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Tax Revenue and Investment in Nigeria: Is There A Link?

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ABSTRACT

This study explored the relationship between tax revenues and investment in Nigeria from 1986 to 2022, with the aim of analyzing how tax revenues influence investment, using gross capital formation as a proxy for investment. Data for the analysis were obtained from the Federal Inland Revenue Service (FIRS) Statistics Report, the National Bureau of Statistics (NBS), and the World Investment Report. The research employed a parsimonious error correction technique. The findings indicated that, in the long term, company income tax, value-added tax, and gross domestic product had a significant positive impact on investment, while stamp duty tax had a negative and statistically significant effect. Additionally, petroleum profit tax and tertiary education tax also negatively and significantly affected investment in Nigeria. In the short term, only petroleum profit tax showed a significant positive impact on investment, while the other variables were not statistically significant. The study suggests that the Nigerian government should diversify the economy by shifting focus from oil to non-oil sectors, as revenue from non-oil sources tends to be more stable. Additionally, the government is encouraged to pay particular attention to non-oil revenue, especially stamp duty tax, which has demonstrated greater promise compared to other tax variables identified in our findings.

Keywords: Investment, Petroleum profit Tax, Stamp duty Tax, Value added tax, GDP.

INTRODUCTION

Tax revenue has been identified by governments as an important macroeconomic variable that can influence economic activities to achieve important macroeconomic goals. Therefore, the structure and changes in tax revenue as a source of government finance are crucial to achieving sustainable development through the investment channel. Because investment is another important macroeconomic variable that is considered to be more important, especially foreign direct investment (FDI), which has a huge potential for growth and development (Dash, 2020). It is believed that for a country to experience rapid growth and development, it must emphasize investment to create jobs through breakthroughs in new production technologies, technology transfer, and innovative research, thereby increasing productivity (Babu et al., 2020).

Domestic investment through capital formation is not only vital but also an integral part of accelerating growth and development in any economic sector as it provides domestic resources that stimulate investment efforts in the economy. The goal of this growth potential is to create economic and social common capital (or costs) that increase national production and income through job creation and reduction of economic poverty (Oyedoku and Ajose, 2018). The focus of this investment study is fixed capital formation. Gross fixed capital formation measures the value of new or existing capital goods purchased by various economic agents such as households, businesses and the government, less the disposal of capital goods (Kuznets, 1934). Intangible assets are intangible assets that are added over time and are often described as non-productive capacity of the economy. In this regard, gross fixed capital formation can be positive or negative during the year. For example, when assets are divested or factories are sold, this represents negative investment in the economy.

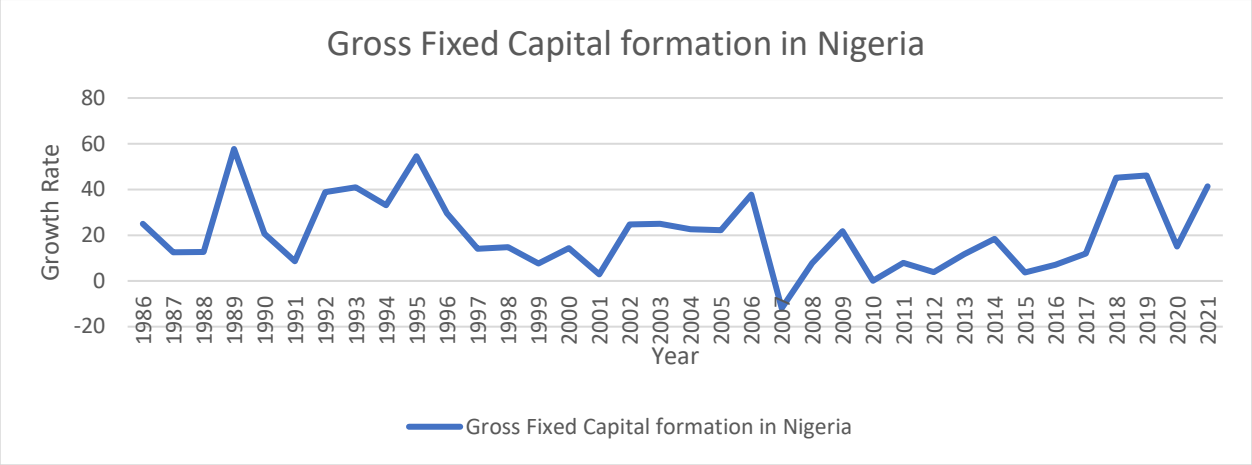


Fig 1: Trend of Gross Fixed Capital formation

In recent decades, Nigeria's investment level has been unsatisfactory, and the gross fixed capital formation has fluctuated greatly. According to the current statistics of the World Bank (2022), the gross fixed capital formation was 87.1 billion naira in 1985 and reached 7950 billion naira in 2016. However, the gross fixed capital formation fell to 7000 billion naira in 2017, but increased to 58290 billion naira in 2021. In terms of growth rate, the gross fixed capital formation averaged 25.7% from 1986 to 1990, fell to 16.1% from 1996 to 2000, and reached a historical low of 2.9% in 2001. In 2007, there was a negative growth of -11.9%. There have been fluctuations since then, and finally maintained at 41.3% in 2021.

On the other hand, the role of taxation in national development has attracted widespread attention from scholars and practitioners, and there is no lack of theoretical evidence in the literature. Taxation is an important component of fiscal policy for development prospects because it plays a vital role in economic development in transition economies, including resource mobilization, reducing income inequality, improving social welfare, foreign exchange, regional development, and controlling inflation. (Uchime & Anichebe, 2019). Taxes can act as a barrier to investment through various forms such as corporate income tax, personal income tax, value-added tax, and tertiary education tax. When tax rates rise or when capital depreciation allowances decrease, investment generally suffers due to changes in the user cost of capital (Alves, 2019; Babu et al., 2020; Halim and Rahman, 2021; Hakim et al., 2022). Different tax policies have the potential to influence both investment and productivity. Furthermore, taxes are a significant source of revenue for governments in both developed and developing nations, including Nigeria.

The National Bureau of Statistics recently revealed that tax revenue collected by all 36 states in Nigeria exceeded N683 billion, with Lagos State contributing N268 billion, which represents 40% of the total revenue for the entire federation in 2019. This figure is deemed low by various standards, leading Ayodele (2021) to suggest that the country's inadequate tax compliance stems from several issues, including inconsistent fiscal policies, a cumbersome and ineffective tax administration system, a high rate of tax evasion, ambiguities in tax legislation, and a lack of transparency regarding how tax revenues are used for social services and visible development projects. Given the critical role of taxation in government revenue generation, one would anticipate a strong performance in growth indicators. However, the growth of tax revenue in Nigeria has been far from significant. For example, the average growth rate of company income tax has not shown substantial improvement.

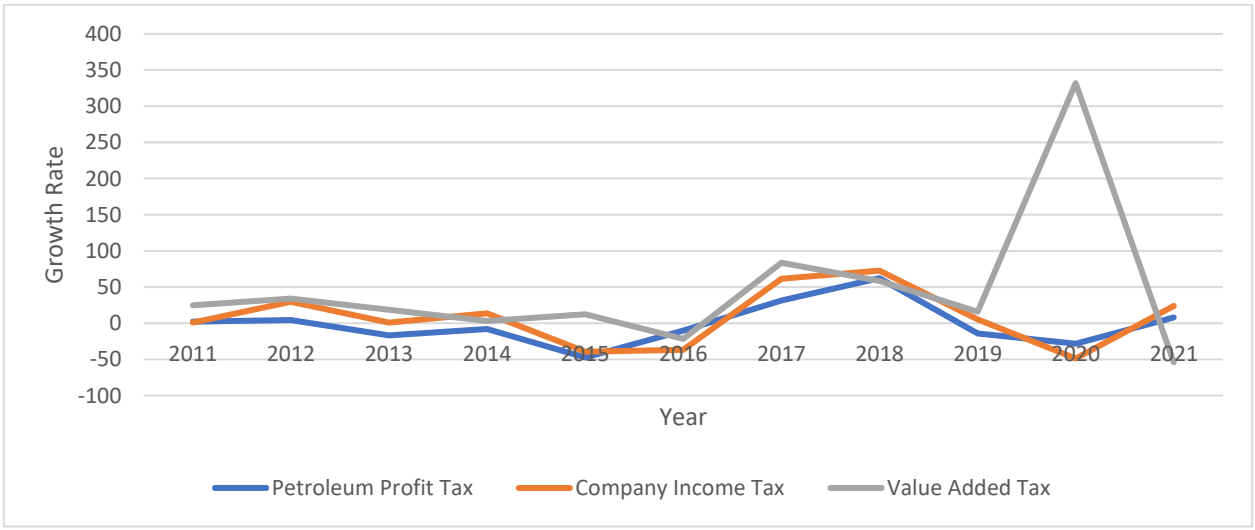


Fig 2: Trend of Selected Tax Revenue in Nigeria

There is no doubt that the performance of several key variables has been influenced by tax revenue from both oil and non-oil sources. Many macroeconomic indicators have struggled in recent years. For example, the growth rate of real gross domestic product (GDP) has been disappointing, averaging 5.0% from 2011 to 2013, dropping to 2.5% between 2014 and 2016, and reaching a concerning -1.9% in 2020 before experiencing a slight recovery to 3.4% in 2021. Similarly, Nigeria's human development index (HDI) has remained low; it stagnated at 0.44% from 1986 to 1996 and only increased to 0.47% by 2006. It improved to 0.53% in 2016 and reached 0.54% in 2021.

Although taxation provides a substantial source of revenue for the government, Nigeria continues to struggle with extreme poverty, with over 70% of its population living on less than a dollar a day. Data from the Central Bank of Nigeria (CBN) indicates that the unemployment rate was 18.8% in 2018 and rose to over 23.0% by 2021. Furthermore, the country is contending with a high inflation rate exceeding 17% and a double-digit interest rate of 26.28% as of the first quarter of 2024. These challenges have resulted in underperformance in the manufacturing sector, an escalating debt burden, and a notable deterioration in macroeconomic indicators, all of which are hindering the Nigerian economy (Adama et al., 2022).

Scholars have pointed out that the manual methods employed by tax authorities to manage various forms of taxation render the Nigerian tax system highly ineffective and prone to inefficiencies. Alongside issues of fiscal indiscipline, the system faces numerous challenges, including a lack of accountability for tax revenues and expenditures, insufficient clarity, a shortage of skilled personnel, poor administration, the absence of a comprehensive database, tax exaggeration, complexities in tax legislation, changes in accounting dates and cessation, delays in tax refunds, and a proliferation of taxes.

To address these issues, the government has periodically introduced various tax reforms; however, significant progress remains elusive. In light of this situation, the current study aims to investigate the impact of tax revenue on investment, using gross fixed capital formation as a proxy for investment.

REVIEW OF RELATED LITERATURE

The current body of literature is rich with research examining the connection between taxes and investment, producing a variety of results. In their study, Ibrahim et al. (2022) investigated the impact of tax revenue on investment by analyzing the role of tax incentives in attracting foreign direct investment (FDI) in Nigeria from 2008 to 2018. They utilized Driscoll-Kraay standard errors regression analysis for their evaluation. The results revealed that tax incentives significantly and positively influence FDI inflows. Notably, tax holidays were shown to have a positive effect on FDI at a 5% significance level ($\beta = 0.1578$; $t = 3.99$; $P < 0.05$), while exemptions from customs duties demonstrated a significant positive impact at a 1% significance level ($\beta = 0.2436$; $t = 5.61$; $P < 0.01$). The authors recommend that the government maintain and strengthen its policies on tax holidays and customs duty exemptions to enhance FDI inflows and promote national economic growth.

The impact of direct and indirect taxes on economic growth has been explored in existing literature. A study conducted by Hakim et al. (2022) analyzed cross-sectional data from 90 developing and 47 developed countries over the period from 2000 to 2020. The researchers developed three models, with GDP per capita, unemployment, and foreign direct investment as the dependent variables, while direct and indirect taxation served as the common independent variables. Utilizing generalized least squares regression, the study revealed a significant negative effect of taxation on economic development. Consequently, the authors concluded that the tax structure in developing countries tends to hinder rather than promote growth during the review period.

Nguyen and Darsono (2022) analyzed macro panel data from ASEAN countries, including Brunei, Cambodia, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand, and Vietnam, to investigate the relationship between tax structure, investment, and economic growth. Utilizing a pooled OLS model, their findings revealed that tax revenue has a significant negative impact on growth within ASEAN economies. The study suggested that while lower tax revenue could encourage saving and investment, it also leads to increased government deficits, which ultimately hampers economic growth.

Oladipo et al. (2021) investigated the relationship between foreign direct investment (FDI) and revenue generation in Nigeria, focusing on the influence of company income tax from 1990 to 2020. The study analyzed several variables, including foreign direct investment, company income tax, petroleum profit tax, and corporate tax. The findings indicate that FDI positively affects revenue generation in Nigeria. In summary, foreign direct investment contributes to increased revenue generation, which, through company income tax, supports economic growth in the country. To enhance government revenue and foster economic development, it is essential for the government to prioritize policies that encourage FDI inflows and utilize this revenue to generate additional tax revenue for infrastructural development.

Oboh (2021) conducted a study analyzing direct tax and foreign direct investment data from 1981 to 2019 using the Ordinary Least Squares (OLS) method. The data encompassed foreign direct investment, company income tax, petroleum profit tax, personal income tax, and education tax. The findings indicated a positive correlation between petroleum profit tax, company income tax, and personal income tax with the ratio of foreign direct investment to gross domestic product (FDI-GDP). Conversely, education tax exhibited a negative correlation with FDI-GDP. The study recommended enhancing tax policies related to the direct tax components of petroleum profit tax, company income tax, and personal income tax to boost foreign direct investment in Nigeria. Additionally, it suggested further research to explore whether increasing revenue from education tax and investing it in the educational system could mitigate the negative relationship between education tax and foreign direct investment.

Makwe and Oladele (2020) investigated the impact of foreign direct investment (FDI) on revenue generation in Nigeria from 1970 to 2018, employing the autoregressive distributed lag (ARDL) bound testing approach established by Pesaran et al. (2001). The study focused on several variables, including FDI in agriculture, FDI in manufacturing processing, FDI in mining and quarrying, company income tax, and petroleum profit tax. The findings indicated that FDI in agriculture does not contribute to the long-term generation of company income tax and petroleum profit tax in Nigeria, as its coefficient was found to be negative and insignificant. In contrast, the coefficient for manufacturing and processing was positive but not statistically significant concerning

company income tax, while it was negative and also non-significant in relation to petroleum profit tax. The authors suggested that the government could encourage foreign investors to reinvest their profits through moral persuasion.

In 2019, Camara investigated the long-term effects of foreign direct investment (FDI) on tax revenue in developing countries from 1990 to 2015, utilizing the Pooled Mean Group (PMG) estimator. The analysis included variables such as the share of added value from agriculture, the share of added value from extractive activities, international trade, and GDP per capita. The findings indicate that FDI inflows generally have a positive effect on tax revenue in developing countries, with the exception of resource-exporting nations, where the impact of FDI inflows on tax revenue is negative.

In his 2019 study on the link between tax structure and investment growth, Alves argued that achieving any desired level of development would be nearly impossible without corresponding investment. The research utilized panel data from all OECD countries spanning from 1980 to 2015. A range of explanatory variables was included, such as tax as a percentage of GDP, income tax, capital gains tax, corporate and individual profit taxes, property tax, workforce and payroll tax, taxes on goods and services, and social security contributions. Conversely, gross fixed capital formation was used as the dependent variable. Employing a generalized method of moments and robust least squares, the study revealed that taxes on income, goods and services, corporations, and social security contributions had a negative and significant impact on investment in OECD economies during the analyzed period. This suggests that increasing taxes could hinder investment growth.

The tax payment statistics among economically active individuals in Nigeria have taken a concerning turn. According to the Nigerian Bureau of Statistics (NBS, 2018), the number of employed individuals in Nigeria stands at 69.5 million. However, only about 19 million of these individuals are estimated to be paying taxes, leaving approximately 50.5 million employed Nigerians outside the tax system. In 2018, the combined tax revenue from the 36 states and the Federal Capital Territory (FCT) amounted to 669 billion naira, resulting in a meager revenue per registered taxpayer and a low figure of 6,021 naira per economically active person (Adeyemi & Adeduor, 2020). This clearly indicates a significant lack of tax compliance, which contributes to the low ratio of tax revenue to the country's gross domestic product. In contrast, South Africa boasts a tax revenue per employed person of around 570,370 naira and a tax-to-GDP ratio exceeding 25%.

Table 1: Structure of Selected Tax Variables in Nigeria, (N billion)

Year	Petroleum Profit Tax	Company Income Tax	Value Added Tax	Tertiary Education Tax	Stamp Duty
2010	2998.5	663.7	623.1	132.9	134200.0
2011	3070.6	654.4	770.1	130.7	150000.0
2012	3201.3	820.6	802.9	188.4	176900.0
2013	2666.4	963.5	945.3	279.4	211900.0
2014	2453.9	1173.5	845.4	189.6	84600.0
2015	1290.0	1269.0	1283.7	206.0	87130.0
2016	1157.8	933.5	1475.0	130.1	661380.0
2017	1520.5	1215.7	1800.0	155.0	169650.0
2018	2467.6	1340.9	1544.0	203.3	446126.0
2019	2114.3	1604.7	1703.9	221.1	176413.0
2020	1517.0	1275.4	8190.6	259.6	171925.0
2021	1636.8	1476.9	1838.4	323.3	120000.0

Source: Federal Inland Revenue Service (2022)

Table 1 outlines the various elements of Nigeria's tax structure. To enhance tax revenue administration in the country, Adeyemi and Adedour (2020) proposed several strategies, including fostering collaboration between the government and taxpayers to boost tax revenue, strengthening the link between access to public services and tax compliance, implementing policies that promote tax transparency, and encouraging partnerships with taxpayers regarding the direct use of tax revenues for infrastructure projects. They also emphasized the importance of involving informal sector groups in tax compliance initiatives and expanding whistleblower policies to gather intelligence for tax enforcement. Taxation serves as a crucial tool for fiscal policy and is a significant source of government revenue. Nigeria has made various policy attempts to leverage taxation as a means of generating funds for both recurrent and capital expenditures. However, the country's tax-to-GDP ratio remains one of the lowest in Africa, which has hindered investment, particularly in the public sector.

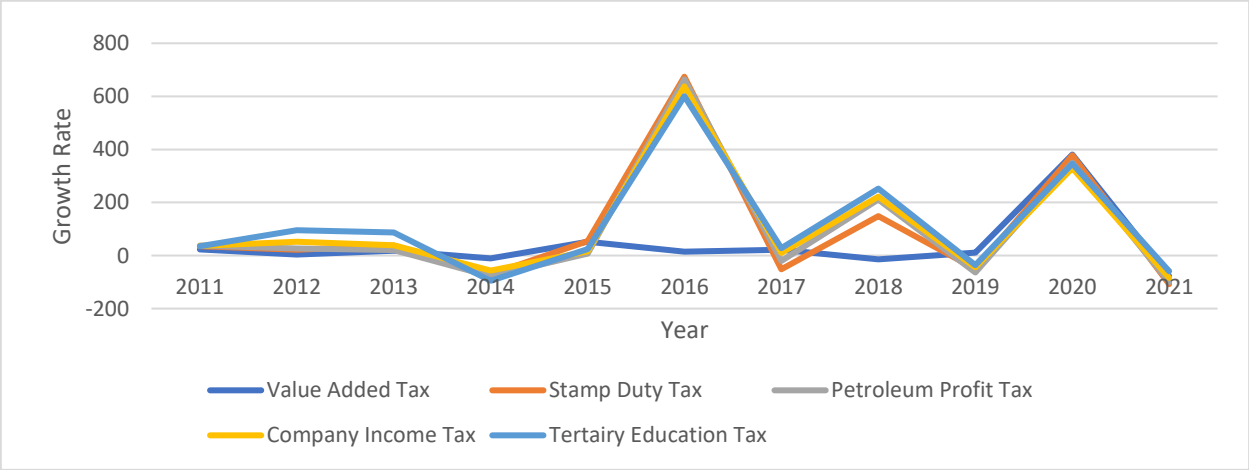
Table 2: Structure of Selected Tax Variables in Nigeria (%)

Year	Petroleum Profit Tax	Company Income Tax	Tertiary Education Tax	Value Added Tax	Stamp Duty
2011	2.4	-1.4	23.6	-1.7	11.8
2012	4.3	25.4	4.3	44.1	17.9
2013	-16.7	17.4	17.7	48.3	19.8
2014	-8.0	21.8	-10.6	-38.1	-60.1
2015	-47.4	8.1	51.8	8.6	3.0
2016	-10.2	-26.4	14.9	-36.8	659.1
2017	31.3	30.2	22.0	19.1	-74.3
2018	62.3	10.4	-14.2	31.2	163.0
2019	14.3	19.7	10.4	8.8	-60.4
2020	-28.3	-20.5	380.7	17.4	-2.5
2021	7.9	15.8	-77.6	24.5	-30.2

Source: Federal Inland Revenue Service (2022)

In 2013, tax as a percentage of GDP was 6%, 16% and 23% for Nigeria, Kenya and South Africa respectively. In 2014, Nigeria's tax revenue as a percentage of GDP dropped from 6% to 5% while that of Kenya and South Africa rose from 16% and 23% respectively to 18% and 21%. In 2015, a further decrease of 1% (decreased from 5% to 4%) was recorded for Nigeria, while Kenya and South Africa stood at 18% and 25% respectively. As Table 3 and Fig indicate, none of the selected tax structure performed very well as they were saddled with fluctuations.

Fig 3: Trend of Selected Tax Variables in Nigeria



Between the periods of 2014, 2016 and 2020, and as can be seen in Fig 2.1, there was a downward trend for tax revenue following 2014 recession, 2016 and the 2020 COVID-19 pandemic (Nchege et al, 2020). Due to the high reliance of the economy on oil revenue and the high volatility of oil prices and the declines in oil revenues, revenue allocations from the federation account to state government has declined by 35% between 2015 and 2017 (Deloitte, 2017).

In addition to the economic downturns and the COVID-19 pandemic, several factors contribute to the inadequate tax revenue generation in Nigeria, including a limited tax base, ineffective compliance enforcement, cumbersome bureaucratic procedures, and a lack of transparency and accountability (De Loitte, 2017). To address these issues, various policy measures have been introduced to enhance tax revenue, such as comprehensive tax reforms and the Voluntary Asset and Income Declaration Scheme (VAIDS). VAIDS is a government initiative aimed at encouraging individuals to voluntarily disclose their assets and income to settle any outstanding tax obligations. This program was executed by the Federal Inland Revenue Service (FIRS) in partnership with all 36 State Internal Revenue Services.

Structure and Trends of Investment

The investment landscape in Nigeria has transitioned from the protectionist policies of the 1970s to the current era of liberalization. Although both policy frameworks aimed to enhance private sector involvement, they differed significantly in terms of foreign investors' equity ownership in businesses. The

protectionist phase was primarily guided by the Nigerian Enterprise Promotion Decree (NEPD) of 1972. This legislation underwent several amendments, yet its core principle remained intact, imposing various restrictions on foreign direct investment and thereby indirectly fostering domestic investment through an indigenization policy.

The 1972 decree designated 22 business sectors exclusively for Nigerian citizens, including advertising, gaming, electronics manufacturing, basic manufacturing, road transport, bus and taxi services, media, retail, and personal services. Foreign investment was allowed up to 60 percent ownership, provided that the proposed enterprise met specific criteria.

Table 4: Growth Rate of Selected Macroeconomic Variables (%)

Year	Gross Fixed Capital Formation	Broad Money Supply (M2)	Human Development Index	Real GDP
1986-1990	25.7	22.3	0.44	4.9
1991-1995	35.2	36.5	0.44	0.2
1996-2000	16.1	27.1	0.46	3.1
2001	2.9	2.9	0.46	5.9
2002	24.7	24.7	0.47	15.3
2003	25.0	25.0	0.46	7.3
2004	22.6	22.6	0.47	9.2
2005	22.2	22.2	0.50	6.4
2006	37.8	37.8	0.47	6.1
2007	-11.9	-11.9	0.47	6.1
2008	7.7	7.7	0.47	6.8
2009	21.8	21.8	0.43	8.0
2010	-0.0	0.0	0.48	9.1
2011	7.8	7.8	0.49	5.3
2012	3.8	3.8	0.51	4.2
2013	11.7	11.7	0.50	5.5
2014	18.5	18.5	0.52	6.2
2015	3.8	3.8	0.53	2.8
2016	7.0	7.0	0.53	-1.6
2017	12.0	12.0	0.53	0.8
2018	45.2	45.2	0.53	1.9
2019	46.1	46.1	0.54	2.3
2020	15.0	15.0	0.54	-1.9
2021	41.3	41.3	0.54	3.4

Source: CBN Statistical Bulletin (2022)

The rate of growth of selected macroeconomic variables were depicted in Table 2.4 where GFCF recorded double digit growth for most of the periods with occasional negative growth. The situation is the same for broad money supply for the monetary sector but recorded only a negative growth of -11.9% in 2007. Also, Table 2.4 shows that the Nigerian economy has average performance in human development index most especially in the last ten years while real growth rate has consistently remained single digit with exception of 2002 with growth rate of 15.3% and a negative growth in 2016 and 2020 occasioned by oil price slump and covid-19 pandemic outbreak.

METHODOLOGY

Theoretical Framework

The study is anchored on the variant of neoclassical model developed by Jorgensen (1963) and expanded by Hall and Jorgenson (1967). At its heart, the Jorgenson's investment model is based on the idea that there exists an optimal capital stock in which economic actors like firms invest and disinvest in order to reach the optimal capital stock. In this regards, investment can be separated into replacement and net-investment. While replacement investment serves the purpose to replace depreciated capital, net-investment actually reflects changes to the capital stock. The interest in the Jorgenson model is the aspect that link it with taxation through economic agents' decision, which is influenced by the changes in tax (Myles, 2009).

Accordingly, the Jorgenson model is modified to include relevant variables to address the objective of the study as follows.

$$PI_t = \alpha X_t + \alpha_1 Z_t + \delta_2 PI_{t-1} + \alpha_i + \varepsilon_t \ldots\ldots\ldots\ldots(1)$$

Equation (1) is similar to that used in prior studies as for instance, Ndikumana (2000) in a study on SSA countries. Intuitively therefore, PI denotes private investment, Xt is a vector of fiscal policy such as personal income tax, value added tax, corporate tax, petroleum tax etc Whilst Zt stands for vector of macroeconomic variables which include real growth rate, interest rate, inflation rate and exchange rate that are believed to condition the inflows of investment, PI is a one period lag of private investment. Likewise, δ is a stability coefficient in the range $0<\delta<1$and εt is a stochastic error term.

Model Specification

The study employs a linear model similar to that developed by Babu, et al., (2020) and Hakim, et al., (2022) in analyzing the effect tax structure on gross fixed capital formation.

Effect of Tax Structure on Investment

The model of tax structure-investment nexus is specified as follows:

$$GFCF = f(PPT, CIT, VAT, TET, SDT, GDP) \ldots\ldots\ldots\ldots(2)$$

In stochastic log form, equation (3.2) is estimated as follows:

$$InGFCF_t = \alpha_0 + \alpha_1 InPPT_t + \alpha_2 InCIT_t + \alpha_3 InVAT_t + \alpha_4 InTET_t + \alpha_5 InSDT_t + \alpha_6 InGDP_t + \mu_t \ldots\ldots\ldots\ldots(3)$$

Where: GFCF denotes gross fixed capital formation, PPT = petroleum profit tax, VAT – value added tax, TET, tertiary education tax, SDT refers to stamp duty tax while GDP is the gross domestic product at 2010 constant prices. All variables are measure in millions. α0, α1 – α6 are constant and coefficients to be estimated and t is the time trend while μ is the white noise error term. A positive relationship is expected to exist between investment and tax components.

Estimation Technique and Procedure

The study employed the parsimonious error correction technique for the purpose of presenting the findings in short and long run. From equations 3.3

Let Yt = f(Xi)

$$Y_t = f(X_i) \ldots\ldots\ldots\ldots(6)$$

Where Y represents the respective dependent variables, X is the explanatory variables while i = 1, 2, ….,6. Accordingly, the error correction Term (ECT) of equation 3.6 is estimated as follows:

$$\Delta InY_t = \sigma_0 + \sum_{i=1}^{K} \sigma 1i \Delta InY_{t-1} + \sum_{i-1}^{K} \sigma 2i \Delta InXi,_{t-1} + \lambda ECT_t \ldots\ldots\ldots\ldots(7)$$

The ECT_{t-1}in equation 6 is the error correction term and λ signifies the speed of convergence to the equilibrium process. It is used to ascertain the stability of the parameters using the cumulative sum of recursive residuals (CUSUM) and or cumulative sum of square of recursive residuals (CUSUMSQ) whose model is detail in Brown, et al., (1975). It should be emphasized here that equation 7 has two components namely, the short run and the long run components. Thus, the part of the model carrying Δ is the short run while λ which is primarily the speed of adjustment is also a long run component in that it is derived from the residual of the long run dynamic estimate.

Unit Root Test Analysis

The essence of this test is to ensure that the series are all integrated of order 1 as a precondition for the Johasen and Juselius (1990) test. For an ECM test to be conducted, the variables must be co-integrated. Therefore, a cointegration using the Johasen and Juselius requires that all variables must be integrated

of order 1 to avoid a breakdown of the model as well as spurious regression. Accordingly, the Augmented Dickey Fuller (ADF) test is estimated as follows:

$$\Delta Y_t = C_i + \omega Y_{t-1} + C_{2t} + \sum_{t=1}^{p} di\Delta Y_{t-1} + \varepsilon t \qquad (7.1)$$

Where yt = relevant time series; Δ = first difference operator; t = a linear trend and εt = error term.

RESULT AND DISCUSSION

Table 1: Results of Variance Inflation factor (VIF)

Variable	Coefficient	VIF
Constant	141.29	NA
LPPT	0.60	4.25
LCIT	1.13	8.86
LVAT	0.17	4.64
LTET	1.13	6.65
LSDT	0.01	1.65
LGDP	0.18	4.64
LM2	3.82	3.82
LHDI	13.64	7.67

Source: Extracted from Eview 12

The aim of Table 4.1 is to ensure that the independent variables are not saddled with the presence of multicollinearity where they tend to influence one another rather than influencing the dependent variable. This situation could bias the findings with the possibility of misleading conclusions. The VIF therefore leads support to the outcomes of correlation matrix. According to the rule of VIF, a value between 1 and 5 indicates moderate multicollinearity in the variables and should be included in the model. Although, some authors have suggested that a VIF value of less than 10 is acceptable while a value above 10 is an indication of high multicollinearity and is therefore a cause for concern (James et al., 2013). Accordingly, all nine variables, particularly the six regressors, exhibit absence of multicollinearity and are therefore included in the models.

Table 2a: Unit Root test results without structural break

Augmented Dickey Fuller Test				Phillips-Peron (PP) Test		
Variable	Level	First Diff	Order	Level	First Diff	Order
LGFCF	-1.67	-4.35	1	-1.79	-4.42	1
LM2	-0.43	-4.43	1	-0.68	-4.27	1
LHDI	-3.44	-8.29	1	-3.42	-8.60	1
LPPT	-1.52	-7.12	1	-1.44	-12.23	1
LCIT	-2.02	-6.47	1	-2.02	-25.31	1
LVAT	-2.41	-5.23	1	-3.50	-8.21	1
LTET	-4.70	-6.29	1	-5.42	-7.19	1
LSDT	-0.92	-4.35	1	-0.96	-5.38	1
LGDP	-3.56	-3.74	1	-1.43	-3.64	1
C.V = 5%	-3.54	-3.55		-3.54	-3.55	

Source: Author's computation using Eview 12.0

In Table 2a, the usual unit root test without structural break is presented at 5% level of significance using the ADF and the PP test statistics. The test reveals that at level, all the variables exhibited the presence of unit root and were said to be non-stationary. At first differencing, stationarity was achieved for the variables. Although, Table 4.2a indicated that the variables observed the presence of unit root at levels and became stationarity at first differencing, it is possible for traces of unit root to still present with the variables even after stationarity is achieved at further level of differencing as a result of structural changes normally occasioned by regime change. This why Perron (1989) noted that structural change that may have occurred in an economy is synonymous with unit root and therefore closely related. Hence, we are not unmindful of the fact that conventional unit root tests may be biased toward a false unit root null when the data are trend stationary with a structural break. This observation has spurred development of a large literature outlining various unit root tests that remain valid in the presence of a break (see Hansen, 2001).

Therefore, Table 2b presents unit root test with structural break using the Zivot-Andrew unit root test. The Table reveals different break dates for both the level and first differencing which according to Perron (1989) is the start date of new administration where a number of macroeconomic variables experience some sort of shocks. Therefore, Table 4.2b indicates that none of the variables were stationary at level but at first differencing, they became stationary with different break dates, an outcomes that coincide with the standard unit test in Table 4.2a.

Table 2b: Zivot-Andrew Unit Root Test with Structural Break

Variable	Level	Break Date	First Diff	Break Date	Order
LGFCF	-3.53	2006	-5.13	1997	1
LM2	-2.11	2017	-5.40	2012	I
LHDI	-3.32	2009	-8.11	1991	1
LPPT	-2.89	2010	-7.56	2000	1
LCIT	-3.92	2015	-9.56	2010	1
LVAT	-4.56	2020	-10.44	1994	1
LTET	-3.89	2013	-6.67	1992	1
LSDT	-4.36	2010	-5.44	1995	1
LGDP	-4.20	2009	-6.40	2001	1
Test critical value 5% = -4.86					

Source: Author's computation using Eview 12.0

Since unit was trended out at first differencing, our concern is on the break dates of the second differencing. Accordingly, the break dates coincide with different economic, social and political events in Nigeria in the period of review. For instance, in the year 1991, General Babangida created additional two states of Delta and AkwaIbom States bringing the number of States in Nigeria to 30 States structure while 1992 was the aborted Third Republic in Nigeria. Likewise, the Interim National Government of Chief Ernest Shonekan who took over from IBB in August 1993 and the eventual overthrown by General SaniAbacha same year altered a number of economic and social activities all through 1994 to 1995. In 1997 the transition to civil rule that heralded the Fourth Republic of the current democratic dispensation by General AbdusalamiAbubakar was already in earnest. The years 2000 and 2001 were in the administration of President Obasanjo who was gradually settling down from many years of military rule. In 2010, President Jonathan was sworn in to replace late President Yardua while in 2012, the Nigeria economy was struggling to recover from the global economic and financial crisis occasioned by the United States housing bubble that had spiral effect across several capital markets around the world.

Co-integration test

This test conducted in Table 3 is carried out using the trace and the max-eigen statistics which are compared primarily with 5% level of significance. The Trace or the Max-eigen values must exceed the chosen level of the test for co-integration to exist between the dependent and the explanatory variables. If at least a co-integrating relation is found with either of the two statistics, long run relationship still exists between the relevant variables.

Table 3: Johasen co-integration test

Trace Statistics				
Hypothesized no of CE(s)	Eigen value	Trace Stat	5%	1%
None**	0.71	149.5	124.2	133.6
At Most 1**	0.69	107.5	94.2	103.2
At Most 2*	0.61	69.8	68.5	76.1

At Most 3	0.41	38.2	47.2	54.5
Max Eigen Statistics				
Hypothesized No of CE(s)	Eigen value	Max-Eigen Stat	5%	1%
None	0.71	42.1	45.3	51.6
At Most 1	0.67	37.5	39.4	45.1
At Most 2	0.61	31.7	33.5	38.8
***(**) denotes rejection of the hypothesis at the 5%(1%) level**				

Source: Author's computation using Eview 12.0

Therefore, Table 3 reveals that Trace test indicates three co-integrating equations at the 5% level and two co-integrating equations at the 1% level while max-eigen statistics did not indicate any co-integrating relationship (see appendix 4a for details). However, since the trace reveals evidence of co-integrating equations, there is a long run relationship between gross fixed capital formation and tax structure (petroleum profit tax, company income tax, value added tax, tertiary education tax and stamp duty tax) as well as GDP.

Long run estimation of GFCF and tax structure in Nigeria

As a result of long run relationship between the variables the long run model is therefore estimated using the fully modified ordinary least square (FMOLS) regression in order to eliminate any traces of serial correlation. This effort is complemented by estimating the variables at their level of stationarity so that the findings are not biased arising from autocorrelation problem. From the results in Table 4.4, all the independent variables account for 98% variation on the level of investment in Nigeria during the period of analysis. Specifically, petroleum profit tax exerted positive relationship with gross fixed capital formation but is statistically insignificant.

Table 4: Long run estimation of GFCF and tax structure

Method: FMOLS

Dependent Variable: LGFCF

Variable	Coefficient	Std error	t-statistics	Probability
Constant	-7.77	3.86	-2.01	0.05
LPPT	0.10	0.07	1.49	0.15
LCIT	0.29	0.12	2.55	0.02
LVAT	0.54	0.12	4.85	0.00
LTET	0.04	0.26	0.16	0.88
LSDT	-0.06	0.02	-2.67	0.01
LGDP	1.02	0.39	2.58	0.02
$R^2 = 0.98$,				

Source: Author's computation using Eview 12.0

This simply implies that any increase in petroleum profit tax is supposed to result in corresponding increase on the level of investment in Nigeria but because the variable is statistically insignificant this relationship could not be felt by investment during the period of review. This is contrary to the findings of Alves (2019) who established significant negative relationship between oil tax revenue and investment in OECD countries and Oladipo, et al., (2021) who had earlier reached significant positive relationship in Nigeria.

Meanwhile, it was observed from the results that a significant positive relationship exists between company income tax and gross fixed capital formation. A 1% increase in company income tax leads to 0.29% increase in gross fixed capital formation in the long run during the period under review. The result gives credence to the findings of Oboh (2021) in Nigeria.

Similarly, value added tax exert positive and significant effect on gross fixed capital formation. For instance, a 100% increase in value added tax leads to 54% increase in gross fixed capital formation in the period under consideration. However, the study is contrary to the significant negative findings by Babu, et al., (2020) in SSA countries. Meanwhile, the study did not support Uchime and Achichebe (2019)'s study who failed to established significant relationship.

Likewise, tertiary education tax had positive but insignificant influence on gross fixed capital formation which implies that the positive relationship has no impact on investment during the period under consideration.

The results in Table 4 also indicate that the effect of stamp duty tax on gross fixed capita formation is negative but statistically significant. This means that changes in stamp duty tax during the period had inverse relationship with the level of investment in Nigeria in the long run. For instance, a unit increase in stamp duty tax reduces investment by 0.06% and vice versa in Nigeria.

Finally, the impact of gross domestic product on investment level in Nigeria is positive and statistically significant. Its coefficient of 1.02 implies that a unit increase in GDP during the period led to 1.02% increase in gross fixed capital formation. This is similar to the findingsof Kumai (2020).

Table 5: Short run estimation of GFCF and tax structure

Method: Least squares

Dependent Variable: ΔLGFCF

Variable	Coefficient	Std error	t-statistics	Probability
Constant	0.15	0.05	2.84	0.01
ΔLGFCF(-1)	0.29	0.18	1.61	0.12
ΔLPPT	0.11	0.05	2.02	0.05
ΔLCIT(-1)	-0.10	0.07	-1.45	0.15
ΔLVAT	-0.03	0.06	-0.56	0.58
ΔLTET(-2)	0.11	0.11	1.04	0.31
ΔLSDT(-1)	-0.03	0.02	-1.34	0.19
ΔLGDP(-2)	-0.50	0.63	-0.78	0.44
ECM(-1)	-0.29	0.12	-2.39	0.03
Diagnostic test (p-value in parenthesis)				
R^2	0.39			
DW-Stat	2.08			
F-Stat	1.95			
Jarque-Bera (Normality) F-Stat	0.35(0.84)			
Breusch-Godfrey Serial correlation F-stat	0.70(0.51)			
ARCH LM F-Stat	0.64(0.74)			
Ramsey Reset (misspecification) Test F-stat	0.00(0.95)			

Source: Author's computation using Eview 12.0

A battery of diagnostic tests were conducted on the variables to ensure a spurious free regression. It is observed that all the explanatory variables account for 39% variation on the level of investment in the short run in Nigeria. Likewise, the result reveals that the model is statistically significant as indicated by the F-statistic even it shows that serial correlation is also not a problem. This is further supported by normality test, serial correction test, ARCH test as well as Ramsey reset. Also conducted is the plots of CUSUM and CUSUMSQ tests for model stability in Fig 1a and Fig 1b. The tests showed that the model passes the diagnostic tests as indicated by their p-values and is satisfactory.

Fig 4: Stability test (CUSUM Plot)

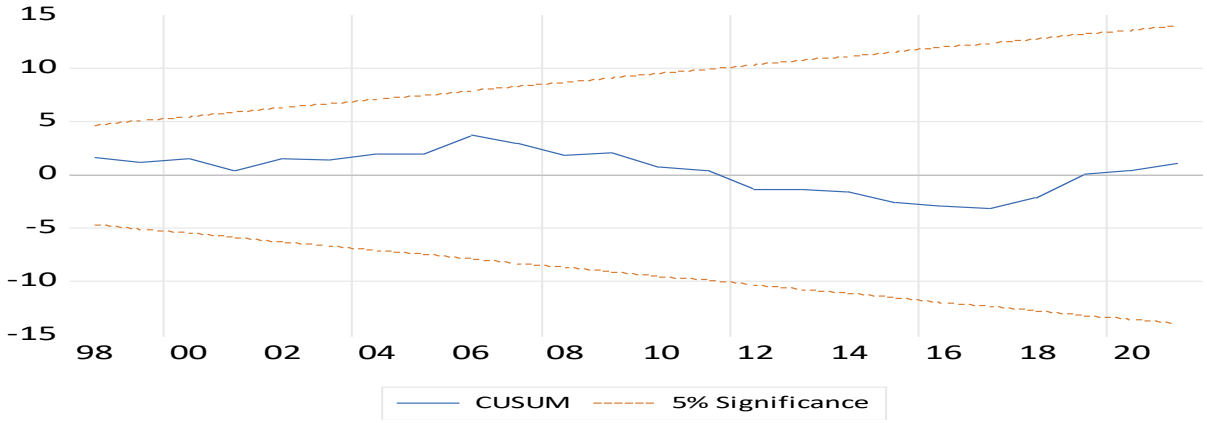
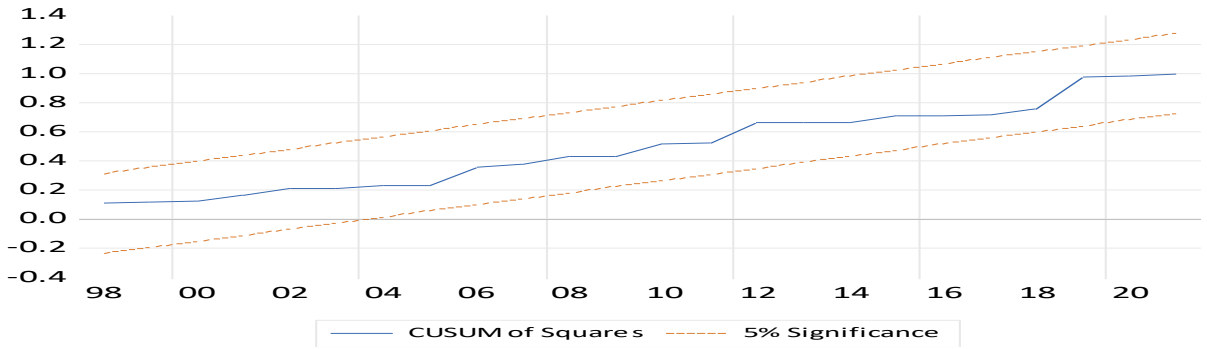


Fig 4b: Stability test (CUSUMSQ Plot)



Accordingly, Table 7 reveals that the impact of previous year lag of gross fixed capital formation on current GFCF is positive but statistically insignificant in the short run. A cursory look at the Table indicates that petroleum profit tax and tertiary education tax had positive relationship with investment while company income tax, value added tax and stamp duty as well as GDP exerted negative impact on investment in Nigeria in the short run. However, only petroleum profit tax is statistically significant in affecting gross fixed capital formation in the period of review. This means, besides petroleum profit tax, changes in all the independent variables had no noticeable effects on the level of investment in Nigeria in the period of the study. For instance, a 100% increase in petroleum profit tax led to an increase in gross fixed capital formation by 11% in the short run. This is similar to the findings of Ibrahim, et al., (2022) in Nigeria and by Halim and Rahman (2021) using data from Brazil, India and Russia.

Finally, the ECM observes the usual negative association and is statistically significant. This development is usually regarded as normal as long as the dependent and the independent variables are observed with co-integration relationship. The ECM has a speed of adjustment of 29% with which disequilibrium is corrected between the short and the long runs.

CONCLUSION

The study examined the link between tax revenue and investment in Nigeria. In order to achieve thisobjective, the study modelled gross fixed capital formation as a proxy for investment as a dependent variable while; Petroleum Profit Tax (PPT), Value Added Tax (VAT), Tertiary Education Tax (TET), Stamp Duty Tax (SDT) and Gross Domestic Product (GDP) at 2010 constant price were the independent variables. A major finding of the study is that non-oil sector is more reliable as a source of revenue generation for government as it can guarantee stable flows of funds in an attempt to build the country gross fixed capital formation thereby attracting real investment as against the current emphasis being placed on revenue from petroleum profit tax. This is predicated on the fact that global prices of oil are highly volatile which tend to severely affect revenue from crude oil sales at the international market.

The importance usually attached to investment is its ability to generate employment, expand productivity and increase output thereby guaranteeing sustainable consumption in the long-run through application of economic productive factors encompassing both new and old technological production processes. This allows the creation of more products both for exchange markets as well as more opportunities that are being intensified for the trade of previous investments. This is because investment decisions can improve the older production processes through efficiency gains by allowing the creation of more added value.

However, the ways and manners by which the state apply taxation can jeopardise investment decisions in that as the government levies taxes on the private side of the economy, both private consumption and investment will tend to decline. This is even more so particularly if the increase in revenues from both income and consumption taxes are mainly from the private-side of the economy. Accordingly, there will be a reduction in the level of aggregate

consumption thereby decreasing the profitability of investment. Therefore, the major conclusion that can be drawn from the study is that the Nigeria's government while trying to use tax a source of revenue generation should endeavor to maintain a balance bearing in mind sustainable tax rate and consumption demand most especially private sector demand.

RECOMMENDATIONS

Arising from the findings, the following recommendations are proffered with the aim at tackling issues relating to gross fixed capital formation and tax revenue in Nigeria.

Firstly, government should diversify the economy away from oil to non-oil since revenue from non-oil sources are relatively more stable.

Secondly, government is advised to beam its search light in the direction of non-oil revenue particularly stamp duty tax which has shown more promising than other tax variables in our findings.

Finally, government may consider a broad-based tax policy aimed at expanding the tax revenue where all key areas of the tax system are reorganized with measurable results. This involves focusing on such areas such as ease and simplicity of implementation, making efficiency and transparency a priority and ensuring that the more challenging aspects of the tax administration are postponed until positive results are recorded.

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