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TAX REVENUE VOLATILITY AND ECONOMIC GROWTH IN NIGERIA

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ABSTRACT: *Over the years Nigeria has experienced downward slope in its productivity and economic growth. This is evident in the country's inability to deliver on national plan, high rate of unemployment, poor road networks, low quality education and low standards of living. In all these, studies have shown low and unsteady revenue generation in the country. This study investigated tax revenue volatility on economic growth in Nigeria, using inflation and exchange rates as moderating variables. This study adopted ex post facto research design. Data were obtained from certified sources; namely, National Bureau of Statistics, Central Bank of Nigeria Statistical Bulletin and Federal Inland Revenue Services for the 1981Q1-2017Q4, amounting to one hundred and eight (108) observations. Data were exposed to the scrutiny of the appropriate regulatory agencies for validity and reliability. Pre-estimation tests were conducted using Pearson correlation and stationarity tests. The post-estimation tests included linearity, Heteroskedasticity, Breusch-Godfrey serial Correlation Lagrangian Multiplier and stability test. Data were analyzed using both descriptive and inferential statistics. Findings revealed that tax revenue volatility moderated by inflation rate and exchange rate had significant effect on economic growth (EG) in Nigeria (Adj.* R^2 *=0.6,* $F_{(3, 105)}$ *=2140.285,* $p < 0.05$*;* $\beta_1 = 0.219$*). This study concluded that tax revenue volatility affects economic growth in Nigeria. It was recommended that government should formulate tax policies that will encourage steady tax revenue. In addition, government should ensure prudent application of tax fund to the development of infrastructure that would translate into economic growth.*

KEYWORDS: economic growth, gross domestic products, tax bribe, tax compliance costs, tax penalty, tax revenue, tax volatility

INTRODUCTION

From the extant literatures, a country's economic growth is measured by the Gross Domestic Product (GDP) while the level of welfare of people is measured by per capita income. That is, GDP as a ratio of the country's total population. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP (Onuoha, Ibe, Njoku, and Onuoha, 2015). In a more concise explanation, economic growth is an increase in the production of goods and services over a specific period, especially a year. In real money terms, the measurement must remove the effects of inflation from its computation. With good

levels of economic growth, businesses will be more profitable as such, stock prices will be on the increase. Thus, economic growth is the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. The access of a nation to international finance as well as foreign financial institution taking risk for Letters of Credits, transactions is informed by the level of the nation's Gross Domestic Product.

Nations in the world look at the indices that contribute to the growth of GDP for proper planning and harnessing of resources. This gave rise to various economic reforms all over the world that were aimed at trying to boast their economies. Elebiju, (2007) mentioned that employment, taxes and investments are paramount in growing the gross domestic product of any nation. This position makes tax as a tool for raising fund for government functions to be more important. Some questions to answer include whether we are currently raising enough fund through taxes to grow our economy. Nigeria Economic Outlook (2018), expressed that much is needed to be explored in the area of taxation as our tax to gross domestic product is 6% as mentioned by Organization for Economic Cooperation and Development (OECD, 2017).

The report of World Bank Group (WBG) in 2018 stated that growth in advanced economies is predicted to decelerate their economies especially USA by adjusting towards monetary policy and fiscal stimulus. The report mentions that emerging market and developing economies (EMDEs) will rebound in commodity exporters while progress in per capita income growth will be subdued in Sub-Sahara Africa. This shows a lot of concerns for the economic growth in developing countries as business outlooks are subjected to various risks. Trade protectionism has increased substantially and risks of disorderly financial market movements heightened the geopolitical tensions. Trade protections constrained individual countries to look inwards in achieving economic growth. This has potentials for decline in economic growth of the nations. The study of Siyanbola, Adedeji, Adegbie and Rahman (2017) on sub-Saharan Africa shows that there is positive effect of tax incentives on industrial and economic growth of the region.

The above position on volatility holds for tax revenue when the series display cluster and intervals. Government plans and budget, growth agenda will remain an illusion to them. At times, volatility in tax revenue is often traced to Tax Rate, Tax base, Economic situation and Political factors (Felix, 2008; Seegert, 2013) this was stated by Utah state legislature (2014) revenue volatility revenue trend report. In literature, econometric studies estimating the elasticity of turnover with respect to the Security Tax Transactions (STT) originally conducted by Jackson and O' Donnell (1985) using UK quarterly data, where their findings suggested that a 1% point cut in stamp duty from 2% to 1% leads to a dramatic 70% increase in equity turnover. In similar studies, Lindgren & Westlund (1990) and Ericsson & Lindgren (1992) use Swedish and international panel data respectively, and find that, in the long run, a one percentage point increase in the STT leads to a decrease in turnover of between 50% and 70%. Increase or decrease on tax revenue could only be traced to tax types of which PPT, CIT, VAT, CED and TETFUND are broad apart. That decrease or increase in tax revenue could only be explained by the amount recorded in tax amount of each category.

Inflation and exchange rates are exogenously determined in the economies of the world. At their harsh periods, they bite hard on individuals and firms. They both impact negatively on cost of production thereby reducing the assessable profit to tax. Kwofie & Ansah (2018) studied the effect of inflation and exchange rate on Stock Market Returns in Ghana. In some cases, inflation and exchange rates determine Foreign direct investments. Lawal (2016) equally dealt with the effect of exchange rate fluctuations on manufacturing sector output in Nigeria. The work of Lesen & Rashid (2018) on the effect of Exchange Rate Volatility on International Trade and Foreign Direct Investment (FDI) in Developing Countries. These studies were similar to the works of (Ngerebo-a & Ibe, 2013; Oleka & Okolie, 2016; Olu & Idih, 2015; Onuorah & Osuji, 2014; Ramasamy & Abar, 2015; Tafa , 2015; Umaru & Zubairum, 2012). In the same vein, while some firms inprove on turnover, and declare image profit while others experience the glut and poor sales to declare low profit and low tax payment. This mixed position in relation to tax could be responsible for the position of tax volatility on the part of the government. Thogh, Koirala (2018) still supported that Real Effective Exchange Rate has effect on Economic Growth of Nepal.

This study becomes imperative owing to the growing needs of the country and the obligations of the government to enhance economic growth in the society as well as international and intertemporal comparisons of nations. In addition, a volatile revenue base is belief is suspected to be a shortcoming for planning and development. Thus, tax revenue volatility is needed in this study to explain poor road network, quality of education, housing provisions that will impact on economic growth in Nigeria.

Volatility of tax revenue is a reflection of fluctuations of the general income level of taxpayers, and the unfortunate hash economic climate of doing business which affect the productivity of companies operating in Nigeria. This inadvertently affects economic growth of the country. Other studies also considered volatility of tax revenue in terms of tax instability and government expenditure in developing economies (Talvi, 2005; Clements, 2007). These studies might have contributed to reduce the mean level of public spending. In an empirical study, Seegert (2012) opined that majority of the increase in state tax volatility in the 2000's can be attributed to imbalance in state tax structures, defined as overweighting either sales or income taxes.

The challenge with Nigeria Economic Growth has called for serious attentions in research literature (Ajide, 2014). Such questions as what caused economic growth to increase or decline?, Why do countries grow faster than the other?, have begun to arose. What are the causes of disproportionate rates of growth across countries? Are factors causing differential growth rates country-specific? Haller (2012) stated further that economic growth is about national income per capita, the national wealth, which includes production capacity, low productivity and wasting agricultural products. Economic growth is subjected to such constraints as excessive rise of population. World Bank Group (2014) indicated that poverty head count in Nigeria is 68% in 2010, excessive governmental intervention, inadequate infrastructure, inefficient utilisation of resources, inadequate schools with poor infrastructure, bad and poor roads network, limited resources in addition to institutional and cultural models that retard growth. Multinational and multi-local companies have relocated to our neighbouring countries to manufacture their products at cheaper costs. Most of our

manufacturing facilities are now church halls and event centre buildings. These bring the need to investigate whether the revenue required to orchestrate and sustain growth in Nigeria is being hampered or stable.

Both Economic conditions and Political factors are very strong in the administration and legal system of taxation, as compliance cost could lead to corruption that played out as bribe is expected to have negative effect on tax revenue and the economic growth of the nation and welfare of the people (Smith & Landon, 2010; Onakoya & Afintinni 2016; Adaramola & Ayeni-Agbaje, 2015). The tax evasion becomes a central cause of attractions to stakeholders, tax payers and potential payers, industry captains, policy makers, professionals and government businesses agents. Marjit, Seidel and Thum (2016) on tax evasion, corruption and tax loopholes, posit that in developing countries, governments face a serious dilemma when raising tax revenues. Fiscal resources are urgently needed to finance essential state services, invest in infrastructure and provide the necessary input in future growth.

The tax revenues are expected from individuals, and firms that engage elaborate strategies to avoid and evade taxes. This position made government to hire tax inspectors and auditors to block these loopholes to be able to improve on tax collection. But in an environment where corruption is the order of the day, collusion may occur among the players especially tax payers and auditor to instigate lesser amount of tax, which will have negative impact on economic growth of the country. Marjit *et al*. (2016) mentioned that government's effort may be frustrated as resources needed to run the affairs of the nation will be scanty. They posit that the simplistic approach granted by the government on tax matters in the face of corruption could continue to leave the government with low tax revenue and high level of corruption being prevalent. On this note, it should be investigated whether tax under payment on PPT, CIT, CED, VAT and TETFUND actually impacts negatively on economic growth. The objective of the study was to ascertain the impact of Tax Revenue Volatility on economic growth in Nigeria. Using the null hypothesis to state that there is no significant impact of Total Tax Revenue Volatility on economic growth in Nigeria.

LITERATURE REVIEW

Economic Growth

Olu and Idih (2015), cited the work of Dwivedi of 2004, mentioned that economic growth is a sustained increase in per capita national output or net national product over a long period of time. This implies that the rate of increase in output should be greater than the rate of growth in population. Another quantification of economic growth is that national output should be composed of such goods and services, which satisfy the maximum want of the maximum number of people. Economic growth is the quantitative increase in the monetary value of goods and services produced in an economy within a given year. It is measured as a percentage change in the Gross Domestic Product or Gross National Product.

Haller (2012) posited that economic growth is the complex long run phenomenon subjected to constraints like excessive rise of population, limited resource, inadequate infrastructures, inefficient utilisation of resources, excessive governmental intervention, institutional and

cultural models that make the increase different. Economic growth is obtained by efficient use of the available resources by increasing the capacity of production of a country. It facilitates the redistribution of economies between population and society. Haller (2012) further stated that the cumulative effect of the small differences of the increase rate in a period of one decade or more. It is easier to redistribute the income in a dynamic growing society than in a static one. When the rate of economic growth is big the period of goods and services rises and consequently, unemployment rate decreases the number of job opportunities and issues as well as the population standard of living.

Tax Revenue

The studies in tax turned into revenue by Okwori and Sule (2016). Obiechina, (2010), Asher (2001), Soyode and Kajola (2006), Illyas and Siddiqi (2010), Chaudhry and Munir, (2010) defined Revenue as all amounts of money received by a government from external sources for example those originating from "outside the government" net of refunds and other correcting transactions, proceeds from issuance of debt, the sale of investments, agency or private trust transactions, and intra-governmental transfers. Financial resources of government constitute the bulk of its revenue and this relates to monies mobilised or generated in the economy (Obiechina, 2010). The working definition of this study is in line with (Asher, 2001; Garrido & Mittone, 2013; Soyode & Kajola, 2006) who believe that options are available to governments for raising fund for bidding resources away from the other sectors of the economy and from other claimants to undertake their activities. Thus, revenue sources are not only limited to oil and non-oil sources but other means available to government in raising funds to financing their activities.

Volatility of Tax

Volatility means the frequency and severity at which the market price of an investment fluctuates (Seegert, 2012). In general term, it is pertinent to mention that volatility is the rate at which the price of a security increases or decreases for a given set of returns. Volatility is measured by calculating the standard deviation of the annualized returns over a given period of time. It could be put as the range to which the price of a security may increase or decrease as equally mentioned by (Balding and Dauchy, 2013). In other words, volatility is a statistical measure of the dispersion of returns for a given security or market index. Volatility can either be measured by using the standard deviation or variance between returns from that same security or market index. The higher the volatility of firm revenue the riskier the security and investment of the firm and for the individuals as well. In the securities markets, volatility is often associated with big swings in either direction. The discussions on taxes and volatility by Shambaugh (2012) and the crises on Europe as highlighted by Schaufele (2016) were centred on the resources of nations and the degree of volatility. At an instance when the stock market rises and falls more than one percent (1%) over a sustained period of time, it refers to as 'volatile' market. Succinctly put, volatility refers to the amount of uncertainty or risk related to the size of changes in a security's value. A higher volatility means that a security's value can potentially be spread out over a larger range of values. This means that the price of the security can change dramatically over a short time period in either direction. A lower

volatility means that a security's value does not fluctuate dramatically, and tends to be steadier.

Bhartia (2009) explains that tax revenue is the income gained by government through taxation. Tax revenue is used to finance government expenditure and to redistribute wealth which translates into financing development of a country (Ola, 2001; Jhingan, 2004; Bhartia, 2009). Musgrave and Musgrave (2004) stated that tax has micro effects on the distribution of income and the efficiency of resource use as well as macro effect on the level of capacity output, employment, prices, and growth (Mascagni, Moore, and McCluskey, 2014).

Tax revenue is generated from all types of taxes in Nigeria, which are collected by the Nigeria's Federal Inland Revenue Service (FIRS). According to FIRS, there are nine (9) types of taxes in Nigeria: Companies Income Tax (CIT), Petroleum Profit Tax (PPT), Value Added Tax (VAT), Personal Income Tax (PIT), Withholding Tax (WHT), Educational Tax (EDT), Stamp Duties (STD), Capital Gains Tax (CGT) and National Information Technology Development Fund (NITDF) Levy. For the purpose of this research, five (5) tax types would be investigated for Volatility.

Theoretically, this work is hinged on Social Contract Theory. Various contributors to Social Contract theory linked their sources to the book written by Jean-Jacques Rousseau in 1762 where the theory was based on moral, political values at the Age of Enlightenment when legitimacy of authority of state over the individual originated. The antecedents of social contract theory are found in antiquity, in Greek and Stoic philosophy, Roman and Canon Law. This theory was orchestrated in the mid 17th to early 19th centuries when it emerged as the leading doctrine of political legitimacy. The social contract theory can be compared with the theory of abundance, distribution and energetics (Harte, 2011).

The theory, social contract has been defined as a sort of contractual arrangement between the society and the state (Lloyd & Sreedhar (2019) as presented in the works of Hobbes, Rousseau and Hume. From the scratch, most social contract theories examine human condition in the absence of any political order which was described by Thomas Hobbes as ‘state of nature’ (Gaba, 2007). Lloyd *et al* (2019) mentioned that Hobbes argued that we form the commonwealth rendering our individual powers to the authority of an absolute sovereign. For Hobbes (1985), then, individual obedience to even an arbitrary government is necessary in order to forestall the greater evil of an endless state of war. Hobbes and Cromartie (2005) argue that individuals' actions are bound only by their personal power and conscience. Social contract theorists seek to demonstrate why a rational individual would voluntarily consent to give up their natural freedom to obtain the benefits of political order. Prominent of 17th and 18th century theorists of social contract and natural rights include Hugo Grotius in 1625, Thomas Hobbes in 1651, Samuel Von Pufendorf in 1673, John Locke in 1689, Jean-Jacques Rousseau in 1762 and Immanuel Kant in 1797, each approaching the concept of political authority differently.

Part of the submission of Grotius in 1625 was that we have rights as individual human beings. Thomas Hobbes in 1651 popularly said that in a "state of nature", human life would be "solitary, poor, nasty, brutish and short" if there is absence of political order and law as we

would have unlimited natural freedoms, including the "right to all things" and thus, the freedom to loot, rape and murder; which would be endless as well as "war of all against all". To avoid this, free men contract with each other to establish political community (Civil Society) through a social contact in which they all gain security in return for subjecting themselves to an absolute sovereign, one man or an assembly of men. Though, the sovereign's proclamations may well be arbitrary and tyrannical, as Hobbes in 1651 saw an absolute government as the only alternative to the terrifying anarchy of the state of nature.

This theory can be applied using some key concepts of government and governed. Early critic of social contract theory was Rousseau's friend, the philosopher David Hume, who in 1742 published an essay "Of Civil Liberty". The second part of this essay, entitled "Of the Original Contract", stresses that the concept of a "social contract" is a convenient fiction, as no party, in the present age can well support itself without a speculative system of principles annexed to its political or practical one; This study accordingly observes that each of the factions into which the Nigerian nation is divided has reared up a fabric of the former kind, in order to protect and cover that scheme of actions which it pursues as counted to the opinion of Hume in 1742. Hume in 1742 argued that consent of the governed was the ideal foundation on which a government should rest, but that it had not actually occurred this way in general.

A legal scholar Randy Barnett has argued that, while presence in the territory of a society may be necessary for consent, this does not constitute consent to all rules the society might make regardless of their content. A second condition of consent is that the rules be consistent with underlying principles of justice and the protection of natural and social rights, and have procedures for effective protection of those rights as well as the liberties (Randy, 2004). This has also been discussed by Brownson (1866), who argued that, in a sense, three "constitutions" are involved: first, the constitution of nature that includes all of what the Founders called "natural law"; second, the constitution of society, an unwritten and commonly understood set of rules for the society formed by a social contract before it establishes a government, by which it does establish the third, a constitution of government. To consent, a necessary condition is that the rules be constitutional in that sense.

The theory of an implicit social contract holds that by remaining in the territory controlled by some society, which usually has a government, people give consent to join that society and be governed by its government, if any. This consent is what gives legitimacy to such a government. Other writers have argued that consent to join the society is not necessarily consent to its government. For that, the government must be set up according to a constitution of government that is consistent with the superior unwritten constitutions of nature and society. The theory of an implicit social contract also goes under the principles of explicit consent (Randy, 2004). The main difference between tacit consent and explicit consent is that explicit consent is meant to leave no room for misinterpretation. Moreover, you should directly state what it is that you want and the person has to respond in a concise manner that either confirms or denies the proposition. According to the will theory of contract, a contract is not presumed valid unless all parties voluntarily agree to it, either tacitly or explicitly, without duress. Lysander Spooner, a 19th-century lawyer and staunch supporter of a right of contract between individuals, argued in his essay No Treason that a supposed social contract cannot be used to justify governmental actions such as taxation because government will

initiate force against anyone who does not wish to enter into such a contract. As a result, he maintains that such an agreement is not voluntary and therefore cannot be considered a legitimate contract at all.

The work of Charles, Ekwe & Azubike (2018); Ibanichuka *et al.* (2016) adopted social contract theory. As seen in today's world, the principle of taxation started as a social contract. The people have made social contract with their ruler, which determines their relationship and how they can be governed. They promise obedience to the society, while they guarantee protection and good government. While he keeps his part of the bargain, they must keep theirs, but if he misgoverns, the contract is broken and allegiance is at an end. It is with the revenue or money realised that the ruler develops the economy.

The theory recognizes government as the sole authority that manages tax on behalf of the society who elected them as the product of a contract. It offers a rational framework for reconciling the imperatives of government authority with the rights and obligation of the masses. The social contract theory says that Nigerian state and her resources should be administered on the basis of common shared principle of justice, the utilisation of the revenue should be used judiciously and applied for the economic development of the masses. According to Rauscher (2012), to explicate the idea of social contract, five important variables into which contracts approaches of relationship between the state and the masses may be analysed are as follows: One, the nature of contract act, two, the parties to the act, three, what the rights, obligation and limitation of the parties are consenting to, three, the reasoning that leads to the agreement, four, the reasoning that leads to the agreement and five, what the agreement (Constitution) is supposed to show. The work of Onakoya and Afintinni (2016) adopted social contract theory when they investigated tax and economic growth in Nigeria.

The issue here is that government is suspected to depends on what the citizen's offer in terms of tax revenue and other forms of contribution that will enable government develop on infrastructure, education, more enrolment in schools, human resources development, information and communication technology and employment creation.

Empirical Studies by Overton, Nukpezah and Ismayilov (2017) investigated Prepayments, late payments, and sales tax revenue volatility in some Texas cities and they stated that Local governments with volatile revenues face a variety of managerial challenges. This study examined the impact of prepayments and late payments on sales tax revenue volatility (STRV). Prepayments and late payments have the potential of disrupting the predictability of sales tax revenue. Using a sample of 1,075 cities in Texas over a 15-year period (1998 to 2013), the study finds that late payments impact Sales Tax Revenue Volatility while early payments do not.

Schaufele's (2016) research on taxes, Volatility and Resources in Canadian Provinces. According to Schaufele, tax policy often breeds controversy, especially when rate changes are motivated by volatile resource sectors. The paper examined how provincial tax policies respond to changes in resources revenues. Specifically, it (i) estimates the "tax-resource" elasticity for Canadian provinces and (ii) measures the resource sector's contribution to the

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volatility of provincial GDP. Empirical results suggest that a $1,000 decrease in per capita resource revenue leads to a 150bps increase in a province's marginal personal income tax rate and a 3% increase in excise taxes on gasoline. Variance decomposition demonstrates that resource-induced volatility accounts, respectively, for 76.2%, 50.8% and 42.1% of the variance of New found land and Labrador, Alberta and Saskatchewan's GDPs.

Ebeke and Ehrhart (2010) examined Tax revenue instability in Sub-Saharan Africa: Consequences and remedies. The paper considered the various sources and consequences of the tax revenue instability in Sub-Sahara African countries. The study employed panel data of 39 countries observed for a period of 25 years (1980-2005). The study found that instability of government tax revenue leads to an instability of public investment and also government consumption. That tax revenue instability reduces the level of public development policies.

Saporta and Kan, (1997) examined the effects of stamp duty on the level and volatility of UK equity prices. This paper investigates the effects of stamp duty - the UK securities transaction tax - on the level and volatility of equity prices. They examined the response of the equity market to announcements of changes in stamp duty rates and compared the prices of two assets, which are similar in all respects apart from their treatment for stamp duty purposes: American Depositary Receipts (ADRs) and their London Stock Exchange-traded stocks. Their findings are consistent with the hypothesis that stamp duty is capitalized in prices. Using univariate GARCH models, they found that stamp duty has no effect on volatility, contradicting the key hypothesis put forward by proponents of transaction taxes.

Empirical investigations of STT effects on equity volatility have focused exclusively on the Swedish experience. Umlauf (1993) uses volatility ratios to test whether equity returns volatility decreased during the higher STT regimes in Sweden. Barr and Selling (1996) use GARCH models to estimate STT effects on the conditional volatility of Stockholm Stock Exchange equity returns. Neither study finds any STT effects on volatility.

Dauchy & Balding (2013) investigated past two decades of the United States federal income tax revenue has shown periods of increased volatility. Throughout the 1990s the growth rate of individual income taxes was between 5 and 10 percent, it has swung between – 12 and +12 percent from 2000 to 2006. Meanwhile, wage income has been relatively stable during this period while capital income annual growth has swung in periods between 2000 and 2006. Looking deeper into the income composition of taxable sources, they found that tax revenue has increased its dependence on volatile capital gains income, due in part to an increasing dependence on high income tax payers. In the decade ending 1976, capital and business income represented about percent of gross income, including about 3.1% for capital gains and losses.

Justifying this study requires the contributions of Schaufele (2016), Dauchy & Balding (2013), McNichol (2013), Albrecht (2013) Basdevant (2012), Seegert (2012), Landon & Constance, (2010) Garrett (2006) Chong & Gradstein (2006), Abildgren (2005), Talvi & Vegh (2005), Kretzschmar, Moles & Constantinou (2005), Sobel & Holcombe (1996) on tax revenue volatility, were conducted in the US, UK, Danish, Canada and South Africa, but none of these studies has been traced to tax revenue volatility in Nigeria. Most of the research

works in Nigeria were on tax revenue and economic growth in Nigeria, this aspect of tax revenue volatility has not been linked to the works in the country.

METHODOLOGY

This study employed *ex-post facto* research design. This design was used in the work of Adegbie, Jayeoba and Kwarbai (2016) to assess value added tax on growth and development of Nigeria. Also, Felix (2008) investigated the growth and volatility of state tax revenue sources in the tenth district for a period of 1967 -2007 using times series data. *The ex-post facto* research design was used because it involved the use of past records in order to determine the present association and to develop a predictive model of forecasting the future relationship that may exist between the variables (Akinyemi, 2016). More importantly, the needed data were sourced from the publications of the Central Bank of Nigeria (CBN) Statistical Bulletin, as well as the tax revenue profile of the Federal Inland Revenue Service (FIRS) and the National Bureau of Statistic (NBS). This study takes after the study of overton, Nukpezah and Ismayilov (2017), Balding and Dauchy, (2013), which made use of *ex-post facto*. In this study, both the descriptive and inferential statistics were adopted to achieve the stated objectives. This type of experimental design was also used by Kirchler, Muehlbacher and Hoelzl (2009).

The population of this study was Nigeria and it assessed the effect of tax revenue volatility on economic growth in Nigeria for the period 1981-2017. This is similar to the study of Chimilila (2017) in Tanzania where 192 months of times series data were employed for the study of variables. It should be noted that data for value added tax and education tax started from 1994 and 1996, respectively. This was the reason for both variables not starting in 1981 `because their implementation starts at a later date. The total sample period is thirty-seven years, while for value added tax and education tax it was twenty-four and twenty-two years.

The data for this study was sourced mainly from the Central Bank of Nigeria (CBN) statistical bulletin, Federal Inland Revenue Service, National Bureau of Statistic and (NBS). The various versions of the Central Bank of Nigeria (CBN) Statistical Bulletin, the annual reports of the Federal Inland Revenue Service (FIRS) and National Bureau of Statistics (NBS) have been duly certified by regulatory agencies and were considered suitable and appropriate for public usage.

Method of Data Analysis

In achieving the objective of this study, the study employed both descriptive and inferential statistics. First, the study examined the descriptive properties of the data using the mean median, maximum, minimum, standard deviation. Second, it examined the time series properties of the variables, the Augmented Dickey Fuller (ADF) and the Phillip and Perron (PP) unit root tests were equally used. Third, it tested for the long run relationship between tax revenue volatility and economic growth in Nigeria, the Autoregressive Distributed Lag (ARDL) model for cointegration was used in addition to test for short run model, the error correction model was equally used. For the model to adjust back to equilibrium the error correction term is expected to be negative and statistically significant at 1, 5 or 10 per cent level of significance. Finally, the post-estimation test was carried out to assess the probability

of using the results for policy purposes. Here, the LM test was used to check if correlation exists in successive error terms. In addition, Ramsey RESET Test was used to examine if the estimated model is linearly and correctly specified. The Breusch-Pagan for heteroscedasticity tests was used to test if the variance of the error term is constant or not. The Jarque-Bera test was used to test if the specified model follows a normal distribution or not and finally, the cumulative sum of residual and cumulative sum of square residuals will be used to test the stability of the model.

Model Specifications

The functional estimation used to achieve the assumptions stated earlier is,

$Y = f(X)^n$ …….(1)

This denotes that Y= Dependent Variable, which is GDP (Gross Domestic product used to measure economic growth)

While X = Independent Variable, proxy as Tax Revenue Volatility (TRV)

The long-run volatility model in algebraic form is presented below as,

$LGDP = \beta_0 + \beta_1 TRV + \beta 2 INFR + \beta_3 EXR + \varepsilon_t$

The scale variable measures Nigerian real GDP and CITV is the companies' income tax revenue volatility. The measure of companies' income tax revenue volatility was constructed using the GARCH (generalized autoregressive conditional heteroskedasticity) approach. To distinguish the short-run effects of volatility measures from the long-run effects, Equation (3) is specified in an error-correction modeling form. Following Pesaran *et al.'s* (2001) bounds testing approach and rewritten (1) as follows:

$\Delta LGDP = \alpha_1 \Delta LGDP(-1) + \alpha_2 \Delta LTRV + \alpha_3 \Delta LINFR + \alpha_4 \Delta LEXR + \alpha_5 ECM(-1)$

Where α is the intercept from equations 3 and ρ_1 is the estimated coefficients for the explanatory variable, *t* represents the periods under study, ε_t is the error term.

ANALYSIS AND RESULTS

At this section, results analysed using eviews is presented for analysis in support to earlier models stated in methodology. In table 4.1 below, the results were determined through Pearson Product-Moment, the diagnostic test and the regression results respectively. The results put academic light on how Tax Revenue Volatility may impact economic growth.

Descriptive Statistics

Table 4.1 Descriptive Statistics

Variables	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob	Obs
LGDP	7.06	7.19	10.30	3.56	2.28	-0.16	0.59	2.86	0.12	148
LEXR	3.38	4.60	5.90	-0.52	1.91	-0.78	0.32	1.72	0.13	148
INFR	20.04	12.47	78.63	0.75	5.64	0.60	1.59	3.59	0.11	148
LTTRV	3.71	4.83	11.33	-7.99	5.14	-0.33	2.10	1.70	0.15	147

Notes: Table 4.1 shows the mean, median, maximum, minimum, standard deviation, skewness, kurtosis and Jarque-Bera test for normality of the variables. The dependent variable is log of gross domestic product (LGDP) the explanatory variables are logarithms of total tax revenue volatility (LTTRV). The control variables are the logarithm of exchange rate (LEXR) and inflation rate (INFR) for the period 1981Q1-2017Q4 in Nigeria. The estimation process was facilitated using Eviews 10.
Source: Researcher's Computation 2019

Interpretation of Descriptive Statistics

Log of gross domestic product (LGDP): The mean value of the gross domestic product is 7.06 with a median of 7.19. In addition, it shows that the maximum value is 10.30 and the minimum value 3.56. This implies that the levels of economic growth in Nigeria differ across time period. It also shows that the total value of goods and services produced follows upward trends during the period of study. The standard deviation of 2.28 shows that the level of growth is susceptible to change in Nigeria. It also shows that economic growth in Nigeria follows a normal distribution because the Jarque-Bera test shows that the variable is normally distributed. Morealso, **Log of total tax revenue volatility (LTTRV):** The mean value of the total tax revenue volatility is 3.71 with a median of 4.83. In addition, it shows that the maximum value is 11.33 and the minimum value -7.99. This implies that the total tax revenue volatility in Nigeria differs across time period covered for in the study. The standard deviation of 5.14 shows that the total tax revenue volatility is susceptible to change in Nigeria. It also shows that total tax revenue volatility in Nigeria follows a normal distribution because the Jarque-Bera test of 1.70 shows that the variable is normally distributed.

Also, Log of exchange rate (LEXR): The mean value of the exchange rate is 3.38 with a median of 4.60. In addition, it shows that the maximum value is 5.90 and the minimum value -0.52. This implies that the exchange rate in Nigeria differs across time period covered for in the study. The standard deviation of 1.91 shows that the exchange rate is susceptible to change in Nigeria. In addition, it shows that exchange rate in Nigeria follows a normal distribution because the Jarque-Bera test of 1.72 shows that the variable is normally distributed. In addition, **Log of inflation rate (LINFR):**

The mean value of the inflation rate is 20.04 with a median of 12.47. In addition, it shows that the maximum value is 78.63 and the minimum value 0.75. This implies that the inflation rate in Nigeria differs across time period covered for in the study. The standard deviation of 5.64 shows that the inflation rate is susceptible to change in Nigeria. Moreover, it shows that inflation rate in Nigeria follows a normal distribution because the Jarque-Bera test of 3.59 shows that the variable is normally distributed.

4.1.1 Pearson Correlation Result

Table 4.2 Correlation Matrix for Tax Revenue and Gross Domestic Product

Variables	**LGDP**	**LEXR**	**INFR**	**LTTRV**
LGDP	1.00			
LEXR	0.77	1.00		
INFR	-0.03	0.13	1.00	
LTTRV	0.89	0.75	0.01	1.00

Notes: Table 4.2 shows the Pearson pairwise correlation matrix. The dependent variable is log of gross domestic product (LGDP) the explanatory variables are logarithms of total tax revenue volatility (LTTRV). The control variables are the logarithm of exchange rate (LEXR) and inflation rate (INFR) for the period 1981Q1-2017Q4 in Nigeria. The correlations are below the major diagonal and the bold coefficients denotes statistical significant at 1, 5 and 10 per cent. The estimation process was facilitated using Eviews 10.
Source: Researcher's Computation 2019.

This section discusses the degree of association between logarithms of total tax revenue volatility (LTTRV), logarithm of exchange rate (LEXR) and inflation rate (INFR) with the log of gross domestic product (LGDP) for the period 1981Q1-2017Q4 in Nigeria. The level of associations is in 89% and 63%, respectively. The implication of these results is that increases in total tax revenue volatility, company income tax volatility, petroleum profit tax volatility, value added tax volatility, education tax volatility, customs and excise duties volatility and exchange rate will lead to increases in economic growth in Nigeria. In sharp contrast, there is evidence that inflation has a negative insignificant relation with economic growth, this implies increases in inflation rate and will lead to decrease in economic growth.

4.1.2 Result of the Stationary Test

Stationary test is conducted to examine the time series properties of the variables over the study period. Specifically, the Augmented Dickey Fuller (ADF) and the Phillip-Perron unit root tests were used to test for stationary in the series and the result is presented in Table 4.3.

Table 4.3. Result of the Unit Root Test

Variables	ADF	PP	Remarks
LGDP	-1.470	-0.900	
ΔLGDP	-3.779***	-5.000***	I(1)
LEXR	-1.968	-1.529	
ΔLEXR	-7.062***	-7.824***	I(1)
INFR	-3.240	-3.147	
ΔINFR	-4.003***	-5.777***	I(1)
LTTRV	-2.375	-2.774	
ΔLTTRV	-3.822***	-10.837***	I(1)

Notes: Table 4.3 presents the unit root test. The dependent variable is log of gross domestic product (LGDP) the explanatory variables are logarithms of total tax revenue volatility (LTTRV). The control variables are the logarithm of exchange rate (LEXR) and inflation rate (INFR) for the period 1981Q1-2017Q4 in Nigeria. The correlations are below the major diagonal and the bold coefficients denotes statistical significant at 1, 5 and 10 per cent. The estimation process was facilitated using Eviews 10. The critical value at 5 for intercept and trend is -3.50 and for intercept alone is -2.93. ** and *** indicates significant at 5 and 1 per cent respectively.
Source: Researcher's Computation, (2019).

Stationary test is conducted to examine the time series properties of the variables over the study period. Specifically, the Augmented Dickey Fuller (ADF) and the Phillip-Perron unit root tests were used to test for stationary in the series and the result is show that the economic growth proxied with the gross domestic product, exchange rate and inflation 3.779, 7.062 and 4.003 were stationary in their first differences, while company income tax volatility and value added tax volatility 6.105 and 3.321 were stationary at levels 5 per cent level of significance. It should be noted that because some of the different order of integration of the variables, the autoregressive distributed lag (ARDL) model approach to cointegration of Pesaran (2001), which allow for the combination of levels and first difference stationary variables were used.

Regression analysis

The hypothesis was that the effect of total tax revenue volatility affects economic growth in Nigeria, within the period of 1981- 2017. The regression analysis was used to estimate the interaction among variables.

Table 4.1 Full Information on the Effects of Total Tax Revenue Volatility on Economic Growth

Panel A: Long Run Estimates

Dependent Variable: LGDP

Variable	**Coefficient**	**S.E**	**t-stat**	**Prob**
LTTRV	0.219	0.026	8.419	0.000
INFR	-0.007	0.003	-2.536	0.012
LEXR	0.567	0.069	8.282	0.000
C	4.480	0.158	28.329	0.000

Panel B: Short -Run Estimates

Variable	**Coefficient**	**S.E**	**t-stat**	**Prob**
D(LGDP(-1))	0.443	0.069	6.395	0.000
D(LTTRV)	0.498	0.122	4.082	0.000
D(INFR)	-0.062	0.011	-5.504	0.000
D(LEXR)	0.282	0.019	15.167	0.000
ECM (-1)	-0.412	0.122	-3.386	0.000

Panel C: Diagnostic Tests	**Statistic**	**Prob.**
Bound Test	135.934	0.000
Serial Correlation	1.264	0.286
Heteroscedasticity	1.111	0.239
Linearity Test	0.279	0.858
Adjusted R-square	0.620	
F-test	2140.285	0.000
	CUSUM	
Stability Test	Stable	

Notes: Table 4.9 reports the long-run estimates, short run estimates and the diagnostic tests for the relationship between total tax revenue volatility and economic growth. The dependent variable is the logarithm of gross domestic product and the independent variables are the logarithm of total tax revenue volatility, inflation rate and the logarithm of exchange rate.

Source: Researcher's Computation 2019

The long-run volatility model in algebraic form is presented below:

$LGDP = \beta_0 + \beta_1 TTRV + \beta_2 INFR + \beta_3 EXR + \varepsilon_t$

From the result table, we substituted values into the above equation to obtain values for the model thus,

Lgdp = 4.480 + 0.219lttrv – 0.007Infr + 0.567lexr

(28.329)*** (8.419)*** (-2.536)** (8.282)***

*The asterisks marks of ** and *** indicate 5% and 1% level of significance, which equally apply to the short run equation below..*

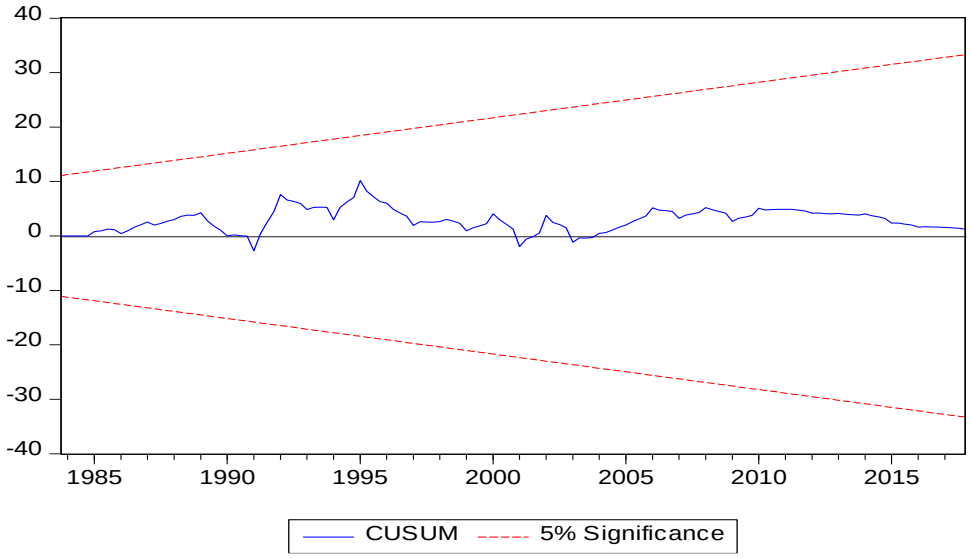
In the Short run, the estimate in the model below as substituted from the above table is presented below;

$\Delta LGDP = \alpha_1 \Delta LGDP(-1) + \alpha_2 \Delta LTTRV + \alpha_3 \Delta LINFR + \alpha_4 \Delta LEXR + \alpha_5 ECM(-1)$

$\Delta lgdp = 0.443 \Delta lgdp(-1) + 0.498 \Delta lttrv - 0.062 \Delta infr + 0.282 Dlexr - 0.412 ECM(-1)$

(6.395)*** (4.082)*** (-5.504)*** (15.167)*** (-3.386)***

Figure 4.1 Stability test graph (CUMSUM) Residual test



The graph (4.1) above depicts the stability of the model in use in this study. It shows that the model is stable and appropriate for this study.

Figure 4.2 **The Total Tax Revenue Graph is depicted below.**

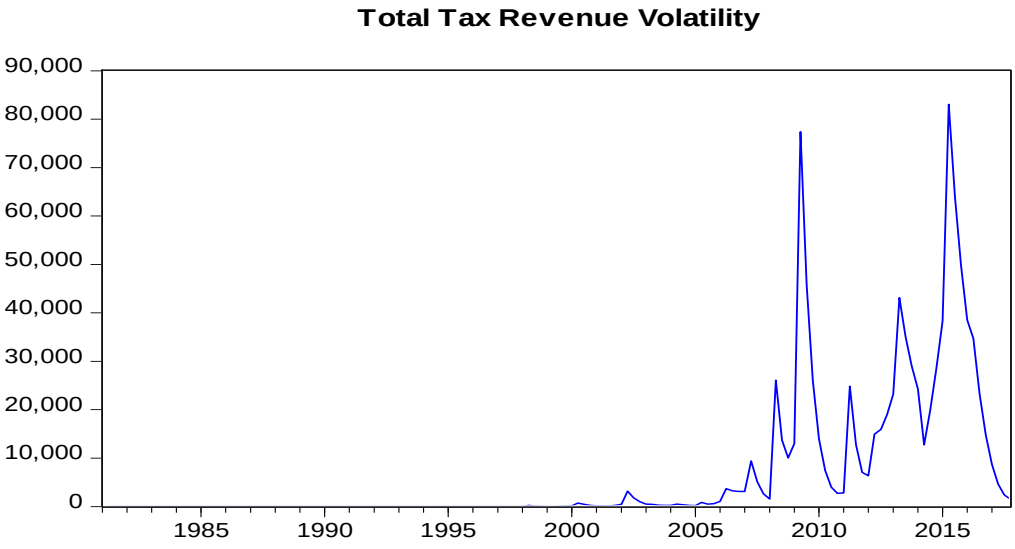


Fig. 2 Total Tax Revenue Volatility graph.

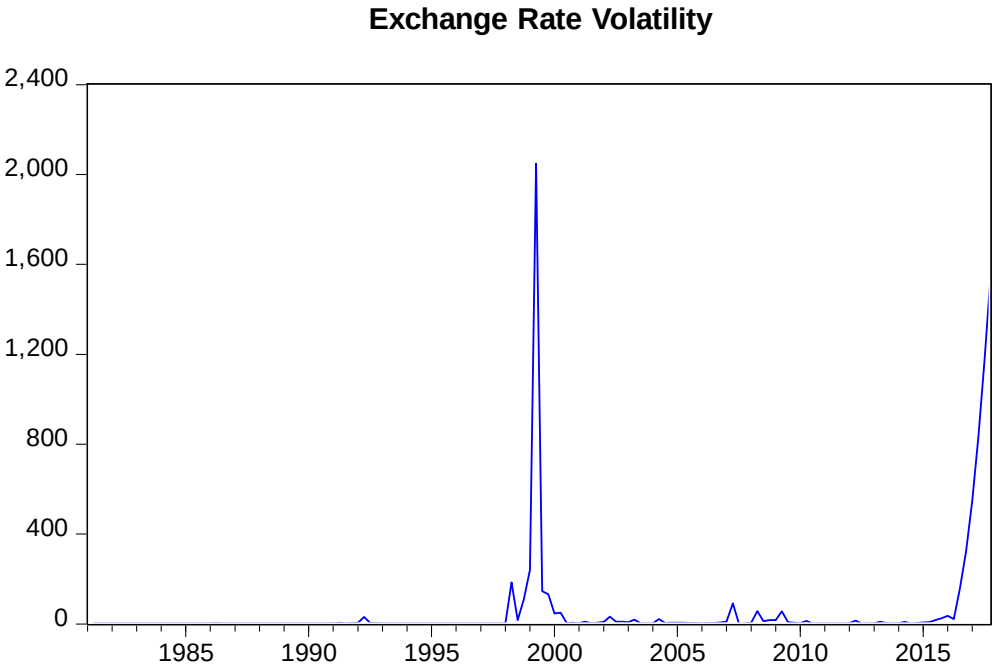


Fig. 3 Exchange Rate Volatility graph

Interpretation

The value of F-Stat is 135.934 and it is greater than the critical values bound at upper bound (I1) of 4.26, 3.5 and 3.13 at 1 percent (Appendix- Model VI). This implies that the variables co-moved in the long run. Having found a long-run relationship between economic growth and total tax revenue volatility, the study then estimates the long-run and the short-run elasticities. The empirical results for the model, obtained through normalizing economic growth and total tax revenue volatility in the short and long run, are reported in Table 4.9.

The estimated long-run coefficients (elasticities) for the UECM model are given in the tables Panel A of Tables 4.9. In the long run, there is an evidence that total tax revenue volatility and exchange rate have a positive relationship between economic growth, while an inflation rate has a negative relationship with economic growth. This implies that increases in total tax revenue volatility and exchange rate will lead to increases in the economic growth in Nigeria and conversely, increases in inflation rate will lead to a fall in economic growth. Furthermore, there is an evidence of a long-run significant relationship that total tax revenue volatility, inflation rate and exchange rate with economic growth in Nigeria (β_1 = 0.219, t-test= 8.419, ρ= 0.000, β_2 = -0.007, t-test= -2.536, ρ= 0.012 and β_3 = 0.567, t-test= 8.282, ρ= 0.000). This implies that total tax revenue volatility, exchange rate and inflation rate are significant factors influencing changes in economic growth in Nigeria. In addition, a 1 per cent increase in total tax revenue volatility and exchange will lead to 2.19% and 56.7% increase in economic growth in Nigeria, respectively in the long run. In sharp contrast, 1 per cent increase in inflation rate will lead to 7% decrease in economic growth. Thus, the null hypothesis that there is no significant effect of total tax revenue volatility on economic growth in Nigeria was rejected. The study accepts the alternative hypothesis that there is a

significant relationship exists between total tax revenue volatility and economic growth in Nigeria

The Short-run Dynamics is for two reasons. First, is to examine if changes and the statistical significance experienced in the long run also exist in the short run model. Second, is to examine the degree of adjustment back to equilibrium using the error correction term. The short-run adjustment process is measured by the error correction term ECM_{t-1} and it shows how quickly variables adjust to a shock and return to equilibrium. For stability, the coefficient of ECM_{t-1} should carry the negative sign and be statistically significant.

The result shows that in the short-term total tax revenue volatility and exchange rate have a positive and significant relationship with the economic growth, while inflation rate has a negative significant relation with economic growth (β_1 = 0.498, t-test= 4.082, $\rho<0.05$, β_2 = -0.062, t-test= 5.504, ρ= 0.000 and β_3 = 0.282, t-test= 15.167, ρ= 0.000). In addition, the estimated coefficient for the ECM_{t-1} reported in Panel B of 4.9 is negative and statistically significant (ECM= -0.412, t-test = -3.386, p= 0.000). This implies that deviations from economic growth equilibrium path are corrected by nearly 41.2% over the following quarter. In other words, the adjustment process is relatively okay in Nigeria. The statistical significance of the ECM_{t-1} confirms the presence of long-run equilibrium relationship between economic growth and total tax revenue volatility in Nigeria.

The Adjusted R-square is 62%, this implies that total tax revenue volatility, exchange rate and inflation rate explains about 62% changes in economic growth, while the remaining 38% were other factors affecting changes in economic growth but were not captured in the model. In addition, the F-statistic of 2140.285 is statistically significant at 5% level of significance, this implies that total tax revenue volatility, exchange rate and inflation rate jointly explain changes in economic growth in Nigeria.

Diagnostic Test

The linearity assumption of ARDL test was estimated using **Ramsey Reset Test**, F-statistics of 0.279 and its ρ-value is of 86 per cent is greater than 5 per cent chosen level of significance, thus the null hypothesis of linearity cannot be rejected. This implies that the model is correctly specified and that there is a linear relationship between the economic growth and total tax revenue volatility in Nigeria. We conducted **Heteroskedasticity Test, using** Breusch-Pagan Test to know whether the covariance of the estimated model error term is constant or not. The result suggests that a statistic of 1.111 is not statistically significant at 5 per cent level of significance; this implies that the null hypothesis of homoscedasticity could not be rejected. Thus there is an evidence that the covariance of the error terms has a constant finite variance. The Breusch-Godfrey Serial Correlation LM Test was carried out to determine if successive error terms are correlated. The probability value of F-statistic of 0.286 is in favour of the null hypothesis that there is no serial correlation in the residuals up to the specified lag order at 5 percent significant level. Thus, the study concluded that the successive error terms were not correlated in the estimated model for economic growth and total tax revenue volatility. **Stability Test (CUSUM Residual Test).** The CUSUM test for stability is meant to determine the appropriateness and the stability of the model. In addition, the CUSUM test is used to show whether the model is stable and is suitable for making long run decision. The CUSUM is also reported in Panel C. For Nigeria, the CUSUM test also

shows that the estimated model is stable, this is because the plot of CUSUM statistic stays within a 5% significance level portrayed by two straight lines.

CONCLUSION AND RECOMMENDATIONS

The projection of this paper is to investigate the effect of tax revenue on economic growth in Nigeria. Achieving a laudable result, data were obtained from authentic public domain like National Bureau of statistics, CBN, FIRS portals. With the aid of econometric analysis we found that Tax revenue volatility has negative effect on economic growth of Nigeria. This is not unconnected with poor state of infrastructure, poor road and crude networks, high level of unemployment. These issues were aggravated by leakages causing volatility through the drain and miss appropriation of surplus collections in Nigeria. The finding is thrown out to assist in addressing the volatile government tax revenue to support government projects. Further implications from the empirical results show that tax revenue contributes less than the acceptable 10% to Nigeria's GDP; this implies that Government needs to implement policies that will attract her citizens to pay tax and ensure appropriate utilization of the taxes collected.

Policy of the government should understand that tax to GDP is put at 6% which is considered low for the nation. It is obvious that total tax revenue should be addressed through tax processes and procedures of tax assessment should be made more simplified and friendly at both e-transaction and human interface levels. This will create effectiveness and efficiency in tax administration that will increase our revenue base to melt out volatility. A process and procedure similar to the one engaged under Voluntary Assets and Income Declaration Scheme is equally laudable. No back duty investigation, no litigation, no court cases, no penalties and no fines. Future research work could examine the moderating effect of tax compliance costs on the relationship between tax revenue volatility and economic growth in Nigeria.

Contribution to knowledge

This study has contributed to the existing literature through an in-depth examination of the economic and social development sustainability through taxation, showing tax revenue volatility, how revenue volatility has become part of the bane for poor execution of government project; to reason for insufficiency of tax revenue, problems of tax administration in Nigeria, the Nigerian national tax policy and impact of tax revenue volatility on economic growth in Nigeria.

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