
TAX REVENUE AND PRODUCTIVITY OF NIGERIA

Okonkwo, Olivia Ogechukwu¹; Amahalu, Nestor Ndubuisi¹ & Obi, Juliet Chinyere

¹ Department of Accountancy, Nnamdi Azikiwe University Awka, Anambra State, Nigeria

Abstract

This study ascertained the relationship between Tax Revenue and Productivity of Nigeria for sixteen years ranging from 2005-2020. Specifically, this study ascertained the relationship between Value Added Tax, Petroleum Profit Tax, Personal Income Tax and Gross Domestic Product per Capita. The time series data sets used in this study were obtained from Central Bank of Nigeria Statistical Bulletin, Securities and Exchange Commission Office publications, National Bureau of Statistics publications and World Bank Statistical Bulletin for the study period. Longitudinal research design was employed. Inferential statistics using Augmented Dickey-Fuller (ADF) test, Pearson correlation coefficient, Ordinary Least Square regression analysis, Granger Causality test, Johansen Co-integration test and Error Correction Model were applied to test the hypotheses of the study. The specific findings showed that there is a significant but negative relationship between Value Added Tax and GDP per Capita ($\beta_1 = -0.383441$; $p\text{-value} = 0.0342$); a significant but negative relationship between Petroleum Profit Tax and GDP per Capita of Nigeria at 5% level of significance ($\beta_2 = -0.385457$; $p\text{-value} = 0.0305$); a significant but negative relationship between Personal Income Tax and GDP per Capita of Nigeria at 5% level of significance. The study recommended inter alia that Federal Government should take strict measures to close all administrative loopholes in the administration and management of tax in Nigeria. If this is done, the revenue accruable from taxation will increase and boost provision of social amenities and infrastructures in Nigeria.

Keywords: Value Added Tax, Petroleum Profit Tax, Personal Income Tax, Gross Domestic Product per Capita

Background to the Study

Productivity is a crucial factor in production performance of firms and nations. Increasing national productivity can raise living standards because more real income improves people's ability to purchase goods and services, enjoy leisure, improve housing and education and contribute to social and environmental programs. Productivity growth can also help businesses to be more profitable. Productivity growth is a crucial source of growth in living standards. Productivity growth means more value is added in production and this means more income is available to be distributed. The creation of productive jobs is the key to economic growth, social development and improvements in living standards (Amahalu, Egolom & Okoye, 2014). Tax revenues are main revenue channels to government. Government use tax proceeds to discharge their functions such as the provision of public goods, maintenance of law and order, defense against internal and external aggression, regulation of trade and business to ensure social and economic maintenance, and also fiscal instrument geared towards stability of the economy. The taxes are levied on individuals, groups, corporate entities and other institutions changeable to tax, and play vital role in economic planning and development of nations. Tax revenue is of vital importance for the sustainability of both developed and developing countries. Firstly, taxation is the main source of central government revenue, since tax collection is mandatory and regular, which can guarantee the stability of income. Secondly, taxation aims to meet the social and public needs by providing public goods and services. Thirdly, government need tax revenue to establish armed forces and judicial systems to ensure the secure and justice of the society (Sickles & Zelenyuk, 2019). In many developing countries, a low tax-revenue/GDP ratio prevents these nations from undertaking ambitious expenditure programs. Thus a rapid increase in domestic revenue and a corresponding increase in public services is a policy priority. However, one needs to be cautious about increased public spending and increased taxation, as distortionary taxes begin to reduce growth when pushed beyond certain levels: tax bases are not simply 'given' to governments: they can be grown or destroyed (Okeke, Mbonu & Amahalu, 2018a).

The major challenge of national governments worldwide is to perpetually increase the welfare of the citizenry through the implementation of appropriate economic policies and programs by direct participation in domestic and global economic activities. Governments attempt to achieve this national objective by providing public goods, such: as roads, bridges, dams, ports and public services such as education, security, health, sanitation etc that form economic and social infrastructure. The adequacy of such infrastructure is a foundation for a country's economic growth and development. In Nigeria, tax administration has been encumbered by several factors ranging from inadequate and unreliable data, paucity of administrative capacity, shortage of skilled manpower, corrupt tax officials, high incidence of tax avoidance and evasion, complex tax codes and the hydra-headed monster of multiple taxation. The divergence of theoretical views on the link between tax revenue and economic growth is manifested in empirical literature. One stream of empirical literature reported negative relationship between tax revenue and economic growth (Aruna, Oshiole & Amahalu, 2020; Asaolu, Olabisi, Akinbode & Alebiosu, 2018). The second stream reported positive influence of tax revenue on economic growth (Okoye, Amahalu, Obi & Iliemna, 2019, Omondi, 2019), while the third stream of literature found evidence of a non-linear effects (inverse U-shaped relationship) (Bonmwa & Ogboru, 2017; Olaoye & Ayeni, 2019). These conflicting empirical results may be explained by differences in target populations with respect to country, sector, company and financial periods, application of varied methodological approaches as well as differences in the study variables measurement, thereby creating a gap that this study attempted to address.

Objectives of the Study

The main objective of this study is to examine the relationship between Tax Revenue and Productivity of Nigeria. The specific objectives are to:

- i. Determine the relationship between Value Added Tax and Gross Domestic Product (GDP) per Capita of Nigeria.
- ii. Ascertain the relationship between Petroleum Profit Tax and Gross Domestic Product (GDP) per Capita of Nigeria.
- iii. Evaluate the relationship between Personal Income Tax and Gross Domestic Product (GDP) per Capita of Nigeria.

Research Hypotheses

The following null hypotheses were tested at 5% level of significance in this study:

H₀₁: There is no significant relationship between Value Added Tax and GDP per Capita of Nigeria

H₀₂: There is no significant relationship between Petroleum Profit Tax and GDP per Capita of Nigeria

H₀₃: There is no significant relationship between Personal Income Tax has and GDP per Capita of Nigeria

Conceptual Review

Tax Revenue

Taxes are compulsory, unrequited payments to general government. They are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments. Tax revenue is the income that is gained by governments through taxation. Taxation is the primary source of government revenue. Tax revenue is defined as the revenues collected from taxes on income and profits, social security contributions, taxes levied on goods and services, payroll taxes, taxes on the ownership and transfer of property, and other taxes. Tax revenue is defined as the revenues collected from taxes on income and profits, social security contributions, taxes levied on goods and services, payroll taxes, taxes on the ownership and transfer of property, and other taxes (Ndum, Okoye & Amahalu, 2019). Total tax revenue as a percentage of GDP indicates the share of a country's output that is collected by the government through taxes. It can be regarded as one measure of the degree to which the government controls the economy's resources. The tax burden is measured by taking the total tax revenues received as a percentage of GDP. This indicator relates to government as a whole (all government levels) and is measured in million USD and percentage of GDP (OECD, 2021). Taxes are crucial because governments collect this money and use it to finance social projects. Without taxes, government contributions to the health sector would be impossible. Taxes go to funding health services such as social healthcare, medical research, social security and so on. Taxes are levied in almost every country of the world, primarily to raise revenue for government expenditures.

Value Added Tax (VAT)

A value-added tax (VAT) is a consumption tax placed on a product whenever value is added at each stage of the supply chain, from production to the point of sale. The amount of VAT that the user pays is on the cost of the product, less any of the costs of materials used in the product that have already been taxed. VAT is essentially a regressive tax that places an increased economic strain on lower-income taxpayers, and also adds bureaucratic burdens for businesses. Value-added taxation is based on a taxpayer's consumption rather than their income. In contrast to a progressive income tax, which levies greater taxes on higher-level earners. However, according to Oraka, Okegbe, and Ezejiofor (2017), VAT has a negative

association with per capita income and a positive link with overall revenue generation by the Nigerian government. A value-added tax (VAT) is a consumption tax levied on products at every point of sale where value has been added, starting from raw materials and going all the way to final retail purchase. Ultimately, the consumer pays the VAT; buyers at earlier stages of production receive reimbursements for the previous VAT they've paid. Value Added Tax (VAT) in Nigeria is a consumption tax that was instated by the Value Added Tax Act of 1993. It is a Federal Tax which is managed by the Federal Inland Revenue Service (FIRS). VAT is charged on most goods and services provides in Nigeria and also on goods imported into Nigeria (Okoye, Okoye & Amahalu, 2015). The main VAT rate in Nigeria is 7.5% (raised from 5% on 1st February 2020). Only a limited number of supplies are nil-rated, meaning any VAT suffered may be recredited to the tax payer. †

Petroleum Profit Tax (PPT)

PPT is a tax on the income of companies engaged in upstream petroleum operations *in lieu* of CIT. Petroleum profit tax (PPT) is a tax applicable to upstream operations in the oil industry. It is particularly related to rents, royalties, margins and profit sharing elements associated with oil mining, prospecting and exploration leases. It is the most important tax in Nigeria in terms of its share of total revenue contributing 95 and 70 percent of foreign exchange earnings and government revenue, respectively. Petroleum operation as defined in the PPTA essentially involves petroleum exploration, development, production and sale of crude oil. The Petroleum Profit Tax is regulated by the Petroleum Profit Tax Act of 1959as amended by the Petroleum Profit Tax Act of 2007. Although the initial law was passed in 1959 to capture the first oil export made in that year (Okeke, Mbonu & Amahalu, 2018). Section 8 of Petroleum Profit Tax Act (PPTA) states that every industry engaged in petroleum operations is under an obligation to render return, together with properly annual audited accounts and computations, within a specified time after the end of its accounting period. Petroleum profit tax involves the charging of tax on the incomes accruing from petroleum operations.

Personal Income Tax (PIT)

Personal income tax is a direct tax on the income from all sources of an individual adult, communities and families, and on executors and trustees. Personal income tax is calculated after some reliefs have been given and or certain expenses exempted according to a graduated rate specifiies by PIT (Okeke, Mbonu & Amahalu, 2018b). Personal Income Tax is a direct tax charged on the income of a person. In the context of personal income tax, a 'person' means an individual, a sole proprietorship (non-juristic person), communities and families and on executors and trustees (of an undivided estate). Under Nigerian Personal Income Tax Laws all taxable persons are entitled to a consolidated relief allowance of 20% of gross income plus higher of 1% of gross income or N200,000.

The tax rate payable is:

| Annual Taxable Income | Rate |
|------------------------------|-------------|
| First N300,000 | 7% |
| Next N300,000 | 11% |
| Next N500,000 | 15% |
| Next N500,000 | 19% |
| Next N1,600,000 | 21% |
| Over N3,200,000 | 24% |

Personal Income Tax Act 1993 which was amended in 2011 by the Personal Income Tax Amendment Act 2011 is the prevailing law on personal income tax.

Productivity

Productivity is a measure of the efficiency with which a country combines capital and labour to produce more with the same level of factor inputs. Productivity is the key source of economic growth and competitiveness. A country's ability to improve its standard of living depends almost entirely on its ability to raise its output per worker, i.e., producing more goods and services for a given number of hours of work. Economists use productivity growth to model the productive capacity of economies and determine their capacity utilization rates. This, in turn, is used to forecast business cycles and predict future levels of gross domestic product (GDP) growth. In addition, production capacity and utilization are used to assess demand and inflationary pressures (Riley, 2020). Productivity is an important determinant of living standards, it quantifies how an economy uses the resources it has available, by relating the quantity of inputs to output.

Gross Domestic Product (GDP) per Capita

GDP per capita is a measure of a country's economic output that accounts for its number of people. It divides the country's gross domestic product by its total population. That makes it a good measurement of a country's standard of living. It tells you how prosperous a country feels to each of its citizens. Per capita gross domestic product (GDP) is a metric that breaks down a country's GDP per person. It is calculated by dividing GDP over a country's population. GDP per capita is a universal measure globally for gauging the prosperity of nations. GDP per capita shows how much economic production value can be attributed to each individual citizen (World Bank, 2019).

Tax Revenue and Productivity

Specifically for both developed and developing economies, there exists a relationship between tax revenue and the level of economic development. Undeniably, it has been argued that the level of economic development has a very strong impact on a country's tax base and tax policy objective varies with stages of development. Fasoranti (2013) submitted that development is increased economic activities. Amahalu, Abiahu, Okika & Obi (2016) summarized a country's economic development as a long-term rise in capacity to supply increasingly diverse economic goods to its citizens. Amahalu, Nweze and Obi (2017) added that the growth capacity is based on advancing technology, institutional and ideological adjustments. Economic growth indicates expansion of a country's potential Gross Domestic Product. Salami, Abiahu and Amahalu (2017) posited that, at the early stage of economic growth, the rate of growth in public expenditure will be very high because government provides basic infrastructural facilities and most of these projects are capital intensive.

Theoretical Framework

New Growth Theory

The new growth theory is an economic concept, positing that humans' desires and unlimited wants foster ever-increasing productivity and economic growth. New growth theory was propounded by Paul Romer in 1994. The new growth theory argues that real gross domestic product (GDP) per person will perpetually increase because of people's pursuit of profits. New/Endogenous growth theory holds that economic growth is primarily the result of endogenous and not external forces. Endogenous growth theory holds that investment in human capital, innovation, and knowledge are significant contributors to economic growth. The theory also focuses on positive externalities and spillover effects of a knowledge-based economy which will lead to economic development. The endogenous growth theory primarily holds that the long run growth rate of an economy depends on policy measures. For example, subsidies for research and development or education increase the growth rate in some

endogenous growth models by increasing the incentive for innovation (Tom-West, Okoye & Amahalu, 2021).

Empirical Review

Okeke, Mbonu and Amahalu (2018) examined the effect of tax revenue on economic development in Nigeria during the period 1994 -2016. Data were obtained from the Central Bank of Nigeria, Office of the Federal Inland Revenue Service and Annual Abstract of statistics of the National Bureau of Statistics. This study was based on time series data. The Augmented Dickey Fuller test, Multiple linear regression, Multicollinearity test, Granger Causality test, Johansen cointegration test and Error correction model were employed in the analysis of the data. The findings of this study showed that tax revenue has a statistically significant relationship with primary school enrolment, life expectancy and per capita income, in Nigeria at 5% level of significance respectively. On the basis of the findings, it was recommended among others that since tax revenue has been proven to contribute to economic development in Nigeria, Government should ensure that the tax revenues are expended judiciously in order to ensure that marginal benefits are accrued for all members of the economy.

Omondi (2019) analyzed the effect of custom and excise duties on economic growth in Kenya for the period 1973 to 2010. The study was motivated by two developments. First, by the inconsistency in existing empirics and secondly by the wide knowledge gap occasioned by the paucity of empirical literature on Kenya. Therefore, the study attempted to reconcile the different positions and also close the knowledge gap. The study adopted a correlation research design based on its ability determine the strength and direction of relationships between variables while the theoretical framework was anchored on endogenous growth model. The empirical results indicated that custom and excise duties are positively correlated with economic growth in Kenya.

Ironkwe and Agu (2019) analysed the relationship between total tax revenue and economic growth in Nigeria. Time series data on different types of total tax revenue and economic development from 1986-2016 were collected from Central Bank of Nigeria statistical bulletin, Federal Inland Revenue Service and National Bureau of Statistics. Multiple regression analysis was used in analysing the data with the aid of STATA version 13. The results indicated that there exists a significant positive relationship between total tax revenue and unemployment in Nigeria; company income tax has no significant relationship with economic growth. The study concluded that total tax revenue relate positively to unemployment and recommends that government should distribute its social welfare programmes in such a way to provide direct benefit to tax payers. This makes them believe that the portion of their hard earned money paid for purposes, is being effectively utilised by the government. The tax official needs improvement through adequate training and provision of suitable working materials and facilities.

Methodology

Research Design

This study focused on ascertaining the relationship between tax revenue and productivity of Nigeria, thereby adopting *Ex-post facto* research design. The population of this study constituted the thirty-six (36) states of the Federal Republic of Nigeria including the Federal Capital Territory, Abuja. Time series data were obtained from the publications of Federal Inland Revenue Service (FIRS) bulletin of various years, Central Bank of Nigeria (CBN)

publications, like Statistical Bulletin for various years, Annual Reports for various years; National Bureau of Statistics (NBS) and the World Bank Publications for sixteen years (2005-2020) period. The variables for which data would be sourced include; value added tax, petroleum profit tax, personal income tax and GDP per Capita for the study period.

Model Specification

In the determination of the effect of tax reform on productivity, this study would adopt the model of Okeke, Mbonu & Amahalu (2018):

$$GDP = \alpha + \beta_1 CED + \beta_2 VAT + \beta_3 PIT + \zeta$$

Where:

GDP = Gross Domestic Product

CED = Custom and Excise Duties

VAT = Value Added Tax

PIT = Personal Income Tax

α = Intercept

$\beta_1 - \beta_3$ = Coefficients of independent variable;

Thus, this study specified a functional relationship between productivity and tax reform:

Productivity = $f(\text{tax revenue}) + \text{control variables} + \mu$

$$GDPPC_t = \beta_0 + \beta_1 VAT_t + \beta_2 PPT_t + \beta_3 PIT_t + \beta_4 GEXEDU_t + \beta_5 GEXPINF_t + \mu_t$$

Where:

$GDPPC_t$ = Gross Domestic Product per Capita for period t

VAT_t = Value Added Tax for period t

PPT_t = Petroleum Profit Tax for period t

PIT_t = Personal Income Tax for period t

$GEXEDU_t$ = Government Expenditure on Education for period t

$GEXPINF_t$ = Government Expenditure on Infrastructure for period t

μ_t = Error term for period t

β_0 = Constant term

β_1 = Coefficient of Tax Reforms

Table 1 Variables Definition and Measurement Units

| Variable Type | Indicators | Variable Symbols | Source |
|---|--|------------------|---|
| Independent Variable (Tax Revenue) | | | |
| | Value Added Tax | VAT | Federal Inland Revenue Service (FIRS) statistical bulletin (various issues) |
| | Petroleum Profit Tax | PPT | Federal Inland Revenue Service (FIRS) statistical bulletin (various issues) |
| | Personal Income Tax | PIT | Federal Inland Revenue Service (FIRS) statistical bulletin (various issues) |
| Dependent Variable (Productivity) | | | |
| | GDP per Capita | GDPPC | Central Bank of Nigeria Statistical Bulletin, World Bank Development Indicator and National Bureau of Statistics (several issues) |
| Control Variables | | | |
| | Government Expenditure on Education | GEXEDU | Federal Ministry of Finance and Budget Office Publications, and World Bank Statistical Bulletin |
| | Government Expenditure on Infrastructure | GEXINF | Federal Ministry of Finance and Budget Office Publications, and World Bank Statistical Bulletin |

Data Presentation and Analysis

Table 2: Pearson Correlation Matrix

| | GDPPC | VAT | PPT | PIT | GEXEDU | GEXINF |
|--------|----------|----------|----------|---------|----------|----------|
| GDPPC | 1.00000 | 0.31348 | 0.24849 | 0.04168 | 0.57421 | -0.64235 |
| VAT | 0.31348 | 1.00000 | 0.96751 | 0.90415 | 0.90942 | -0.19607 |
| PPT | 0.24849 | 0.96751 | 1.00000 | 0.85770 | 0.88957 | -0.24914 |
| PIT | 0.04168 | 0.90415 | 0.85770 | 1.00000 | 0.74068 | 0.09830 |
| GEXEDU | 0.57421 | 0.90942 | 0.88957 | 0.74068 | 1.00000 | -0.39057 |
| GEXINF | -0.64235 | -0.19607 | -0.24914 | 0.09830 | -0.39057 | 1.00000 |

Source: E-Views 10.0 Output, 2021

Interpretation

The Pearson correlation matrix analysis in table 2 reveals the existence of a positive relationship between, VAT, PPT, PIT, GEXEDU and GDPPC at 0.31348, 0.24849, 0.04168 and 0.57421 coefficient factors respectively. On the other hand, GEXINF (-0.64235) exhibited a negative relationship with GDPPC.

Table 3: ADF (Augmented Dickey Fuller) Unit Root Test Result

| Variables | Test Statistic | Test Critical Values | | | Status | Prob. |
|-----------|----------------|----------------------|-----------|-----------|------------|--------|
| | | 1% level | 5% level | 10% level | | |
| | ADF | | | | Stationary | |
| GDPPC | -4.675417 | -4.297073 | -3.212690 | -2.747676 | 1(1) | 0.0059 |
| GEXEDU | -6.646857 | -4.297073 | -3.212690 | -2.747676 | 1(1) | 0.0005 |
| GEXINF | -4.878404 | -4.297073 | -3.212690 | -2.747676 | 1(1) | 0.0044 |
| PIT | -4.259916 | -4.200056 | -3.195352 | -2.728955 | 1(1) | 0.0229 |
| PPT | -8.027973 | -4.200056 | -3.195352 | -2.728955 | 1(1) | 0.0000 |
| VAT | -8.135536 | -4.200056 | -3.195352 | -2.728955 | 1(1) | 0.0000 |

Source: E-Views 10.0 output file, 2021

Interpretation

In order to ascertain the stationary state of the time series variables, this study employed the unit root test. The Augmented Dickey-Fuller test was employed and the results were shown in table 3. The results of the unit root test using Augmented Dickey-Fuller at 1 percent level shows that all the time series variables are non-stationary at level 1, but became stationary only after first differencing, hence the variables have an order of integration of one. This conclusion is based on comparison of the augmented Dickey fuller statistics and the critical values provided by MacKinnon (1996). Hence, this permits us to carry out the regression test.

Test of Hypotheses

Table 4: Ordinary Least Square regression analysis testing the relationship between VAT, PPT, PIT, GEXEDU, GEXINF and GDPPC of Nigeria

Dependent Variable: GDPPC
 Method: Least Squares
 Date: 11/29/21 Time: 05:05
 Sample: 2005 2020
 Included observations: 16

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|-----------|
| C | 3.459284 | 0.139450 | 24.80659 | 0.0000 |
| VAT | -0.383441 | 0.169289 | -2.265017 | 0.0342 |
| PPT | -0.385457 | 0.153115 | -2.517434 | 0.0305 |
| PIT | -0.400263 | 0.119732 | -3.342983 | 0.0029 |
| GEXEDU | 0.018647 | 0.006492 | 2.872340 | 0.0166 |
| GEXINF | 0.005614 | 0.003881 | 1.446512 | 0.1786 |
| R-squared | 0.803081 | Mean dependent var | | 3.301250 |
| Adjusted R-squared | 0.704621 | S.D. dependent var | | 0.003416 |
| S.E. of regression | 0.001856 | Akaike info criterion | | -9.460397 |
| Sum squared resid | 3.45E-05 | Schwarz criterion | | -9.170676 |
| Log likelihood | 81.68318 | Hannan-Quinn criter. | | -9.445561 |
| F-statistic | 18.56440 | Durbin-Watson stat | | 2.046224 |
| Prob(F-statistic) | 0.000000 | | | |

Source: E-Views 10 Regression Output, 2021

Interpretation of Regression Coefficient Result

The result in table 4 shows that VAT ($\beta_1 = -0.383441$); PPT ($\beta_2 = -0.385457$) and PIT ($\beta_3 = -0.400263$) negatively relate with GDPPC, while on the other hand, GEXEDU ($\beta_4 = 0.018647$) and GEXINF ($\beta_5 = 0.005614$) positively relate with GDPPC, however, statistically

significant at 5% significant level as depicted by the probability values of the slope coefficient with the exception of GEXINF ; $P(x_1=0.0342<0.05; x_2=0.0305<0.05; x_3=0.0029<0.05; x_4=0.0166<0.05; x_5=0.1786>0.05)$.

The regression coefficient equation shows that:

$$GDPPC = 3.459284 - 0.383441VAT - 0.385457PPT - 0.400263PIT + 0.018647 GEXEDU + 0.005614 GEXINF$$

The implication of the model is that for there to be an increase in GDPPC, there must be 38.34%, 38.55% and 40.02% reduction in VAT, PPT and PIT respectively. On the other hand, one naira increase in GEXEDU and GEXINF will cause GDPPC to increase by 1.86% and 0.56% respectively. The coefficient of determination (adjusted R-squared) is 0.704621 which means that 70.46% of variations in GDPPC are explained by the independent variables (VAT, PPT, PIT, GEXEDU and GEXINF), and the Durbin Watson Statistic is 1.946224 suggesting no presence of auto correlation. The overall significance value of the regression model; Prob(F-statistic)= 0.000000 is less than the critical value of 0.05 inferring that the regression model is significant in predicting the relationship between the independent variable (VAT, PPT, PIT, GEXEDU and GEXINF) and the dependent variable (GDPPC). Consequently, there is a negative but significant relationship between Tax Revenue and Productivity of Nigeria at 5% significant level.

Table 5: Granger Causality Test showing the Causality between VAT, PPT, PIT, GEXEDU, GEXINF and GDPPC of Nigeria

Pairwise Granger Causality Tests

Date: 11/29/21 Time: 06:02

Sample: 2005 2020

Lags: 2

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|---------------------------------------|-----|-------------|--------|
| DVAT does not Granger Cause DGDPPC | 13 | 7.74628 | 0.0134 |
| DGDPPC does not Granger Cause DVAT | | 2.10143 | 0.1847 |
| DPPT does not Granger Cause DGDPPC | 13 | 8.58358 | 0.0102 |
| DGDPPC does not Granger Cause DPPT | | 2.12639 | 0.1817 |
| DPIT does not Granger Cause DGDPPC | 13 | 8.25299 | 0.0106 |
| DGDPPC does not Granger Cause DPIT | | 0.25362 | 0.7820 |
| DGEXEDU does not Granger Cause DGDPPC | 13 | 7.55062 | 0.0150 |
| DGDPPC does not Granger Cause DGEXEDU | | 1.83232 | 0.2212 |
| DGEXINF does not Granger Cause DGDPPC | 13 | 5.16399 | 0.0485 |
| DGDPPC does not Granger Cause DGEXINF | | 1.21918 | 0.3450 |

Source: E-Views 10 Regression Output, 2021

The result of the Granger causality test in table 5 indicates a uni-directional relationship between VAT, PPT, PIT, GEXEDU, GEXINF and GDPPC at 5%. It implies that VAT, PPT, PIT, GEXEDU and GEXINF granger cause GDPPC at the Probability values of 0.0134, 0.0102, 0.0106, 0.0150 and 0.0485 respectively which are less than 0.05. The Granger Causality test result reveals evidence of casual relationship between VAT, PPT, PIT, GEXEDU, GEXINF and GDPPC, thereby buttressing the empirical evidence that a causal link exists between VAT, PPT, PIT, GEXEDU, GEXINF and GDPPC of Nigeria.

Table 6: Johansen Co-integration Test

Date: 11/29/21 Time: 06:36
 Sample (adjusted): 2008 2020
 Included observations: 13 after adjustments
 Trend assumption: Linear deterministic trend
 Series: GDPPPC DVAT DPPT DPIT DGEXEDU DGEXINF
 Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|------------------------------|------------|--------------------|------------------------|---------|
| None * | 0.898536 | 153.9360 | 95.75366 | 0.0000 |
| At most 1 * | 0.753905 | 101.3107 | 69.81889 | 0.0000 |
| At most 2 * | 0.711958 | 69.06383 | 47.85613 | 0.0002 |
| At most 3 * | 0.542960 | 40.43692 | 29.79707 | 0.0021 |
| At most 4 * | 0.447729 | 22.42828 | 15.49471 | 0.0038 |
| At most 5 * | 0.317113 | 8.772806 | 3.841466 | 0.0031 |

Trace test indicates 6 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|------------------------------|------------|------------------------|------------------------|---------|
| None * | 0.898536 | 72.62529 | 60.07757 | 0.0000 |
| At most 1 * | 0.753905 | 52.24690 | 43.87687 | 0.0000 |
| At most 2 * | 0.711958 | 38.62692 | 37.58434 | 0.0065 |
| At most 3 * | 0.542960 | 28.00864 | 25.13162 | 0.0012 |
| At most 4 * | 0.447729 | 18.65547 | 14.26460 | 0.0322 |
| At most 5 * | 0.317113 | 8.772806 | 3.841466 | 0.0031 |

Max-eigenvalue test indicates 6 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: E-Views 10.0 Output, 2021

Interpretation of Diagnostic Result

In table 6, the Johansen co-integration test was used to determine the existence of long-run equilibrium relationship among the variables under study. The Trace Statistic value and Max-Eigen Statistic are shown to be greater than the critical values at 5% levels, thus indicating 6 co-integrating equation at 5% levels. Therefore, it is concluded that there exists a long run equilibrium relationship between dependent variable (GDPPC) and independent variables (VAT, PPT, PIT, GEXEDU, GEXINF). This implies that the regression model is not spurious and the conclusion thereof is valid.

Table 7: Error Correction Model

Vector Error Correction Estimates

Date: 11/29/21 Time: 06:41

Sample (adjusted): 2007 2020

Included observations: 14 after adjustments

Standard errors in () & t-statistics in []

| Cointegrating Eq: | CointEq1 | | | | | |
|---|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|
| DGDPPC(-1) | 1.000000 | | | | | |
| DVAT(-1) | -5.365350 (1.66391) [-3.22455] | | | | | |
| DPPT(-1) | 45.49314 (6.73434) [6.75539] | | | | | |
| DPIT(-1) | -18.57279 (1.48783) [-12.4831] | | | | | |
| DGEXEDU(-1) | -25.41814 (1.03616) [-24.5311] | | | | | |
| DGEXINF(-1) | -7.017016 (0.71429) [-9.82373] | | | | | |
| C | -0.279135 | | | | | |
| Error Correction: | D(DGDPPC) | D(DVAT) | D(DPPT) | D(DPIT) | D(DGEXEDU) | D(DGEXINF) |
| CointEq1 | 0.005867 (0.00940) [0.62420] | -0.000465 (0.00891) [-0.05223] | -0.001274 (0.00208) [-0.61259] | -0.013971 (0.01187) [-1.17666] | 0.071178 (0.01228) [5.79695] | 0.033589 (0.02067) [1.62495] |
| C | 0.033750 (0.43625) [0.07736] | -0.015833 (0.41367) [-0.03828] | 0.008333 (0.09652) [0.08634] | 0.023750 (0.55112) [0.04309] | 0.122500 (0.56993) [0.21494] | -0.058333 (0.95949) [-0.06080] |
| R-squared | 0.017402 | 0.000124 | 0.016772 | 0.059207 | 0.604350 | 0.107159 |
| Adj. R-squared | -0.027262 | -0.045325 | -0.027920 | 0.016443 | 0.586366 | 0.066576 |
| Sum sq. resids | 100.4861 | 90.35158 | 4.918829 | 160.3696 | 171.5057 | 486.0851 |
| S.E. equation | 2.137183 | 2.026546 | 0.472846 | 2.699913 | 2.792080 | 4.700508 |
| F-statistic | 0.389624 | 0.002728 | 0.375272 | 1.384523 | 33.60465 | 2.640451 |
| Log likelihood | -51.23812 | -49.96238 | -15.03472 | -56.84766 | -57.65328 | -70.15448 |
| Akaike AIC | 4.436510 | 4.330198 | 1.419560 | 4.903971 | 4.971106 | 6.012874 |
| Schwarz SC | 4.534681 | 4.428370 | 1.517732 | 5.002142 | 5.069277 | 6.111045 |
| Mean dependent | 0.033750 | -0.015833 | 0.008333 | 0.023750 | 0.122500 | -0.058333 |
| S.D. dependent | 2.108634 | 1.982124 | 0.466380 | 2.722388 | 4.341297 | 4.865251 |
| Determinant resid covariance (dof adj.) | 197.2105 | | | | | |
| Determinant resid covariance | 117.0034 | | | | | |
| Log likelihood | -261.4736 | | | | | |
| Akaike information criterion | 23.28947 | | | | | |
| Schwarz criterion | 24.17301 | | | | | |
| Number of coefficients | 18 | | | | | |

Source: E-Views 10.0 Output, 2021

Interpretation of Vector Error Corrector Model (VECM) Analysis

The result of the VECM analysis in table 7 reveals that the value of the error correction coefficient is 0.005867. This indicates that approximately 0.59% of the short run errors of the GDPPC is corrected each year. In other words, GDPPC adjusts to its long run equilibrium at a speed of 0.59%.

Summary of Findings, Conclusion and Recommendations

Findings

Based on the analysis of this study, the following findings were deduced:

- i. There is a significant but negative relationship between Value Added Tax and GDP per Capita of Nigeria at 5% level of significance ($\beta_1 = -0.383441$; p-value = 0.0342)
- ii. There is a significant but negative relationship between Petroleum Profit Tax and GDP per Capita of Nigeria at 5% level of significance ($\beta_2 = -0.385457$; p-value = 0.0305)
- iii. There is a significant but negative relationship between Personal Income Tax and GDP per Capita of Nigeria at 5% level of significance ($\beta_3 = -0.400263$; p-value = 0.0029)

Conclusion

This study examined the relationship between Tax Revenue and Productivity of Nigeria for sixteen years (2005-2020). In order to avoid spurious estimates, the unit roots of the series were verified using Augmented Dickey-Fuller (ADF) technique after which Granger Causality, Johansen Co-integration Test and Error Correction Estimates were conducted. Data analysis revealed that there is a significant but negative relationship between Value Added Tax and GDP per Capita ($\beta_1 = -0.383441$; p-value = 0.0342); a significant but negative relationship between Petroleum Profit Tax and GDP per Capita of Nigeria at 5% level of significance ($\beta_2 = -0.385457$; p-value = 0.0305); a significant but negative relationship between Personal Income Tax and GDP per Capita of Nigeria at 5% level of significance. In conclusion, this study found a significant but negative relationship between tax revenue and productivity of Nigeria.

Recommendations

The following recommendations were suggested:

- i. In order to reverse the negative relationship between value added tax and GDP per capita, Federal Government should take strict measures to close all administrative loopholes in the administration and management of value added tax in Nigeria. If this is done, the revenue accruable from value added tax will increase and boost provision of social amenities and infrastructures in Nigeria.
- ii. Government should be encouraged to persistently invest tax revenues from oil sector (particularly PPT) to develop other sectors of the economy so as to bridge the gaps between revenue accrued to the government and infrastructural deficiencies.
- iii. Since personal income tax play vital role in the growth of the country's economy, a position which the granger causality test upholds, then the regulatory framework of taxation in the country should put in place a more effective tax revenue generation system that can enhance better administration of personal income tax. The measure should emphasise and address accountability of personal income tax.

References

- Abiahu, M.F.C., & Amahalu, N.N. (2017). Effect of taxation on dividend policy of quoted deposit money banks in Nigeria (2006-2015). *EPH - International Journal of Business & Management Science*, 1-30.
- Amahalu, N.N., Egolum, U.P., & Okoye J.N (2014). Due Process and Fiscal Responsibility Act as tools for effective fund management in Nigeria, Sub-Sahara Africa and the Transformation Question, Faculty of Management Sciences, 2014 Conference Proceedings, 285-305.
- Amahalu, N.N., Abiahu, M.F.C., Okika E.C. & Obi, J.C. (2016). Effect of money laundering on Nigerian economy. *Research Journal of Financial Sustainability Reporting*, 1(2), 1-12.
- Amahalu, N.N., Nweze, C.L., & Obi, J.C. (2017). Effect of backflush accounting on financial performance of quoted food and beverage firms in Nigeria. *EPH - International Journal of Medical and Health Science*, 2(3), 58-80.
- Aruna, F.E., Oshiole, S., & Amahalu, N.N. (2020). Effect of taxes on net investment of listed communication firms in Nigeria. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 10(2), 171-183.
- Asaolu, T.O., Olabisi, J., Akinbode, S.O., & Alebiosu, O.N. (2018). Tax revenue and economic growth in Nigeria. *Scholedge International Journal of Management & Development*, 05(07), 72-85.
- Bonmwa, T.G., & Ogboru, I. (2017). An empirical analysis of government expenditure and economic growth in Nigeria. *Journal of Economics and Development Studies*, 5(4), 122-134.
- Feng, Y., & Eko, S. (2014). The relationship between tax revenue and economic growth of Hebei Province based on the tax multiplier effect. *Global Economy and Finance Journal*, 7(2), 1-18.
- Ironkwe, U.I., & Agu, E.O. (2019). Tax revenue and economic development in Nigeria. *International Journal of Advanced Academic Research*, 5(4), 1-15.
- Ndum, N.B., Okoye, E.I., & Amahalu, N.N. (2019). Pension fund asset investment and economic growth in Nigeria. *Journal of Global Accounting*, 6(2), 57-77.
- Okeke, M.N., Mbonu, C.M., & Amahalu, N.N. (2018). Tax revenue and economic development in Nigeria: A Disaggregated Analysis. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 8(2), 178-199.
- Okeke, M.N., Mbonu, C.M., & Amahalu, N.N. (2018a). Tax revenue and economic development in Nigeria: A Disaggregated Analysis. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 8(2), 178-199.
- Okeke, M.N., Mbonu, C.M., & Amahalu, N.N. (2018). Effect of tax revenue on economic development in Nigeria. *International Journal of Research in Business, Economics and Management*, 2(4), 25-61.
- Okeke, M.N., Mbonu, C.M., & Amahalu, N.N. (2018b). Effect of tax revenue on economic development in Nigeria. *International Journal of Research in Business, Economics and Management*, 2(4), 25-61.
- Okoye, P.V., Amahalu, N.N., Obi, J.C., & Iliemna, R.O. (2019). Effects of tax leakages on economic development of Nigeria. *Journal of Global Accounting*, 2019, 6(1), 104-128.
- Okoye, P.V.C, Okoye, J.N., & Amahalu, N.N. (2015). Effect of Integrated Personnel and Payroll Information System (IPPIS) on Federal Government Recurrent Expenditure in

- Nigeria. National Association of Accounting Teachers Journal, Federal University, Utuoke, Bayelsa State.
- Olaoye, C.O., & Ayeni, O.F. (2019). Oloidi, G.A., & Oluwalana, L.O. (2014). Another approach to evaluating the productivity of value Added tax in Nigeria. *Developing Country Studies*,4(15), 39-45.
- Omondi, B.O. (2019). The effect of custom and excise duties on economic growth in Kenya. *International Journal of Scientific and Research Publications*, 9(1), 530-546.
- Oraka, A. O., Okegbe, T. O. & Ezejiofor R., A. (2017). Effect of value added tax on the Nigerian economy. *European Academic Research* V(2) May 2017 Impact Factor: 3.4546 (UIF).
- Riley, G. (2020). Productivity improvements in China. <https://www.tutor2u.net/economics/reference/productivity-and-economic-growth>. Accessed 19/02/2020
- Sickles, R., & Zelenyuk, V. (2019). *Measurement of productivity and efficiency: Theory and Practice*. Cambridge: Cambridge University Press.
- Tom-West, R., Okoye, P.V.C., & Amahalu, N.N. (2021). Intellectual capital and economic value added of quoted information communication and technology firms in Nigeria. *International Journal of Management Studies and Social Science Research*, 3(5), 281-294.
- World Bank. (2019). World development indicators. <https://data.worldbank.org>. Accessed 13/02/2020