeh and Chukwuani (2017)	
Independent variable			
VAT	VAT Revenue	Ayanduba and Aronwman (2015)	+
Control Variables			
FDI	FDI inflows	Easson, (2004)	+
DEBT	Total domestic and foreign debt	Nzotta, 2004).	+

Source: Researchers compilation (2018).

PRESENTATION AND ANALYSIS OF RESULT

Figure 1: Total Revenue and VAT Distribution.
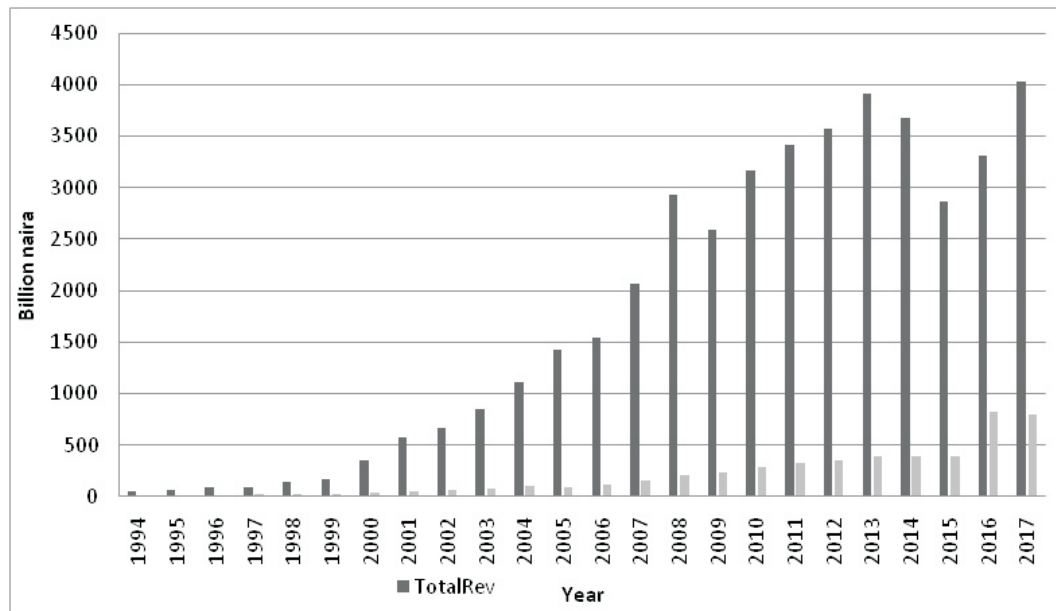
Source: CBN, FIRS (2018)

Figure 1 shows total revenue performance and also VAT revenue profile from 1994 to 2017. As observed, statistics shows that total revenue has been on a steady rise from the beginning of the study period driven largely by rising oil prices which has also been complemented with improvement in non-oil revenue performance. In 2009 a down turn in total revenue was observed which was quite short-lived as revenue bounced back increasing in 2010 in a sustained manner until 2015 when the global fall in crude oil prices set in hurting oil revenue. Nigeria's economy has been growing except at an average of 6% than the 5 per cent continental average except for 2015 when crash in oil prices hampered revenue from oil related sectors and mainly the petroleum profit tax and thus affecting total tax revenue for 2015 (Guardian, 2015).A revenue rebound was observed in 2016 coming on the heels of Non-OPEC production and relentless demand growth moving up more than a million barrels per day each year and which have remained largely so amidst benign oscillations into 2017.

Figure 2 shows the total revenue profile and the percentage contributions of VAT to total revenue over the study period. As observed, the % contributions of VAT have been quite unimpressive. In 1995, VAT contributed 10.15% to total revenue, declining to 8.9% in 1996 and improved slightly to 12.61% in 1997 and then again to 14.11% in 1998. In 1999, VAT contributed just 11.32% to revenue and then 14.054% in 2000. The period following from 2000-2013, the contribution of VAT was abysmally low at less than 10% with the highest being 9.14% in 2013. Some slight improvement followed in 2015 when VAT contributed 13.3% and then 24.519% in 2016 but declining to 19.799% in 2017.

The dismal performance of VAT is indeed an unfortunate situation for Nigeria as the potentials of VAT-type revenue has been identified globally as countries are now moving away from income based taxes to consumption based taxes.

Figure 2: Total Revenue and VAT percentage Contribution
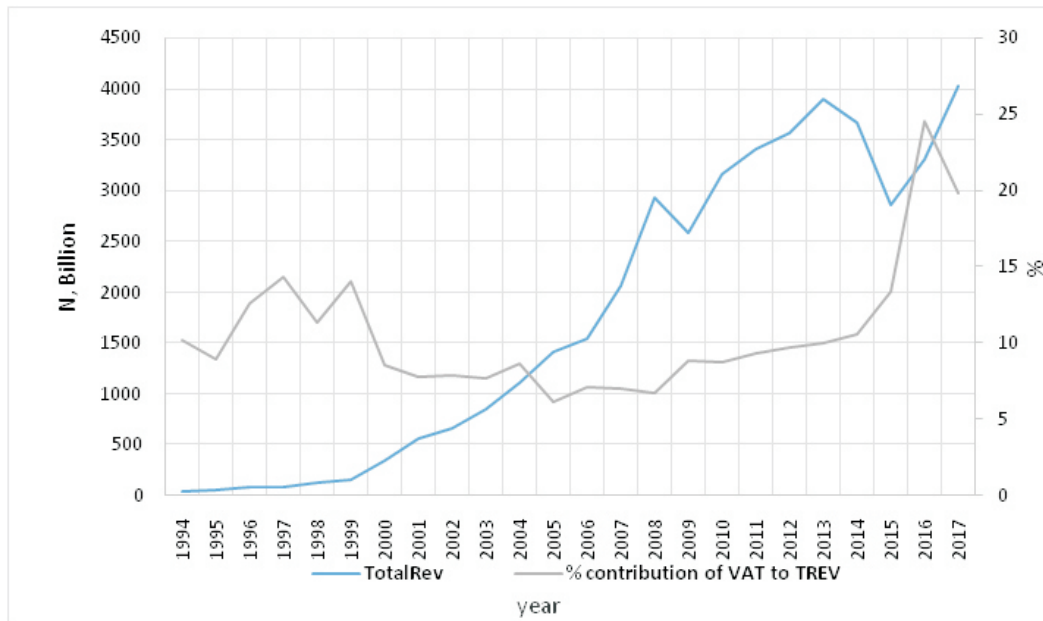
Source: CBN, FIRS (2018)

Figure 3 examines the volatility of VAT revenue in Nigeria. The considerations of volatility is important for tax planning and fiscal policy. A very volatile tax revenue may pose challenge for budgeting and fiscal coordination. As shown in the figure 3, VAT exhibits no threatening volatility as the trend shows very stable behaviour with less unprecedented shocks. Though there are sharp spikes in 2010 and 2015 deviations, the trend of VAT is generally not characterized with threatening oscillations year-on-year over the period. This is a good sign for policy makers as it implies that over the business cycle, VAT revenue will still maintain some considerable stability and hence it can be depended upon in the forecasting, budget planning and fiscal coordination. It has been empirically shown that VAT are less susceptible to shocks because it is consumption-base

Figure 3: Total Revenue and Volatility of VAT Revenue.
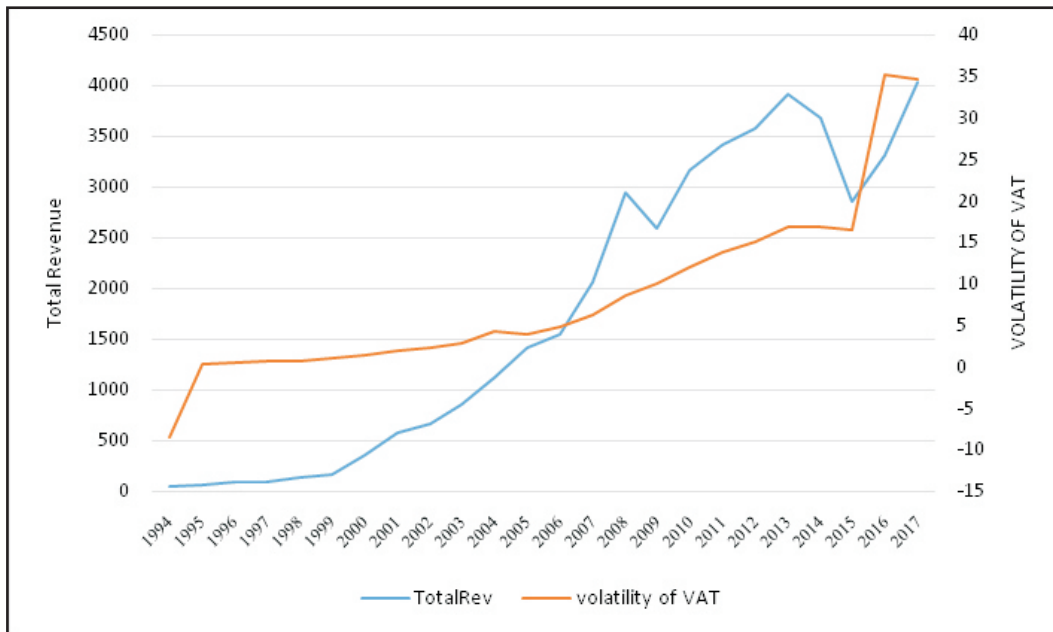
Source: CBN, FIRS (2019)

Figure 4 examines the Capital expenditure (CAPEX) data and the growth levels of capital expenditure. As observed from the trend below, a steady growth in capital expenditure can be observed from the beginning of the study period 1981-1999. In 2000, we observed that the trend steeped downward as capital expenditure dropped from 498.0276 billion in 1999 to 239.4509 billion in 2000. A major reason for this is the shortfall in revenue especially resulting from the fall in oil prices. In 2001, CAPEX increased to 438.6965 billion but again dropped to 321.3781 billion in 2002 and also declined further to 241.6883 billion in 20003. In 2004, we observed an increase to 351.3billion and this further rose to 519.5 billion in 2005. In 2006, we observed a further rise in CAPEX to 552.3858 billion and then to 759.323 in 2007. Consistent rise in CAPEX is observed up until 2012 where it dropped to 874.834 billion from 918.5489billion in 2011. A rebound in CAPEX is observed in 2013 moving up to 1108.386 billion and then falling again to 783.1224 billion in 2014. 2015, 2016 and 2017 CAPEX stood at 818.365billion, 634.8036 billion and 979.5billion respectively. From the graph below, the change in CAPEX depicts a trend characterized by several spikes and oscillations indicating the high vulnerability of CAPEX to shocks especially those coming from oil prices.

Figure 4: Capital Expenditure (CAPEX) and % change in CAPEX
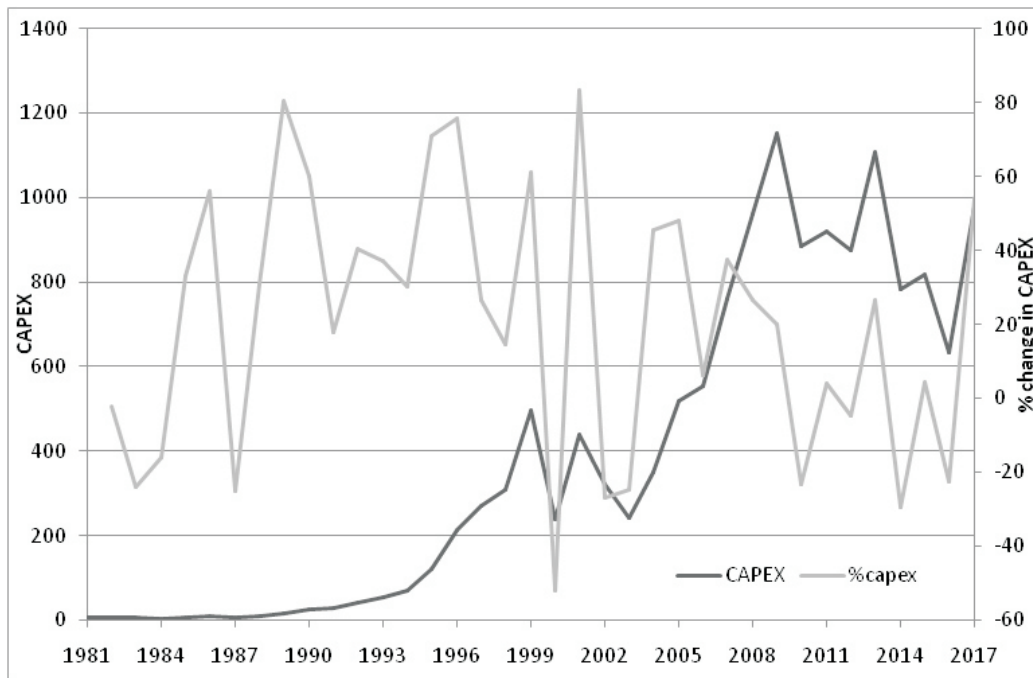
Source: CBN, FIRS (2019)

Table 1: Descriptive Statistics

	CAPEX	VAT	DEBT
Mean	584.1884	7661845	5467.677
Median	535.9429	199850	4207.125
Maximum	1152.797	65635352	18366.31
Minimum	70.9183	7261	1037.296
Std. Dev.	329.2679	20213869	4392.475
Skewness	0.130126	2.371507	1.390597
Kurtosis	1.713083	6.791944	4.605522
Jarque-Bera	1.723886	36.87502	10.31274
Probability	0.000	0.000	0.0057

Source: Researchers compilation (2019).

The summary/ descriptive statistics is presented for the variables as shown in the table above. As observed, VAT has a mean value of 7661845(nm) with standard deviation value of 20213869 indicating significantly high volatility in VAT revenue within the period under review. Maximum and minimum values are 65635352(nm) and 7261.00(nm) respectively. CAPEX has a mean value of 584.1884 (BN) with standard

deviation of 329.2679 also indicating significantly high volatility in CAPEX within the period under review. The Maximum and minimum values are 1152.797(bn) and 70.9183(bn) respectively. DEBT has mean value of 5467.677 (bn) with maximum and minimum values of 18366.31(bn) and 1037.296(bn) respectively The Jacque-bera statistic and the p-value indicate that the series are normally distributed and the presence of outliers are unlikely in the series and their residuals.

Table 2. Unit root test Results

Unit root test at levels			
	ADF-Test Statistic	95% Critical ADF Value	Remark
VAT	1.7881	-2.96	Non-stationary
CAPEX	1.9573	' '	' '
DEBT	1.8372		
Unit root test at 1st difference			
	ADF-Test Statistic	95% Critical ADF Value	Remark
VAT	3.1688	2.96	Stationary
CAPEX	6.4613	' '	' '
DEBT	6.9632		

Source: Researchers compilation (2019).

The Augmented -Dickey Fuller (ADF) test is employed in order to analyse the unit roots. The results are presented in levels and first difference. This enables us determine in comparative terms, the unit root among the time series and also to obtain more robust results. The result indicates that all of the variables have ADF values that are less than the 95% critical ADF value of 2.96. The implication of this is that the time series for these variables are stationary in their levels. Moving forward, we take the first differences of the respective variables and perform the unit root test on each of the resultant time series. The rationale behind this procedure is that Box and Jenkins (1976) have argued that differencing non-stationary time series will make it attain stationarity. The result of the unit root test on these variables in first differencing shows that the ADF values in absolute terms is greater than the 95% critical ADF values. With these result, all variables are adjudged to be stationary. Thus we accept the hypothesis that the variables possess unit roots. Indeed the variables are integrated of order one i.e. I(1)

Table 3. Co-integration Test (Trace Statistics)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5% Critical Value	Prob.**
r = 0*	0.926747	90.13013	47.85613	0.000
r = 1*	0.70763	37.85351	29.79707	0.0048
r = 2*	0.476187	13.25878	15.49471	0.1057

Source: Researchers compilation (2019).

Table 4: Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
r = 0*	0.926747	52.27662	27.58434	0.000
r = 1*	0.70763	24.59473	21.13162	0.0156
r = 2*	0.476187	12.93241	14.2646	0.0803

Source: Researchers compilation (2019).

Following the unit root test results shown in table 2 which indicate that the time series variables are integrated of order one I(1), the next step is to examine whether or not there is at least one linear combination of the variables that is integrated of order zero, I(0), and hence, if there exists a stable and non-spurious cointegrated relationship in the long run between time series variables (Miguel, 2000). The Johansen approach determines the number of cointegrated vectors for any given number of non-stationary variables of the same order. The study utilizes the Johansen co-integration methodology in conducting the co-integrating properties of the data. Using the trace and maximum Eigen-value statistics, the results for the test rejects the null hypothesis that there is no co-integrated vector and hence the variables are co-integrated. With this result, we proceeds to specify the long run equation.

Table 5: Multicollinearity Test using Variance Inflation Factor (VIF) Test

Variable	Centered VIF
VAT	3.407754
DEBT	4.441037

Source: Researchers compilation (2018).

Multicollinearity among the independent variables implies that they are perfectly correlated. If there exists perfect correlation between the independent variables, the parameter coefficients will be indeterminate. In the presence of multicollinearity, there will be large standard errors of the estimated coefficients. This violation is not a problem of the model or the disturbance term and therefore does not affect the BLUE properties of the OLS estimates. Various statistical methods that can be used to test the degree of multicollinearity have been advanced. In this study, the variance inflation factor (VIF) test is used. Basically, VIFs above 10 are seen as a cause of concern (Landau and Everitt, 2003)

Table 6. OLS Result

Variable	Aprori Sign	Beta, standard error p-values
C		4.76188* {0.6409} (0.0000)
VAT	+	0.5232* {0.1572} (0.0088)
DEBT	+	-0.6643* {0.1851} (0.0059)
$R^2 = 0.574$, Adj $R^2 = 0.506$, S.E of regression $= 0.2846$, F-stat $= 35.966$, p(f) Stat$=0.000$, Durbin Watson $=2.033$		

Source: Researchers compilation (2019).

The regression result reveals the structural coefficients of the variables and their relationship with Infrastructural development. The R2 of the regression stood at 0.574 which suggest that the model explains about 57.4% of systematic variations in the dependent variables with an Adjusted R2 of 50.6%.The variables are estimated in their log forms and hence the interpretations are done in terms of percentage changes. The coefficient and p-values for VAT; 0.5232 {0.000}, reveals that VAT has a positive and statistically significant impact on at 5% level. The result suggests that an increase in VAT has a positive impact on Infrastructural development and with a 1% rise in VAT resulting in a 5.232% increase in Infrastructural development. The coefficient and p-values of DEBT, -0.6643 {0.000} reveals that DEBT has a negative and statistically significant impact on Infrastructural development at 5% level. Specifically, the estimate suggests that a 1% increase in DEBT will cause a decline in Infrastructural development by about 6.643%.

Table 7. Post -Estimation diagnostics

Breusch-Godfrey Serial Correlation LM Test:	F-statistic = 1.581	Prob (f)	= 0.9210
Heteroskedasticity Test: Breusch-Pagan-Godfrey	F-statistic= 2.227	Prob (f)	=0.2378
Ramsey Reset Test	F-statistic= 2.603	Prob (f)	=0.1103

Source: Researchers compilation (2018).

The Breusch-Pagan test for heteroskedasticity, Breusch-Godfrey Serial Correlation LM Test an Ramsey Reset test were performed as diagnostics for the estimation and the result confirms the absence of heteroskedasticity, serial correlation and omitted variables bias in the estimation and hence the post estimation diagnostics suggest that the estimation results are valid and satisfies the necessary statistical conditions.

Discussion of Result and Test of Hypothesis
The regression results reveals the structural coefficients of the variables and their relationship with Infrastructural development. The coefficient and p-values for VAT; 0.5232 {0.000}, reveals that VAT has a positive and statistically significant impact on at 5% level. The result suggest that an increase in VAT has a positive impact on Infrastructural development and with a 1% rise in VAT resulting in a 5.232% increase in Infrastructural development. Therefore, we reject the null hypothesis that VAT has no positive and significant impact on Infrastructural development in Nigeria. The finding of the study is in tandem with Oladipupo and Ibadin (2016) which examine the impact of non-oil taxation on the infrastructural development in Nigeria. The positive and significant relationships between the infrastructural development and some tax revenue components indicate that policy measures to expand tax revenue through more effective tax administration will impact positively the infrastructural development in Nigeria. The finding is also supported by that of Owolabi and Okwu (2011) which showed that VAT revenue contributed positively to the development of the respective sectors. Though the finding is at variance with Ayanduba and Aronwman (2015) which investigated the impact of tax revenues collected by the government on infrastructural development in Nigeria. The findings show that VAT have non-significant impact. In the same vein, Oliver, Edeh and Chukwuani (2017) study examines the effect of Federal Government of Nigeria's Tax resources on infrastructural development of Nigeria. The result reveals that VAT had positive and insignificant effect on Infrastructural Development in Nigeria.

Conclusion and Recommendation
VAT is an indirect tax that is imposed on goods and services, and the ultimate burden rests on the final consumer. It is imposed only on the value added at every level in the chain of production. It was introduced in 1994 in Nigeria as a replacement for sales tax with the aim of increasing the revenue base of the government and making funds available for developmental purposes. The aim of the study is to examine empirically, the impact of VAT on infrastructural development in Nigeria. This study adopts a time-series research design. In this study, secondary data retrieved from the CBN statistical bulletin, Federal Inland Revenue Service (FIRS) and National Bureau of Statistics for various years will be used for the study. The data will cover the period between 1994-2017. The study found that VAT is generally not characterized with threatening oscillations year-on-year over the period. This is a good sign for policy makers as it implies that over the business cycle, VAT revenue will still maintain some considerable stability and hence it can be depended upon in the forecasting, budget planning and fiscal coordination. Though VAT growth rates have been meshed with a lot of oscillations and this may be expected due to the efficiency and monitoring levels of tax management authorities and the several loop-holes associated with the remittance of VAT revenue.

The regression results reveal the structural coefficients of the variables and their relationship with Infrastructural development. The coefficient and p-values for VAT; 0.5232 {0.000}, reveals that VAT has a positive and statistically significant impact on at 5% level. The result suggest that an increase in VAT has a positive impact on Infrastructural development and with a 1% rise in VAT resulting in a 5.232% increase in Infrastructural development. The study recommends that that the government and tax authorities look critically at the VAT- consumption based models in ensuring revenue stability. Also, there are enormous inefficiencies with regards to the way and manner infrastructural development is carried out in Nigeria. The issues of late and slow budget implementation must be addressed alongside effective budget monitoring and evaluation.

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APPENDIX

Appendix 1: DATA

	VAT	**DEBT**	**CAPEX**
1994	7261	1056.396	70.9183
1995	20761	1194.6	121.1383
1996	31000	1037.296	212.9263
1997	34000	1097.683	269.6517
1998	36000	1193.847	309.0156
1999	47100	3372.181	498.0276
2000	57500	3995.634	239.4509
2001	91800	4193.271	438.6965
2002	108600	5098.886	321.3781
2003	136400	5808.009	241.6883
2004	159500	6260.595	351.3
2005	178100	4220.979	519.5
2006	221600	2204.721	552.3858
2007	289600	2608.519	759.323
2008	401700	2843.564	960.8901
2009	481400	3818.467	1152.797
2010	564890	5241.657	883.8745
2011	659153.7	6519.69	918.5489
2012	710555.1	7564.431	874.834
2013	802683.5	8506.311	1108.386
2014	802964.6	9535.542	783.1224
2015	65635352	10948.53	818.365
2016	65635352	14537.12	634.8036
2017	46771000	18366.31	979.5

Dependent Variable: CAPEX

Method: Least Squares

Date: 04/12/19   Time: 14:20

Sample (adjusted): 1994 2017

Cointegrating equation deterministics: C

Fixed leads and lags specification (lead=1, lag=1)

Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
VAT	0.523207	0.157251	2.71031	0.0088
DEBT	-0.66430	0.185114	2.303815	0.0059
C	4.76188	0.640901	5.48341	0.0000
R-squared	0.5741397	Mean dependent var		381.9878
Adjusted R-squared	0.506585	S.D. dependent var		375.5437
S.E. of regression	286.1229	Sum squared resid		430106.1
Long-run variance	38065.08			

	CAPEX	VAT	DEBT
Mean	584.1884	7661845	5467.677
Median	535.9429	199850	4207.125
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