ISSN: 2349-5197
Impact Factor: 3.765

INTERNATIONAL JOURNAL OF RESEARCH SCIENCE & MANAGEMENT

MACROECONOMICS DYNAMICSAND TAX REVENUE PERFORMANCE IN NIGERIA (1987-2016)

Kehinde O. Odunsi*[1], Johnson A. Egwakhe[2], & Hammed B. Akinlabi[3]
Department of Business Administration and Marketing, School of Management Sciences, Babcock University.

DOI: 10.5281/zenodo.1490735

Abstract
This paper examined the effect of macroeconomic variables on tax revenue performance in Nigeria from the year 1987 to 2016. The work considered 1987 as the baseline and data were sourced from Central Bank of Nigeria and other Federal Institutions. Ordinary Least Square (OLS) was used for the estimation. Pre and post diagnostics test were conducted prior to analysis. Adjusted R^2 denotes that the explanatory variables explain about 95% of all the changes in the dependent variable. The p-value and F-statistics were statistically significant at 1% (0.000), meaning that the explanatory variables jointly influence the dependent variable of tax revenue performance. On the aggregate, the results show a significantly positive effect of exchange rate and real gross domestic product on tax revenue performance but inflation rate had negative, but insignificant effect on tax revenue performance in Nigeria within the timeframe. The results indicate that some macroeconomic variables exerted effect on tax revenue performance. The work suggests monetary and fiscal policy resilience to stimulate upward growth and stabilization of macroeconomic variables especially exchange rate and inflation. The aforementioned promote and strengthen investors' confidence towards attainment of higher tax revenue yield.

Keywords: Macroeconomic variables, Taxation, Performance, Tax revenue performance.

Introduction
Nigeria post-independence economic performance has been decidedly unimpressive and structurally weak. Despite the availability of resources and the colossal amount of foreign exchange derived mainly from natural resources, economic growth has been weak, infrastructural decay, and the incidence of poverty has increased. Most sovereign nations' economic objective is to improve the standard of living of her citizenry and promote economic growth and development. However, the vicious circle of poverty and under-performance in tax revenue have fuelled the challenges facing Nigerian economy with reference to extreme poverty, declining health care, illiteracy, democratic and political stability, unhealthy quality of the natural environment, incidence of crime and violence, and become an investment hub for international capital, *ceteris paribus*. The aforementioned economic weakness and the infrastructural decay could be attributed to the poor tax revenue performance over the years.

Tax revenue constitutes governments 'major income base all over the world and as such government use tax proceeds to execute traditional functions and obligations to the people (Azubike, 2009). Prominent among the functions are the provision of public goods, maintenance of law and order, defense against external aggression, regulation of trade and business to ensure social and economic maintenance. Chigbu and Njoku (2015) discussed that the primary aim of taxation is to generate revenue capable of financing government expenditure at all levels of government. This is achieved by imposing taxes on individuals, groups, businesses and corporate bodies by the constituted authorities. According to Akwe (2014) meeting the needs of the society calls for huge funds which an individual or society cannot contribute alone, except through taxation. Fasanu (2014) argue that taxes constitute key sources of revenue to the federation account shared by the federal, state and local governments. This accounts for Odusola (2006) position that in Nigeria, the government's fiscal power is divided into three-tiered tax structures and shared across federal, state and local governments, each of which has different tax jurisdictions.

According to Adeosun (2017), Nigerian tax to GDP ratio stood at 6% in 2017 compared to other African countries such as Ghana (20.8%), Republic of Benin (15.4%), Gambia (18.9%), South Africa (26.9%), and Botswana (35.2%). This was considered unfriendly for a country like Nigeria with over 190million people struggling with infrastructure deficit, low standard of living, and weak socio-economic activities and unable to execute projects for development. Further, Central Bank of Nigeria [CBN] (2013) report indicated that Nigerian currency has witnessed continual fall in market value resulting into high cost of production, upward movement in consumer price index, negative economic growth, and lower purchasing power of citizen as well as reduction in corporate taxable profit. For example, the exchange rate was ₦150.30/$1 in 2010 while it relatively moved up to ₦157.31/$1 in 2013 (CBN, 2013). However, same Naira/Dollar officially revolved around ₦197.50/$1 and ₦305/$1 in 2015 and 2016 respectively, while the parallel market rate jumped from less than ₦200/$1 in year 2014 and closes at ₦495/$1by December, 2016 (CBN Annual Report, 2016). In line with currency devaluation, the tax revenue performance drastically dropped from the peak of ₦5,481.7 trillion in 2012 to ₦4,287.8 trillion and ₦3,977.9 trillion in 2015 and 2016 (CBN Annual Reports, 2016; & Federal Inland Revenue Service [FIRS] Annual Reports, 2016) respectively as a result of high exchange rate and thus, has led to high domestic cost of production with little or no profit in the hand of taxable persons. The exchange rate effect on tax revenue is explicit in the work of Babatunde, Adenikinju and Adenikinju (2010).

Long-term broad-based economic growth of Nigeria is an increased household income to enable significant trade and investment anchored on robust market. While rapid growth in China, Malaysia and India for instance, have lifted millions beyond subsistence living, Nigeria and many other African countries have, however, experienced the opposite by recording low growth rates which Odusola (2006) attributed to Nigeria economic sluggishness *viz-a-vis* other emerging economies. Scholarly consensus exists in literature that macroeconomic policy is critical to successful development along high employment, price stability, long-term viability of the balance of payments, exchange rate, inflationary control, interest rate, and external equilibrium. Different approaches to the creation and characteristics of tax system aligned with budget require mutual interaction between taxes and macroeconomic variables. Fasanu (2009) and Adegboyega and Odusanya (2014) amplified the argument that the increase in the cost of running government coupled with the dwindling tax revenue has left all tiers of government in Nigeria formulating strategies to improve the revenue base. Similarly, Okafor (2012) observed that income tax revenue has generally been grossly understated due to improper tax administration arising from under assessment and inefficient machinery for collection.

The Nigerian tax system was established to achieve various economic objectives at notable periods, yet it has basically functioned as a tool for revenue collection which is the legacy from the pre-independence government based on 1948 British tax laws (Chukwuemeka, Malaolu, Oduh, & Onyema, 2012). Over time however, it has been observed that the Nigerian tax system has inherent problems in its structure and practice. A lot of literature exists on tax revenue and economic growth of Nigeria (Bukie, Aboodi, & Ahangari, 2014). Also, several literature exist on macroeconomic variables and economic growth of Nigeria (Saibu & Olatunbosun, 2013). However, the volume of available literature on the effect of macroeconomic variables on tax revenue performance in both developing and developed countries (Gaalya, 2015; Gaalya, Edward & Eria, 2017; Karimi, Kaliappan, Ismail & Hamzah, 2016; Micah, Bbaale & Hisali, 2017; Nwosa, Saibu & Fakunle, 2012; Samia & Sohail, 2016); have shown that the gaps have not been fully addressed. The foregoing implies the presence of a gap in the research concerning the role of macroeconomic variables in the tax revenue performance in Nigeria from 1987-2016.

Another problem threatening the tax revenue performance in Nigeria is high incidence of tax evasion and avoidance by tax payers, leading to low level of government revenue which further reduces the level of government expenditure (Cornelius, Ogar, & Oka, 2016). Data available indicate that by 1985, government expenditure was ₦13,040.9million, by 1990, it increased to ₦60,268.2million and ₦25,4038million in 1995. In 1998, the total expenditure of the Federal Government recurrent and capital was ₦443,563.3billion, increased by ₦87,301.0billion or2.45% above ₦356,262.3billion for the period of 1997. The expenditure also exceeded the 1998 budget estimate of ₦370,000billion by ₦73,563.3billion or 19.9% also between the year 2005 and 2009, the general government expenditure has also been increasing rapidly. In view of the problems confronting

tax revenue performance in Nigeria, this paper investigated the effect of macroeconomic factors on the tax revenue performance in Nigeria.

Literature review

Akers (2014) sees macroeconomics as a branch that deals with aggregate indicators of economics along performance, structure, behaviour and decision-making, rather than firms' and individual analysis. Macroeconomics studies aggregate indicators; gross domestic production (GDP), exchange rates, balance of payment, interest rates, unemployment rates as indices of economy functions. However, exchange rate, inflation, and GDP were the selected indices and discussed along concept and empirics. The exchange rate constitutes the price of a nation's currency vis-à-vis expressed in terms of another currency (Ahamed, 2016). This typology was dichotomized along price of home currency to foreign currency or price of foreign currency to home currency (Andrew, David & Gauco, 2016). David and Glauco (2012) definition of exchange rate present the price of a nation's currency in terms of another currency which, Adu and Nitim (2014) addressed from types as fixed exchange rate system, flexible exchange rate system and managed floating regime.

The fixed exchange rate system refers to a system in which exchange rate for a currency is fixed by the government (Aseidu, 2006). The basic purpose of adopting this system is to ensure stability in foreign trade and capital movements. In addition, it is a safeguard against crashing or plummeting local currency vis-à-vis foreign currency. To achieve stability, government has to maintain large reserves of foreign currencies to maintain the exchange rate at the level fixed. Under this arrangement, each country keeps value of its currency fixed in terms of some 'External Standard' (Efiong, Ayuk, & Imong, 2018; Arfan, Dawood, Abdullahi, & Faudziah, 2012). However, when the value of domestic currency is tied to the value of another currency, it is known as 'Pegging' (Aseidu, 2002). When value of a currency is fixed in terms of some other currency or in terms of gold, it is known as 'Parity value' of currency (Amadi, 2002).

Flexible exchange rates can be defined as exchange rates determined by global supply and demand of currency (Efiong, *et. al*., 2018). In other words, they are prices of foreign exchange determined by the market that can rapidly change due to supply and demand which are neither pegged nor controlled by Central Bank of Nigeria. Within this pure definition of flexible exchange rate, pure floating regimes and managed floating regimes exist according to Denisia (2010). Pure floating regime exists in conditions of absolutely no official purchases or sales of currency, while managed (also called dirty) floating regime, enables some official interventions.

In a similar perspective, Gross domestic product (GDP) is a monetary measurement of market value of goods and services produced in a period (quarterly, bi-annually or yearly) (Effiok, Tapang, & Eton, 2013; Efiong, *et. al*., 2018). Gross Domestic Product (GDP) is an economic measure of a nation's total income and output for a given time period, usually a year (Gaalya, 2015). Economists use GDP to measure the relative wealth and prosperity of different nations, as well as to measure the overall growth or decline of a nation's economy (Dunning, 1993; 2000). In addition, GDP measures the monetary value of final goods and services (Akram, 2016); those that are bought by the final user, produced in a country in a given period of time. Rodrik (2007) posits that economic growth helps people move out of poverty when compared with the experiences of a wide range of developing countries; as it found strong evidence that rapid and sustained growth is the single most important way to reduce poverty. In contrast, Adigun (2015) indicated that gross domestic product might be the acquisitiveness, materialism, and dissatisfaction with one's present state associated with a society's economic struggles.

Gross Domestic Product (GDP) as a proxy for economic growth, recorded a negative growth of 1.5 percent which affected Nigerian' tax revenue performance in 2016. The real GDP has been on increase from 2010 to 2015 except 2016; ₦54,612.3trillion in 2010 to ₦69,023.9trillion in 2015 but dropped to ₦67,984.2trillion in 2016 (NBS Report, 2016). The fall is evident as it translates into adverse effect on the tax revenue performance from ₦5,481.7trillion in 2012 to ₦3,977.9trillion in 2016 (FIRS Annual Report, 2016). The role of GDP in stimulating economic stability through tax is made explicit in the light of the issues raised in the dwindling economy. This suggests that GDP is one of the factors that influence the amount of taxes collected by government which Ajaz and Ahmed (2010) documented.

The conceptual approach to inflation is relatively similar both in theory and numerical discourse. Maku (2010) defines inflation as the sustained increase in the general price level of goods and services. It can also mean a sustained or continuous fall in the value of money (Mojekwu & Ogege, 2012). These definitions approached inflation from demand and supply side with price as the constant term. Inflation affects economies in various positive and negative ways. The negative effects are anchored on opportunity cost, sunk cost or holding cost (Jun, 2015), with uncertainty over the future discouraging investment and savings. The work of George and Bariyima (2015), addressed shortages of goods as consumers begin hoarding out for concern that prices will increase in the future. Positive effects according to Aseidu (2006) revolves around reduction in real burden of public and private debt, adjustment in interest rates (Odili, 2015), and dropping unemployment due to nominal wage rigidity.

Inflation according to NBS Report (2016) is exerting an inverse relationship with tax revenue performance since an increase in inflation causes tax revenue performance to decrease. For instance, inflation rate stood at 11.80% in 2010 with a slight growth to 12% in 2012 and further moved to 18.6% in December, 2016 (NBS Report, 2016). However, the tax revenue performance consistently dropped from ₦5,481.7trillion in 2012 to ₦3,977.9trillion in 2016 (CBN & FIRS Annual Reports, 2016) due to high cost of production which affected the purchasing ability of the citizen as well as the companies' taxable profit. The nexus between inflation and tax revenue is not evidently established in some literatures like Odili (2015), Jun (2015), and Babatunde, *et. al.* (2010).Inflation has its typologies; demand pull inflation, cost push, creeping, galloping or hyperinflation. The demand pull inflation exists when a sustained rise in the general price level surfaces as a result of sustained rise in the aggregate demand. This situation occurs when aggregate demand exceeds economy's productive capacity. The cost push inflation is induced by rising cost of production which is successfully passed on to the consumers in the form of higher prices. Creeping is situation of persistent and continuously rising price level, while hyperinflation refers to inflation which has gone out of hand.

2.1 Tax Revenue Performance

Tax is a compulsory contribution/levy on persons/corporate bodies, properties, income, commodities, and transactions by the government proportionate profit declared. Taxes include any duty, levy or revenue accruable to the government in full or in part (FIRS Act, 2007). Tax revenue represents the income that is accrued to governments through taxation (Hornby, 2010). They are income due to the state, to fund public expenditure (Haiyambo, 2013). Developed countries see it as a stable and consistent source of revenue (Ibanichuka, Akani, & Ikebujo, 2016). Organisation for Economic Co-operation and Development [OECD] (2016) defined tax revenue as the revenues collected from taxes on income and profits, social security contributions (Lin &Wang, 2014), levies on goods and services, payroll taxes, taxes on the ownership and transfer of property, and other taxes (James, 2015). It can be regarded as one measures of the degree to which the government controls the economy's resources (Jan & Marta, 2014).

Empirically, exchange rate and tax revenue interconnection or linkage is documented by scholars like Asbeyebgbe, Stosky and WoldeMariam (2004), Amadi (2002), Effiok,*et al*(2013), and Mehdi, Fatemeh and Abdulmajid (2014) that have investigated exchange rate on tax revenue performance in different contexts, statistical tools, and data with divergent results. Nevertheless, the empirical results denote positive significant relationship between exchange rate and tax revenue performance. However, Effong, *et. al.* (2018) introduced Foreign Direct Investment [FDI] with exchange rate and a positive and significant result was uncovered. In similar studies conducted by Basirat, Aboodi and Ahangari (2014); Masoomeh and Malarvizhi (2014); Micah (2015) which assessed the impact of exchange rate on tax revenue, the findings revealed that exchange rate has a positive significant impact on tax revenue performance. The discovery is similar to Jun (2015) and Mehdi, *et al.* (2014) that indicated that exchange rate will positively influence tax revenue. The linearity with trade openness into the equation of exchange to tax revenue demonstrated that negative results could emerge. This Mushtaq, Bakhsh and Hassan (2012) estimated in Pakistan, with result showing that exchange rate impact negatively on tax revenue during the period of study.

The studies by Muibi and Sinbo (2013); Babatunde, *et. al.* (2010); Nwosa, *et. al.* (2012); Samia, *et. al.* (2016) examined the impact of exchange rate on tax revenue in Pakistan, Nigeria, and Lybia, with negative

relationships between exchange rate and tax revenue performance. Andrew *et al* (2016) added credence to Nwosa, *et. al.* (2012) who had previously investigated exchange rate regime and revenue performance in sub-Saharan Africa and the result revealed that the poor cumulative relative revenue performance of the Franc zone countries resulted from differences in environmental and structural factors, and the different responses to changes in real exchange rate, and this real exchange rate misalignment also contributed. As such Agbeyegbe, *et. al.* (2004) presented an argument along trade liberalisation, exchange rate, and tax revenue with robust evidence that the relationship between trade liberalization and tax revenue is sensitive depending on the proxy for trade liberalization. However, Gaalya (2015) discovered positive and significant direct relationship between trade liberalisation and tax revenue, but currency appreciation and higher inflation showed some linkage to lower tax revenues or its components. This divergence in approach informed the decision to introduce inflation into the estimation to deepen insight and ripple-effects.

Nwosa, *et. al.* (2017) showed that annual rate of inflation has significant and negative effect on tax revenue as measured by share of tax revenue to GDP. In a similar study by Mahdari (2008), tax revenue was statistically significant and negatively affected by inflation during the period of the study. Yannick (2010) empirically looked at adoption of inflation targeting and tax revenue performance and found that on average, inflation targeting has a significant positive effect on tax revenue collection. Philip (2014) further investigated the relationship between economic measures like GDP and tax revenue and identified the factors determining tax revenue in Malaysia while revealing that inflation has indeed positive and statistically significantly impact on tax revenue performance. Kamyar (2013) and; Velaj and Prendi (2014) examined the relationship between inflation rate, oil revenue and taxation in Iran and Albania, with evidences indicating that inflation has positive significant impact on the oil and corporate tax revenue. In various studies by Chaudhry and Farzana (2010); Muibi and Sinbo (2013); Mushtaq, *et al* (2012); Samia, *et. al.* (2016) on relationship and impact of inflation on tax revenue in Ethiopia, Pakistan, Nigeria and Libya found that there exists, a negative relationship and adverse impact of inflation on tax revenue performance in all the countries.

The academic field has further examined tax revenue performance from the perspective of GDP. This is evident in the work of Raed and Ahmad (2016) that examined GDP and tax revenue-causality relationship in developing countries and results indicate that tax revenue does not granger cause gross domestic product. Ayenew (2016), Canicio and Zachary (2014), Mubi and Sinbo, (2013), Mushtaq, *et. al.* (2012), Nwosa, *et. al.* (2012), Velaj and Prendi (2014) found positive relationship between gross domestic product and tax revenue. In a similar study, Hakim and Bujang (2014) explained that total tax revenue to GDP ratio is higher in the high-income nations when compared with the low and middle countries. Mahmood (2013) depict impact of FDI on tax revenue along short and long relationship between tax revenue model, FDI, and GDP per capital. Ayenew (2016) utilized Johasen Cointegration approach to explain tax revenue in Ethiopia with results indicating that industrial value-added share of GDP and real GDP per capital have positive and significant effect on tax revenue in the long run. While, in the short run real GDP per capital exerted a negative effect on tax revenue in Ethiopia.

Methodology

This study adopted *ex-post facto* research design by relying on secondary data collected from established Government Institutions The research design is consistent with the following studies: Cornelius, *et al* (2016), Garang, Yacouba and Thiery (2018), Mahmood and Chardoury (2013), Million, Azzime and Gollagari (2016), Odaba (2016), and Udeh, Ugwu and Onwuka (2016). The data covered the period 1987 to 2016. The choice of the periods was informed by the political, economic, and infrastructural, security issues in the Nigerian economy. The data was sourced mainly from the Central Bank of Nigeria's (CBN) annual reports and statistical bulletin, Federal Inland Revenue Service's (FIRS) Annual Report, and National Bureau of Statistics (NBS). Ordinary least square (OLS) estimation technique was utilized as the statistical tool of analysis. Pre-diagnostic tests were conducted with reference to time series characteristics of the variables through descriptive statistics and multicollinearity.

3.1 Model Specification

Along the objective of the work, dependent and independent variables were factored into a functional equation. Tax revenue performance was considered as a progenitor of macroeconomic variables (real gross domestic product, exchange rate, and inflation). The following structural equation was established and tested:

$$LOG(TRP)_t = \alpha_0 + \beta_1 LOG(RGDP)_t + \beta_2 LOGEXR_t + \beta_3 INF_t + \mu_t \quad \ldots\ldots\ldots (1)$$

Where:
TRP = Tax revenue performance
α_0 = Intercept or constant
$\beta_1 - \beta_3$ = Coefficients of explanatory variables
RGDP= Real Gross Domestic Product
EXR = Exchange Rate
INF = Inflation Rate
μ = Error Term
t = Time

Apriori Expectation

In the paper, negative or positive relationship is expected between economic variables (exchange rate, inflation and real GDP respectively) and tax revenue performance.

Results and discussion of findings

4.1 Descriptive Statistics

This section of the analysis provides an overview on the data set while attempt is also made to describe the main attributes of the data. The descriptive analysis of the time series data obtained for all the variables is presented in Table 1. The table shows skewness, kurtosis, and Jarque Berra statistics of the series in order to determine the series suitable for running the Ordinary Least Square regression based on the normality test determined from the *P*-value of the Jarque Berra statistics. The summary of time series results were shown in Table 1.

Table 1: Descriptive Analysis of the Variables

	EXR	LINF	LRGDP	TRP
Mean	93.55472	2.720025	13.98970	1.66E+12
Median	115.2551	2.561088	12.88222	6.86E+11
Maximum	305.6000	4.287716	18.04996	5.48E+12
Minimum	4.017900	1.686399	12.22982	1.40E+10
Std. Dev.	74.41973	0.713492	2.248309	1.91E+12
Skewness	0.542195	0.777621	0.186719	0.871918
Kurtosis	3.148962	2.529754	2.518356	2.285995
Jarque-Bera	1.497612	3.299887	7.331490	4.438454
Probability	0.472931	0.192061	0.125585	0.108693
Observations	30	30	30	30

Source: Researcher's Study, 2017

The descriptive analysis of the variables shows the mean, maximum, minimum, median and standard deviation of all the variables. Specifically, the mean values of INF, RGDP, TRP, and EXR stood at about 20%, ₦14,941, 15.5Score, and 0.33% respectively. This shows the average values of all the variables used for the 30 years under study. Their respective minimum and maximum values are equally shown indicating variations over the years for the respective series. The difference between the maximum and the minimum values for most of the variables are significantly high, this can be an evidence of low performance with regards to each of the variables. The standard deviation values shown in Table 1 indicate the dispersion or spread in the data series. The higher the value, the deeper the observed deviation of the series from the mean, and the same applies to lower value and lower deviation of the series from the mean. The variable with a higher degree of dispersion from the mean is the Gross Domestic Product (GDP), this further explains its variations over the years under study.

The skewness, kurtosis and Jarque-Berra statistics of all variables in Table 1 indicate the true nature of the data series. The Table provides a historical background for the behaviour of the data, the skewness of the data series shows a symmetric (normal) data distribution for those that were positively skewed. The kurtosis statistic further shows that only tax revenue performance and GDP series were platykurtic in nature, this is because the variable were below the threshold of 3, while INF and EXR seems to be leptokurtic because the variables were above the threshold of 3. The closer the series are to their kurtosis and skewness, the better the chances of such series to be normally distributed.

The probability value of Jarque-Berra statistics of INF and RGDP series are shown to be less than the acceptable 0.05, indicating non-normality of the series while all other series are normally distributed based on the p-value of Jarque-Berra statistics of the series. As such, the logarithm of each non-normally distributed series was computed and used in the analysis. Table 1 indicates that all the variables are positively skewed. Also, in relation to kurtosis, all the variables are platykurtic indicating evidence of thin tail than normal distribution. Based on the probability values for Jarque-Berra statistics in the descriptive Table 1, all the series are normally distributed. Thus, the regression model can be estimated using the transformed series as one of the assumption of Ordinary Least Square Regression is normality of series which have been met.

4.2 Regression Results

A standard Multiple Regression Analysis (MRA) was performed on the data to determine how well macroeconomic variables dimension (exchange rate, inflation and real gross domestic product) predict tax revenue performance. The value of the R^2 was used to indicate the predictive strength of the independent variables on the dependent variable. A higher R^2 indicates a higher predictive capability of the block of the independent variables on the dependent variables (Moohammad, Aini, & Kamal, 2014). The Beta value signifies whether the relationship between the dependent and independent variables is positive or not when *F* value is found to be significant (Pallant, 2011). Table 2 presents the results of the empirical OLS regression estimates.

Table 2 Regression Estimate

	Model 1 (LOGTRP)			
Variable	**Coefficient**	**Std Error**	**T**	**Prob.**
C	5.769819	0.580484	9.939662	0.0000
LOG(RGDP)	0.192978	0.046313	4.166841	0.0003***
LOG(EXR)	1.206808	0.085886	14.05126	0.000***
INF	-0.009226	0.005137	-1.795922	0.0841*
Adjusted R-Square	0.950			
F-stat	188.542	0.0000***		
Ramsey RESET Test	1.9402	0.1759		
Serial correlation Test	8.6909	0.0530		
Heteroscedasticity test	6.5189	0.0889		

Note: *,** and * indicate 1%, 5% and 10% level of significance respectively. The variable names remain as described in the model.**
Source: Researcher's Statistical Analysis, 2017.

$LOG\ (TRP)_t = 5.769819 + 0.192978LOG(RGDP)_t + 1.206808LOGEXR_t - 0.009226INF_t$. Eq2.
The regression estimate of model 2 shows that the logarithm of exchange rate and logarithm of Gross Domestic Product were positive (LRGDP & EXR) and inflation had negative (INF) effect on Tax Revenue Performance (TRP). This is indicated by the signs of the coefficients, that is $\beta_{1\text{-}2}= 0.1929>0$; $1.2068>0$ while $\beta_3 = -0.00922<0$. This result is not consistent with a prior expectation ($\beta_i \neq 0$; where $\beta_i=\beta_1, \beta_2, \beta_3$) based on β_3.

From Table 2, the size of the coefficient of the independent variable (β_1) shows that a 1% increase in RGDP will lead to 19% increase in Tax Revenue Performance, also a 1% increase in Exchange Rate will lead to 120% increase in tax revenue performance (especially from service industry and informal sector of the economy). However, the result also shows that a 1% increase in Inflation Rate will result in 0.9% decrease in Tax Revenue

Performance of the economy. Based on the *P*-values for each of the coefficients, all the exogenous variables are individually significant. The *F*-stat showed a probability value of 0% which indicates that the explanatory variables are statistically significant because the probability value is not greater than 5%, the level of significance adopted for this study. Therefore, the model is statistically significant.

Furthermore, the Adjusted *R*-squared for model 1 in Table 2 showed that about 95% variations in Tax Revenue Performance can be attributed to the influence of all the explanatory variables (RGDP, EXR & INF) while the remaining 5% variations in the respective dependent variable were caused by other factors not included in this model. The Ramsey Reset test confirmed that the model for this study is correctly specified (i.e. no specification biasness in the model). The probability value (significant value) of *F*-statistics is reported herewith.

The Breusch-Godfrey LM test affirmed that the series is not serially correlated which implies that the figure of a particular year cannot be used to correctly predict that of other future years. Also, there is no heteroscedasticity. Based on the *p*-value of the result on table 2 of 0.088 which is above 0.05, the researcher may not reject the null hypothesis; this means that all the variables are homoscedastic which is a good result. Based on the results, the null hypothesis that macroeconomic variable dimensions (real gross domestic product, exchange rate and inflation) have no significant influence on tax revenue performance in Nigeria was rejected.

4.3 Discussion of Results

The results of the MRA conducted for the study presented in Table 2 revealed that the macroeconomic variable dimensions (real gross domestic product, exchange rate and inflation) have significant effect on tax revenue performance in Nigeria. The results of this study are in consonance with the findings of Chigbu, *et. al.* (2015); Mubi and Sinbo (2013); Canicio and Zachary (2014) who found positive relationship between tax revenue and economic growth. In a similar study conducted by Hakim and Bujang (2014) they state that total tax revenue to GDP ratio is higher in the high-income nations when compared with the low and middle countries.

The finding of this study on the effect of inflation on tax revenue performance indicates that inflation has negative effect on tax revenue performance in Nigeria, but was not significant. This is in harmony with some findings of empirical studies that indicates that there is positive effect of inflation on tax revenue performance (Philip, 2014; Samia & Sohail, 2016; Yannick, 2010). Philip (2014) investigated the relationship between economic measures and tax revenue and identified economic factors as determining tax revenue in Malaysia from year 1990 to 2009. The study found that inflation is indeed statistically significantly to affect tax revenue in Malaysia. The result showed that both income tax and inflation rate have positive relationship with tax revenue performance. This implies that the higher the inflation and income tax, the higher will be the economic erosion in salary.

The finding of this study also indicates thatexchange rate has positive effect on tax revenue performance. This is in consonance with those of Mehdi, *et. al.* (2014) that found a positive significant relationship between exchange rate and tax revenue performance. Masoomeh and Malarvizhi (2014) also found that exchange rate has a positive impact on tax revenue performance. The result revealed that the poor cumulative relative revenue performance of the Franc zone countries is mainly attributable to differences in environmental and structural factors, and to their different responses to changes in the equilibrium real exchange rate, but that the misalignment of the real exchange rate also played a part.

Conclusion and recommendations

The study analysed the effect of macroeconomic variable dimensions (exchange rate, real gross domestic product and inflation) on tax revenue performance in Nigeria for the period 1987- 2016.The study provides both theoretical and statistical evidences that macroeconomic variables affects tax revenue performance in Nigeria. The study on the basis of the findings as discussed above concludes that tax revenue performance in Nigeria are positively and significantly affected by the exchange rate and real gross domestic product. On the other hand, tax revenue performance is not positively affected by inflationary rate. This implies that the higher the inflation rate, the lower the tax revenue performance. The general conclusion is that exchange rate and real gross domestic product are the main drivers of tax revenue performance in Nigeria. In view of the findings of this

study, it is recommended that Nigerian government must put in place policies that have a bearing on macroeconomic variables and maintain stability of exchange rate and inflation so as to attain higher tax revenue yield. Also, government should factor in tax policy when formulating policies that are meant to control inflation in Nigerian economy.

Acknowledgement

The author desires to appreciate Prof J. Egwakhe who inspired this article write-up. He also tirelessly proof-read and corrected it. He has indeed been a mentor. Appreciation goes to Dr Akinlabi for his statistical prowess. Most importantly, appreciation goes to Mrs Yekemi Odunsi, my darling wife, who supported me all through my studies and to God Almighty for life, good health, and renewed mercies.

References

[1] Adegboyega, B. S., & Odusanya, A. I. (2014). Empirical analysis of trade opennes, capital formation, FDI, and economic growth: Nigeria experience. The International Journal of Social Sciences and Humanities Invention, 1(1), 36-50.
[2] Agbeyegbe, T., Stotsky, J.G., &WoldeMariam, A. (2004).Trade liberalization, exchange rate changes, and tax revenue in Sub-Saharan Africa. IMF Working Paper, No. 178.
[3] Adigun,A.O. (2015). Sectoral inflow of foreign direct investment and economic growth in Nigeria.Journal of Economic Sustainable Development6(17), 166 -172.
[4] Adu, B. E.,&Ntim, A. L. (2014).Causality analysis of foreign direct investment, exchange rate and interest rate volatility in Ghana.Journal of Economics and Sustainable Development, 5(9), 17-25.
[5] Ahamed, L.A. (2016). Influence of exchange rate on foreign direct investment in Sri Lanka. Journal of Economics and Sustainable Development, 7(5), 14-19.
[6] Ajaz, T.,& Ahmad, E. (2010).Effect of corruption and governance on tax revenues. The Pakistan Development Review, 49(4), 405-417.
[7] Akers, H. (2014). Key macroeconomic variables.EHow Contributor.
[8] Akram, M.H. (2016). Analysis of foreign direct investment and unemployment and their impact on economic growth in Jordan. International Journal of Investment Management and Financial Innovations, 2(1), 1-12.
[9] Akwe, J. A. (2014). Impact of non-oil tax revenue on economic growth: The Nigerian perspective. International Journal of Finance and Accounting, 3(5), 303-390.
[10] Amadi, S. N. (2002). The impact of macroeconomic environment on foreign direct investment in Nigeria. International Journal of Development, 4(2), 1-12.
[11] Andrew, N., David, O.C., &Gauco, D.V. (2016). Exchange rate regime and foreign direct investment flows to developing countries. Journal of International Economics 20(1), 95-107.
[12] Anyanwu, J. C. (2012). Why does foreign direct Investment go where it goes: New evidence from African countries.Journal of Economics and Finance, 13(20), 425-430.
[13] Arfan, S., Dawood, A.M., Abdullahi, K. A., and Faudziah, H.B.F. (2012).Political stability and the foreign direct investment inflows in Pakistan.British Journal of Arts and Social Sciences, 9(2), 199-123.
[14] Asiedu, E. (2002). Aggressive trade reform and infrastructure development: A solution to Africa's foreign direct investment woes, University of Kansas, Kansas, Mimeo.
[15] Asiedu, E. (2006). Foreign direct investment in Africa: The role of natural resources, market size, government policies, institutions and political instability. The World Economy.29(1), 63-77.
[16] Ayenew, W. (2016).Determinants of tax revenue in Ethiopia (Johansen Cointegration Approach).International Journal of Business, Economics and Management, 3(6), 69-84.
[17] Azubike, S. (2009).Attracting and negotiating foreign direct investment with transnational corporations in Nigeria. Lagos, Nigeria: Philip publications.
[18] Babatunde, A. M., Adenikinju, O., &Adenikinju, A. (2010).Oil price shocks and stock market behaviour in Nigeria.Journal of Economic Studies, 5(16), 23-38.
[19] Basirat, M. F., Aboodi, F. &Ahangari, A. (2014).Analyzing the effect of economic variables on total revenue in Iran.Asian Economic and Financial Review, 4(6), 755-767.
[20] Bukie, O. H., Adejumo. O. T., &Edame, G.E., (2013). The effects of tax revenue on economic growth of Nigeria.International Journal of Humanities and Social Science, 2(6), 16 – 26.

[21] Canicio, D., & Zachary, T. (2014). Causal relationship between government tax revenue growth and economic growth: A case of Zimbabwe (1980-2012). Journal of Economics and Sustainable Development, 5(7), 45-60.
[22] Central Bank of Nigeria Annual Reports and Statistical Bulletin, 1990-2017.
[23] Chaudhry, I.S., & Farzana, M. (2010).Determinants of low tax revenue in Pakistan. Journal of Social Sciences, 30(2),439-452.
[24] Chigbu,E.E., &Njoku, C.O. (2015).Taxation and the Nigerian economy (1994-2012).Management Studies and Economic Systems (MSES), 2(2), 111-128.
[25] Chukwuemeka, E. P., Malaolu, C. S., Oduh, V., &Onyema, M. (2012). Revenue implications of Nigeria's tax system. Journal of Economics and Sustainable Development, 3(8), 206-214.
[26] Cornelius, H.O., Ogar, F., &Okar, P. (2016). The contribution of deposit money banks on the growth of the agricultural sector in Nigeria. Nigeria. Journal of Social Science Research. 6(2), 56-62.
[27] David, O.B. (2012). Foreign direct investment and tax revenue of countries in Latin America.Global Journal of Business Research, 1(2), 1-13.
[28] Denisia, V. (2010). Foreign direct investment theories: An overview of the main FDI theories. European Journal of Interdisciplinary Studies, 2(2), 104-110.
[29] Dunning, J.H. (1993). Location and the multinational enterprise: A neglected factor? Journal of International Business Studies, 1(1), 45-66.
[30] Dunning, J. H. (2000).The eclectic paradigm as an envelope for as an envelope for economic and business theories of MNE activity.Reading University, UK and Rutgers University, USA: International Business Review 9(2), 163 -190.
[31] Efiong, E. J., Ayuk, E. I. &Imong, N. R. (2018).Effects of exchange rate fluctuations on foreign direct investment in Nigeria between 2001 and 2015.Account and Financial Management Journal (AFMJ), 3(1), 1277-1284.
[32] Effiok, S.O., Tapang, A.T., & Eton, O.E.(2013). The impact of tax policy and incentives on foreign direct investment (FDI) and economic growth: Evidence from export processing zone (EPZ) in Nigeria. European Journal of Commerce and Management Research, 2(9), 101-196.
[33] Fasanu, K.A. (2014). Foreign direct investment and economic growth: A cross-country exploration in Asia using panel cointegration technique. Journal of Economics, 3(4), 234-240.
[34] Federal Inland Revenue Service, Nigeria.Annual Reports 2000-2016.
[35] Federal Inland Revenue Service Establishment Act, No 14 of 2007.
[36] Gaalya, M.S. (2015). Trade liberalization and tax revenue performance in Uganda. Modern Economy, 6(1), 228-244.
[37] Gaalya, M. S., Edward, B., & Eria, H. (2017).Trade openness and tax revenue performance in East Africa countries. Modern Economy, 8(1),690-711. https://doi.org/10.4236/me.2017.85049
[38] Garang, A.P.M., Yacouba, K. & Thiery, K. K. Y. (2018). Time series bound approach to foreign direct investment, unemployment and economic growth. Modern Economy, 9(1), 87-96.
[39] George,T.P., & Bariyima, D.K. (2015).Tax incentives and foreign direct investment in Nigeria.Journals of Economics and Finance,6(5), 10-20.
[40] Haiyambo, E. (2013). Tax incentives and foreign direct investment: The Namibian experience, A Thesis submitted to Harold Pupkeitz Graduate School of Business Polytechnic of Namibia.
[41] Hakim, T. A., & Bujang, I. (2012).The impact and consequence of tax revenues' components on economic indicators: Evidence form panel group data. INTECH Open Access Publisher. http://dx.doi.org/10.5772/48415.
[42] Hornby, A.S. (2010). Oxford advanced learner's dictionary: International student's edition 8th ed. Oxford: Oxford University press
[43] Ibanichuka, E. L., Akani, F.N.,& Ikebujo,O.S. (2016).A time series analysis of effect of tax revenue on economic development of Nigeria. International Journal of Innovative Finance and Economics Research, 4(3), 16-23.
[44] International Monetary Fund Working Papers 2000-2012.
[45] James, O.A. (2015). How does tax revenue respond to financial inflow from FDI and aid? Panel evidence from West African Sub-Region.Journal of Development Studies, 5(3), 101-110.

[46] Jan, H., & Marta, O. (2014). Determinants of foreign direct investment in EU countries - Do corporate taxes really matter? Procedia of Economics and Finance, 12(3), 243-250.
[47] Jun, S. (2015).The nexus between foreign direct investment and growth in the SAARC member countries. Journal of East Asian Economic Integration, 19(1), 39-70.
[48] Kamyar, R. (2013). The relationship between Inflation rate, oil revenue and taxation inIRAN: Based OLS methodology. Journal of Economics and Sustainable Development, 4(19), 131-146.
[49] Karimi, M., Kaliappan, S. R., Ismail, N. W. & Hamzah, H. Z. B. (2016). Does trade liberalization affect international tax revenue? Evidence from dynamic panel threshold method. Journal of Economic Studies, 25(1), 75-87.
[50] Lin, W., & Wang, J. (2014). Do the changes in tax incentives encourage direct investment in China by Taiwanese enterprises? Journal of Accounting and Taxation, 6(2), 38-53.
[51] Mahmood, H., & Chaudhary, A.R. (2013).Impact of FDI on tax revenue in Pakistan. Pakistan. Journal of Commerce and Social Science. 7(1), 59-69.
[52] Maku, O.E. (2009). Does government spending spur economic growth in Nigeria? Munich Personal RePEc Archive. Retrieved on 26/8/2017 fromhttp://mpra.ub.uni-muenchen.de/17941/MPRA Paper no. 17941.
[53] Masoomeh, H., & Malarvizhi, C. (2014).Impact of GDP and exchange rate on foreign direct investment in Malaysia.Australian Journal of Basic and Applied Sciences, 8(1), 473- 478.
[54] Mehdi, A., Fatemeh, G.,& Abdulmajid, A. (2014).Analyzing the effect of economic variables on total tax revenues in Iran.Asian Economic and Financial Review, 4(6), 755-767.
[55] Micah,S., Bbaale, E.,&Hisali, E. (2017).Trade openness and tax revenue performance in East African countries.Modern economy, 8(1), 690-711.
[56] Million, T.J., Azime, A.H., & Gollagari, R. (2016). The relationship between FDI and tax revenue in Ethiopia: An evidence based on ARDL model with a Structural break. A Proceedings on International Conference on Ethiopia Economy, Addis Ababa. 1-30.
[57] Mojekwu, J.N., &Ogege, S. (2012). Nigeria public debt and economic growth: A critical appraiser. The Business & Management Review,3(1), 253-262.
[58] Muibi, S.O., &Sinbo, O.O. (2013).Macroeconomic determinants of tax revenue in Nigeria (1970-2011).World Applied Science Journal, 28(1), 27-35.
[59] Mushtaq, S., Bakhsh, K.,& Hassan, S. (2012). Estimating impact of trade liberalization on tax revenue in Pakistan. Journal of Agriculture and Social Science, 8(4), 148-150.
[60] Natioanl Bureau of Statistics Reports, 2000-2016.
[61] Nwosa, P.I., Saibu, M.O.,&Fakunle, O.O. (2012).The effect of trade liberalization on trade tax revenue in Nigeria. African Economic and Business Review, 10(2), 28-43.
[62] Odaba, H. (2016). Foreign direct investment inflows on tax revenues in the transition economies of European Union.Global Journal on Humanities and Social Sciences, 2(5), 17-22 available from: http://www.world-education-center.org/index.php/pntsb
[63] Odusola, A. (2006). Tax policy reforms in Nigeria – Research Paper No. 2006/3, United Nations University – World Institute for Development Economies Research.
[64] Okafor, R.G. (2012). Tax revenue generation and Nigerian economic development. European Journal of Business and Management, 4(19), 49 – 56.
[65] Odili, O. (2015). Granger causality nexus between exchange rate volatility, economic growth and foreign direct investment in Nigeria. International Journal of Scientific Research and Education, 3(7), 4068-4082.
[66] Philip, G.M. (2013). Effect of infrastructure on foreign direct investment in Pakistan. Journal of Advances in Management and Applied Economics, 3(1),35-45.
[67] Raed, A. M. I., &Ahmad, N. H. A. (2016). GDP and tax revenue causality relationship in developing countries: Evidence from Palestine. International Journal of Economics and Finance, 8(4), 54-62.
[68] Rodrik, D. (2007). One economics, many recipes: Globalization, institutions and economic growth. Princeton, NJ: Princeton University Press.
[69] Saibu, O.M.,& Olatunbosun, O.S. (2013).Macroeconomic determinants of tax revenue in Nigeria (1970-2011).World Applied Sciences Journal, 28(1), 27-35.

[70] Samia, M.M., &Sohail, A. (2016). The impact of trade liberalization on tax revenue: A case study on Libya economy from 1982-2012. Australian Journal of Basic and Applied Sciences, 10(4), 132-136.
[71] Udeh, S. N., Ugwu, J. I., & Onwuka, I.O.P. (2016).The impact of external debt on economic growth in Nigeria. European Journal of Accounting Auditing and Finance Research, 4(2), 33-48.
[72] Velaj, E., &Prendi, L. (2014). Tax revenue - The determinants factors: The case of Albania. European Scientific Journal, Special Edition, 1(1), 523-531
[73] Yannick, L. (2010). Adoption of inflation targeting and tax revenue performance in emerging market economies: An empirical investigation. MPRA Munich Personal RePEc Archive. Online at https://mpra.ub.uni-muenchen.de/23948/ MPRA Paper No. 23948, posted 19. July 2010 02:51 UTC