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Impact of Tax Revenue on Income Inequality and Poverty in Nigeria

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Abstract

This study is on the impact of tax revenue on income inequality and poverty in Nigeria from 1995 to 2022, variables used are total tax revenue as the independent variable, poverty rate and income inequality proxy by Gini coefficient as dependent variables. Multiple taxation, corruption, value added tax, policy failures and inefficient fiscal operations are identified by this study as contributive factors to income inequality and poverty in Nigeria. The findings revealed that the relationship between total tax revenue and poverty rate is positive (as against apriori expectations). The estimated results are R^2 at 0.626243 and adjusted R^2 0.588253 which are the coefficient of determination or explainability of the independent variable (TTR) for the dependent variable (GIN), 63% of the changes in the dependent variable (GIN) is caused by changes in (TTR). The study concluded that tax revenue has a significant positive impact on poverty rate and income inequality in Nigeria. Major recommendations are that the Ministry of Finance, the Federal Inland Revenue Service (FIRS) the state board of Internal Revenue Service, the Joint Tax Board (JTB) should improve the dividend of taxation through accountability, transparency, better revenue generation and tax revenue expenditure on infrastructure and basic services.

Keywords

gini coefficient, fiscal operations, tax revenue, poverty reduction, income tax

1. Introduction

There seems to be a relationship between tax revenue, income inequality, poverty rate and economic growth, which this study is set to establish. The role of government in regulating economic activities can be traced back to Keynesian Economics. In the Keynesian approach, public spending may increase the aggregate demand which further stimulates economic growth and employment. Although reduction in government expenditure may adversely affect the economy, yet excess of government expenditure due to increase in recurrent expenditure or unproductive use of the collected tax in the economy creates fiscal deficit (Tavwa, 2022; World Bank, 2022). Oyeranti and Ishola (2012) stated that fiscal policy in any economy is the mechanism through which revenue collected through taxes by the government is manipulated in such a way that the performances of some basic macroeconomic variables such as aggregate income, aggregate demand, aggregate employment and aggregate investment among others are enhanced. The important issue in income redistribution is that some people are worst-off while others are better-off in the distribution of income which is measured by the share of their disposable income that is spent on consumption and investment expenditure (Idoko & Abu, 2021; Obiora & Otulugbu, 2019). Income inequality which is the concern of income redistribution is fundamentally a summary statistic of the dispersion of income among individuals (Okatch, Siddique & Rammohan, 2013). The concept of income redistribution through tax pay as you earn (PAYE) emphasizes the need for ensuring equality in the distribution of income or wealth measurement of individuals or households which connotes equal sharing of the burden of a tax. It is a way of comparing the gap in household incomes in a given region, country or world. According to Oboh and Eromonsele (2018), the Gini coefficient is one of the most commonly applied measures of inequality and it measures the degree to which the Lorenz curve departs from the line of equality. It measures the extent to which income or in some cases, consumption among individuals or households within an economy deviate from a perfectly equal distribution.

Poverty is a multidirectional macroeconomic problem because it denotes every negative that limits households' access to basic necessities of life. It is a major phenomenon in developing countries with different dimension that affects all facets of human life. Poverty in Nigeria is partly a feature of high inequality which manifests and it is characterized by unequal income distribution and limited access to basic infrastructure, education, training and job opportunities. Poverty a condition in which an individual or household is unable to cater for basic needs of food, clothing, and shelter, lack of skills, gainful employment, and self-esteem. Jamal, Sani, Muhammad and Abdulwahab (2018) asserted that poverty can be considered as a "virus" which extends widely among populace in Sub-Saharan African countries. Dapel (2018) observed that in many low and middle income countries, poverty and its consequences such as malnutrition and hunger are aggravated by global challenges such as rapid population growth, insecurity, bad governance and poor quality of institutional leadership as in the case

of Nigeria, and climate change, which exacerbate the vulnerability of poor people and hinder rural development.

Available statistics revealed that poverty remains a challenge in Nigeria. Many households in the country are exposed to widespread poverty and the gap between the rich and the poor keeps increasing daily partly because the poor are subjected to the payment of higher taxes, especially tax on goods and services owing to the rising challenge of inflation.

Taxes generally are withdrawals from the circular flow of income, as such they limit savings and consumption owing to the effects on disposable income, Mehmood and Sadiq (2010) pointed out that tax as a fiscal policy instrument can help reducing poverty in the long run through increase in productivity and employment. Park (2011) reported that taxes and social transfers can have immediate effect on income, but that inequality can be addressed by taxation, social transfer and social expenditure, yet whether and to what extent tax revenue should be used as an instrument for income redistribution remains a challenge in developing economies. The impact of tax revenue in redistributing income in Nigeria lies on the fact that income is not evenly distributed, hence the existence of the element of dualism; the rich and the poor syndrome, the formal and the informal sector of the economy. The informal sector is difficult to tax.

Tax revenue is expected to serve as a tool for redistributing income between the rich and the poor or between the "have" and "have not" partly because the primary goal of developing countries is to promote equality in income distribution. Thus, the assumption is that an increase in tax revenue will increase the rate of economic growth through its multiplier effects on investment in the provision of public goods and services thereby increasing the per capita income of households, which leads to a higher standard of living. Taxation is seen as a burden which every citizen must bear to sustain his or her government because the government has certain functions to perform for the benefits of those it governs (Dennis & Okoye, 2014; Aigbokhan, 2019). The basic needs approach argues that tax revenue can be used for the provision of basic infrastructure such as electricity, roads, health care, education, housing, water and sanitation, which could enhance inclusive growth and development in the economy.

Contrary to this theoretical postulation, realities on ground indicate that although taxes such as income tax, company tax and value added tax among others have being on the increase in Nigeria, and the Federal Inland Revenue have also made pronouncements of Nigeria's increase earnings from taxes as tax revenue, the income is not evenly distributed because both the rich and the poor pay for goods and services that have been taxed which also suggests that the poor bear more tax burden than the rich. Iheonu and Urama (2019) observed that Nigeria has the highest rate of extreme poverty in the world, with 86.9 million Nigerians living in extreme poverty. The increasing number of poor people in the developing economies is macroeconomic challenge that demands immediate attention. The World Bank (2018) reported that poverty kills about 25000 children each day especially in some of the poorest

villages on earth. About 2.8 billion of the world population lives on less than $2 daily and about 1.4 billion live on $1.9 per day. The poverty situation in Nigeria no doubt has a strong positive relationship with corruption which is endemic in the country. More so, despite the increasing revenue from tax, the rate of poverty in the country has not reduced. Olaoye, Ogundipe and Oluwadere (2019) asserted that government should increase its value added tax because it has the potential of improving the economy of Nigeria, which suggests that high VAT revenue could lead to equality in income distribution and reduced poverty.

Nigeria has one of the lowest revenue-to-GDP ratios in the world. This has made its fiscal operations highly dependent on deficit financing, external debt and vulnerable too. Tax is considered as one of the main sources of revenue in developing economies, including Nigeria. Over the years, revenue derived from taxes (by the federal, state and local governments) has been very low, amidst rising challenge of income inequality and extreme poverty among many households which seems to suggest that the impact of the taxes collected on the poor is yet to be properly felt. This is caused by inefficiency in fiscal operations and multiple taxations. The authorities have adopted a national plan aiming to raise the tax revenue-to-GDP ratio to 15 percent by 2025 (BOF, 2022), which means that if policy measures are not carefully implemented, more people will drop into poverty by 2025.

Access to electricity, public transportation has drooped consistently in the past ten years with recent hike in school fees for public schools. Consequently, there is high rate of tax evasion and tax avoidance in the country. Although taxes such as income tax, company tax and value added tax among others have been on the increase in Nigeria, the poor seems to be worse off. The Federal Inland Revenue Service has also made pronouncements of increased earnings from taxes as tax revenue, the increasing rate of inequality in income distribution as attested to by the increasing rates of poverty in the country is an indication that the income earned as tax revenue has not been evenly distributed. The increases in the rate of value added tax (VAT) also suggest that the poor bear more tax burden than the rich.

The rising prices of goods and services in the country even when there has been an increase in taxes like the value added tax (VAT) on essential services like electricity(electricity tariff) have left the majority poor worst-off. This may be attributed to the fact that when people pay a greater share of their income as tax and such revenues are not invested in economic activities that will affect them directly, disparity in income distribution has become the order of the day.

It seems as if the introduction of the pay as you earn form of tax that aims at ensuring equality in income in Nigeria is not yielding the desired result as both the rich and the poor go to the same markets where inflation has become their major feature. This scenario if allowed to continue may have serious consequences on individuals and the economy as a whole. Despite this challenge, there seems to be paucity of empirical studies on the effect of tax revenue on income inequality and poverty in Nigeria. This indeed is the motivation for this research.

Conceptually, tax is a compulsory levy imposed on the profit, income and gains of individuals, firms and other entities by the agencies of government in other to raise revenue for government expenditures. Value added tax is the tax on spending/consumption levied at every stage of a transaction but eventually borne by the final consumer of such goods and services in Nigeria. Income is one of the determinants of wellbeing (Eneji, Onouha, & Dickson, 2019), be it government income, personal income or company income. Contextually, inequality is a state or condition of being unequal in income and other resources amongst persons, groups, geopolitical zones or regions, countries or states... Afuberoh, Akhor and Okoye (2014) stated that tax is a fiscal instrument used to encourage or discourage specific production or consumption behaviors that affect the economic, political, environmental or social sustainability. Similarly, Obiora and Otulugbu (2019) maintained that custom excise duties, in the form of tariffs, petroleum profit tax, company income tax and value added tax impact significantly on income inequality in Nigeria. The broad objective of a tax system is to guarantee the long-run fiscal soundness of the policies and programs of government, while the purpose of tax administration is to fully implement the tax system. Government can also increase or decrease the rates of tax, increase or decrease the rate of capital allowances (given in lieu of depreciation) to encourage or discourage certain industries (e.g., in the area of agriculture, manufacturing or construction) or may give tax holidays to pioneer companies. Income tax therefore can be used as an instrument of social and economic change if employed as a creative force in economic planning and development. Ogbonna and Appah (2012) assert that the main aim of taxation is to raise income to finance government expenditure and to redistribute riches and the management of the economy. Income redistribution therefore entails the use of fiscal policy measures such as tax to ensure that a certain segment of population is not worst-off in terms of money value. Theoretically, the Kuznet's curve shows that inequality follows an inverted-U shape with economic development, rising in initial stages of industrialization and declining with subsequent development. Consequently, there are good economic reasons for emphasis to be given to this subject. This implies that not only does high inequality lead to higher poverty levels at current income levels, but it constitutes a barrier to poverty reduction.

Paulus, Figori, and Sutherland (2009) conducted a study on the effect of tax benefits on income distribution. They showed the major ways in which governments can use the system of cash benefits and personal incomes taxes to influence income distribution. They pointed out that taxes tend to be progressive, and hence, individuals with higher incomes pay a higher percentage of their earnings as tax. They found that in reducing income inequality of main income, tax and benefit play major roles. Their study is relevant to this research because it captures tax and income distribution which, but the scholars failed to also examine its effects on poverty which is one of the objectives of this study.

Sameti and Rafie (2010) investigated the interaction of income distribution, taxes and economic growth

in Iran and some selected East Asian Countries. Using a panel data regression for data gathered from 1990-2006, the findings of the study showed that government expenditure ratio to GDP with two lags have a significant negative effect on Gini coefficient. Also, the effect of indirect taxes on income inequality was found to be negatively insignificant. Liu (2011) studied regressive impact of indirect tax incidence and the economic management of the inequality of residents' income, used data to estimate the indirect tax regressive index and found that the regressive nature of VAT and consumption tax is reasonably strong and therefore, they widen the income gap on varying degrees. Their study is relevant since it focused on indirect tax like VAT which is one of the objectives of this study. However, the study failed to examine its impact on poverty.

Park (2011) examined taxes, social transfers, and income inequality. The study found that taxes and social transfers can have immediate effect on income. The study concluded that inequality can be addressed by taxation, social transfer and social expenditure. The study is relevant to this present study because it examines taxes and income inequality, but the scholar did not examine its effects on poverty.

Sacchi and Salotti (2011) investigated the relationship between fiscal decentralization and regional inequalities using a sample of 23 OECD countries for the period 1971-2000. They explored the impact of fiscal decentralization on income inequality. Their aim was to ascertain if regional economic disparities have effect on the fiscal decentralization process. Their results showed the significance of both the nature of fiscal decentralization- expenditure versus taxation and of the degree to which responsibility and decision powers are actually left to sub-central government. Their study is relevant to this study because it concentrated on inequality, but while the researcher used OECD countries, this study uses Nigeria.

Attinasi, Checherita, Westphal, and Rieth (2011) examined "personal income tax progressivity and output volatility: Evidence from OECD countries" over the period 1982 to 2009. Their measure of tax progressivity was centred on the variation between the marginal and average product of workers. They found significant empirical evidence for the hypothesis that greater personal income tax progressivity results to lower output volatility. This study is relevant since it was on tax, but the research examined its effect on output volatility while this study will examine its impact on income inequality and poverty in Nigeria. Rodrigo and Ivanna (2010) examined equity and fiscal policy, focusing on the distributional impact of taxes and social spending of Central America countries and the study revealed that the income distributional effects of taxes are regressive but in an insignificant manner. They further stated that increasing taxes and channeling the revenue to social spending would undoubtedly enhance the income of even the poorest family units. This study is relevant to the present research because tax revenue is a fiscal policy that has distributive effect. However, while the study was carried out in Central America, this study will focused on Nigeria.

Furthermore, Sekwati and Malema (2011) investigated the potential impact of VAT in Botswana on households' consumption expenditure behavior. The findings found that the increase in VAT rate increased prices of goods and services, and that the poor households were more adversely affected owing mainly to their higher marginal propensity to consume. The impact was negligible on the middle and upper income classes because these income groups have relatively degrees of freedom to adjust their consumption patterns in response to the increase in VAT. This study is relevant to the present research because it was on VAT, but while the scholars focused on its effect on consumption, this study will examine how it affects income inequality and poverty in Nigeria.

Martinez-Vazquez, Moreno-Dodson, and Volovic (2012) examined the effect of company tax on income inequality. The study used company income tax variable with globalization index to account for dimension of company income tax. They found in a closed economy one percentage point increase in ratio of company income tax to GDP decreases income inequality by 0.7 percent point. Thus, this negative effect on income inequality will be lesser the more opened an economy is. 10 point rise in the globalization index, decreases negative effect of company income tax on income inequality by 0.1 percentage point. In general, their study showed the likely role that taxes and public expenditure policies play in affecting income distribution, that progressive personal income taxes and corporate income taxes reduce income inequality. The study also found that indirect taxes such as general consumption taxes, excise taxes and customs duties have a negative impact on income redistribution. Their study concluded that there is significant effect of both taxes and public spending on income distribution when they are considered jointly. This study is relevant to the research because it was on income inequality, but the focused was on company tax, not tax revenue generally which is the aim of this study.

Ramot and Ichihashi (2012) examined the effects of tax structure on economic growth and income inequality. They used a panel data set of cross national data of 65 countries for the period 1970-2006. The study found that statutory corporate income tax rate has a significant negative relationship with economic growth and income redistribution by controlling for various other variables of growth and income inequality. They however, stated that personal income tax rates have no effect on economic growth and on income inequality. Also in their findings, they classified the countries into tax groups based on their average top statutory corporate income tax rates and found that, high company income tax rates, above 40% corresponded with lower income inequality also on the other hand; lower company income tax rates below 40% are not significant in reducing income inequality. This study is relevant to the current research because it captures tax revenue and inequality in income. However, while time series data covering 1970 to 2006 were used, this study will use time series data covering 1995 to 2019.

Afuberoh and Okoye (2014) studied the impact of taxation on revenue generation in Nigeria, with reference to FCT and some selected states in the country. The researcher adopted also primary sources of data to present and analyze the information for the study. The research found that, taxation had significant contribution to revenue generation; taxation had a significant contribution on Gross Domestic Product (GDP). The study recommended among others that well equipped data base on all tax payers should be established by the Federal, State and Local Governments with the aim of identifying all possible sources of income of tax payers for tax purpose and the tax collection processes must be free from corruption. This study on the impact of taxation in Nigeria is relevant to this research, but while the researchers used primary data and FCT as the study setting, this study will use secondary data and the study will be delimited to Nigeria as a whole.

Bastagli, Coady, and Gupta (2012) reviewed how fiscal policy can address income distribution in both developing and developed economies. They assembled a detailed database on post-tax and transfer income inequality for 128 developing and 22 developed economies. They found that fiscal policy can influence income inequality both indirectly through its impact on the future earning capacities on market income of individual and directly through its impact on current disposable incomes. They concluded that in developed economies, fiscal policy has played a significant role in redistribution, particularly on the expenditure side, also through income taxation progressivity. However, the developing economies need to improve their distributive influence of fiscal policy by improving their capacity to raise tax revenue and to spend those resources more equitable and efficiently. This study is relevant to the present research since tax is a fiscal policy. But, the researchers examined its effect on income distribution only, without assessing how it affects poverty.

Furthermore, Ilaboya and Ohonba (2013) examined the impact of direct and indirect tax on income inequality, their approach was country-specific using tax and macroeconomics data from 1980-2011. They employed multivariable econometric analysis approach to find the effect of taxation on income inequality in Nigeria. Their study found a significant negative relationship between total tax revenue to GDP and income inequality in Nigeria. This study is relevant to this research since it was on tax and income inequality, but while the scholars examined the impact of direct and indirect taxes on income inequality only, this study will go further to analysis their impact on poverty in Nigeria.

Maina (2017) investigated the effect of consumption taxes on poverty and income inequality in Kenya. The study used the OLS technique of data analysis. The findings confirmed that consumption taxes are regressive. Consumption tax is positively related to GDP per capita. The research recommended restricted use of differentiated rates. The differentiated rates should be well targeted to the poor; lower rates are to be applied on basic goods which the poor spend more of their income on, compared to the rich. It further recommended that Taxes collected can be utilized to provide essential facilities targeting the poor and that the government should ensure that the tax system is efficient and at the same time it

redistributes wealth. This study is relevant to the present research because it focused on tax, poverty and income inequality, the scholar concentrated on consumption tax while this study will focus on impacts of tax revenue and value added tax revenue on income inequality and poverty in Nigeria.

Oboh and Eromonsele (2018) examined the impact of taxation on income inequality in Nigeria. The study used a time series data for a period of 34 years ranging from 1980 to 2014. The Error Correction Model (ECM) was used to analyze the data gathered. The results revealed that indirect tax was found to be negatively related to income inequality in Nigeria, implying that indirect taxes help to redistribute income effectively. On the other hand, direct tax was found to have a positive impact on income inequality in Nigeria. This implies that direct tax widens the gap between the rich and the poor in Nigeria. The study concluded that indirect taxes reduce income inequality more in Nigeria. Flowing from the above research findings, the study therefore recommends that the government should put more efforts in its drive to ensuring compliance to tax payments since taxation has the potential to effectively remedy economic and social ills of the society such as income inequalities, regional disparities, just to mention a few. Therefore, indirect taxes should be given more drive by the government as indirect taxes help to reduce income inequality more in Nigeria. This study is relevant to the present work because it captures tax and income inequality, but its major deficiency is that it failed to assess its impact on poverty and the data used were limited to the period 1980 to 2014, while this study will capture time series data for 2019.

Afuberoh, Akhor and Okoye (2014) carried out a study on taxation as a tool for effective income re-distribution in Nigeria covering 1981 to 2014. The study used the Ordinary Least Square technique in analyzing the time series data. The results revealed that all tax variants do not exert significant impact on income disparity as observed by Gini Coefficient at 5% level. The study concluded that taxation has not be able to fulfill its role as a standard tool of income re-distribution in Nigeria and recommended that there is the need for effective, and equitable utilization of tax revenue, ensure that taxes create a more income-inclusive society by bridging the income disparity gap between the poor and the rich. This study is relevant to the current research since it focused on taxation as a tool for redistributing income which is the concern of income inequality. However, while the scholars used the error correction model (ECM), this study will use the OLS technique of analysis.

Kaisa and Jukka (2015) investigated the consequences of the introduction of Value Added Tax on Government revenue and inequality in developing countries. Their results, stemming from instrumental variable regressions, suggest that the adoption of VAT has helped to reduce income inequality little. Thus, suggesting that the move to the VAT has not undermined equitable development. Their results also revealed that there are some differences in the impacts of VAT across countries. This study on VAT is relevant to this research since it examined its effect on income inequality, but its major shortcoming is that it failed to assess its impact on poverty. Thus, VAT adoption has led to lower income differences

in more open economies. Fu (2016) conducted a research on a topic titled "does indirect tax increase the income gap between urban and rural areas?" The empirical analysis of commodity tax shows that Value Added Tax (VAT) has a negative effect on income gap between urban and rural areas. The study stated further that in general, indirect tax whose main body is VAT is worsening income distribution. This study is relevant to the work because it captures income inequality and VAT as a form of tax whose revenue contributes to tax revenue in the country, but it failed to examine its effect on poverty.

Ogundipe, Ogunniyi, Olagunju and Asaleye (2019) analyzed gender perspective of income inequality and poverty among sample of rural households in Southwest, Nigeria. Gini coefficient, Foster-Greer-Thorbecke (FGT) and Logistic regression model were used as techniques for data analysis. The study found that income inequality was lower among the male respondents than the female counterparts. A number of explanatory variables were considered, the following - educational years, household size, farming experience, market distance, extension access, credit access and member of social group represent important poverty drivers in the study area. The study revealed that reducing the number of dependent household members and ensuring ready availability and equal access to institutional facilities, basic amenities, credit facilities, and human capital development of rural households are some measures that could curb the menace of poverty. This study is relevant to this study since it was on income inequality and poverty, but while the scholars focused on its gender perspective, this study will concentrate on its effect on income inequality and poverty in Nigeria regardless of gender.

Mansi, Hysa, Panait and Voica (2020) conducted a study on poverty: A challenge for economic development: Evidences from Western Balkan Countries and the European Union. The aim of the study was to analyze the factors that impact poverty and compare these results between countries within the European Union and post-communist countries that include the Western Balkan (WB) countries: Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia covering the period 2009 to 2018. The method used consists of both descriptive statistics and multiple regression analysis using the fixed effect model. The results show that income inequality does indeed impact the further progress of poverty for both the EU and WB, while economic development in terms of GDP is shown to have a more significant impact on EU than in WB, where the most significant impact was through income per capita. Other factors such as education, investment environment, and especially unemployment also significantly impacted on decreasing the poverty rate in both economic zones. This study is considered relevant to the present research because it concentrated on poverty which is a variable in the study. However, while the scholars concentrated on the effect of poverty on economic development, this study will examine the impact of tax revenue on poverty as a macroeconomic variable in Nigeria.

Similarly, Omodero (2020) assessed the effect of value added tax (VAT) and customs and excise duties (CED) on consumption covering 2005 to 2019 using the OLS technique. The results indicated that VAT

insignificantly but positively affects consumption, while CED has a considerable auspicious influence on use. This result showed that VAT imposition on merchandises and services is discouraging the absorption of specific food stuffs and services and allowing the operation of informal economic activities to thrive in Nigeria. It was found that CED charges do not reduce the use of certain illegal products purposely taxed to discourage their consumption. This study recommended a reduction in the prices of food items and services to enable consumers to increase their patronage, while the products that attract CED but are harmful should be banned entirely. This study is relevant to the present

Work since it was on VAT as a form of tax that constitutes part of tax revenue. However, while the study examined its effect on consumption, this study will examine its effect on poverty and income inequality in Nigeria.

2. Methods

This research uses secondary and specifically time series data, (Schmidheiny, 1998; Venkatachalam and Bauer, 2010). The time series data were sourced from the publications of the Central Bank of Nigeria and Federal Inland Revenue Service (FIRS) website for various years. The study uses time series data for a sample period spanning from 1995 to 2022. The ordinary least square (OLS) method is adopted for data analysis, (Green, 2000; Gujarati, 2003).

2.1 Model Specification

The specification of the model here entails the functional and mathematical expression of the relationship between the proxies of the explanatory variable; total tax revenue (TTR) which is the combination of Value added tax revenue (VAT), company profit tax (CPT), income tax (ICT) and Gini Coefficient (GIN) as a measure or proxy for income inequality. Two models and four functions are formulated from the functional relationship theorized. Equation 1 measures the impact of total tax revenue on poverty in Nigeria. Poverty rate (PVR) is used as dependent variable. Therefore, the functional specification of the relationship between the explanatory variables and dependent variable in each of the model is as follows:

PVR=f (TTR) ---------- (1)

TTR = f (CPT, VAT, ICT) ---------- (2)

PVR= f (CPT, GIN, TTR) ---------- (3)

GIN =f (TTR) ---------- (4)

The specified functional relationship between the variables is transformed into the Multiple OLS regression modeling approach as follows:

$PVR= \beta_0 \_ \beta_1 CPT – \beta_2 GIN – \beta_2 TTR + \mu t$…….. (5)

$GIN = \beta_0 \_ \beta_1 TTR$ ---------- (6)

Equation (1) – (4) are expressions of the functional relationships. Equation (5) and equation (6) are the

two models being estimated.

Where:

PVR = Poverty rate

GIN = Income inequality proxy by Gini coefficient

TTR= Total tax revenue

CPT= Company profit tax

VAT= Value added tax

ICT = Income tax (PAYE)

β_0= Parameter denoting the intercept of the relationship between the explanatory and dependent variables

$\beta 1$-$\beta 3$ = parameters showing the slope of the relationship between each explanatory variables

μ_t = Error or linear stochastic term at time t used to capture other influencing factors on the dependent variables not captured in the model.

3. Results and Discussion

Table 1. Dependent Variable: PVR

Method: Least Squares				
Date: 12/08/23 Time: 19:50				
Sample: 1995-2019				
Included observations: 25				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	22.87975	8.948111	2.556936	0.0184
CPT	0.201269	0.151948	-1.324592	0.1995
GIN	0.822879	0.172029	4.783387	0.0001
TTR	0.001037	0.003537	0.293307	0.7722
R-squared	0.649374	Mean dependent var		56.52920
Adjusted R-squared	0.599285	S.D. dependent var		6.027450
S.E. of regression	3.815501	Akaike info criterion		5.661668
Sum squared resid	305.7190	Schwarz criterion		5.856688
Log likelihood	-66.77085	Hannan-Quinn criter.		5.715758
F-statistic	12.96430	Durbin-Watson stat		1.609497
Prob(F-statistic)	0.000052			

All computations in this analysis were done using Econometrics Views (E-Views version 10). Table 1 shows the result of ordinary least square estimate for equation 1. The objective was to evaluate any

significant relationship amongst the dependent variable (PVR) and three independent variables; CPT, GIN AND TTR. The apriori expectation for gini coefficient (GIN) as proxy for income inequality is positive, while that of total tax revenue (TTR) is negative. From the estimated results, the coefficient of GIN at 0.822879 confirms with economic apriori expectation while the coefficient of TTR at 0.001037 does not confirm with apriori expectation, and also insignificant at less than 1 percent. This result means that as total tax revenue increases, the poverty rate in Nigeria is also on the increase. The reason for this could be corruption and misappropriation of tax revenue for the period under investigation (1995-2019). The estimated results of the R2 at 0.649374 and adjusted R2 =0, 599285 are the coefficients of determination or explainability of the independent variables for the dependent variables. About 65 percent of the changes in the dependent variable (poverty rate) are caused by changes in CPT, GIN AND TTR which is a reasonable goodness of fit.

Table 2. Dependent Variable: PVR

Method: Least Squares				
Date: 12/08/23 Time: 20:52				
Sample: 1995-2019				
Included observations: 25				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	59.17898	1.749255	33.83096	0.0000
TTR	-0.007019	0.003521	-1.993444	0.0582
R-squared	0.747321	Mean dependent var		56.52920
Adjusted R-squared	0.610248	S.D. dependent var		6.027450
S.E. of regression	5.685491	Akaike info criterion		6.390330
Sum squared resid	743.4706	Schwarz criterion		6.487841
Log likelihood	-77.87913	Hannan-Quinn criter.		6.417376
F-statistic	3.973820	Durbin-Watson stat		0.973364
Prob(F-statistic)	0.058204			

Table 2 shows the result of ordinary least square estimate for equation 2. The objective was to evaluate the separate impact of TTR on t the dependent variable (PVR). A prior expectation for total tax revenue (TTR) is negative. From the estimated results, the coefficient of TTR =- 0.007019 confirms with a prior expectation, and also insignificant at less than 1 percent. This result means that as total tax revenue increases, the poverty rate in Nigeria decreases insignificantly for the period under investigation (1995-2022). The estimated results of the R2 at 0.747321 and adjusted R2 =0, 610248 are the coefficients of determination or explainability of the independent variable (TTR) for the dependent

variable (PVR). About 75 percent of the changes in the dependent variable (poverty rate) are caused by changes in TTR which is a reasonable goodness of fit.

Table 3. Dependent Variable: GIN

Method: Least Squares				
Date: 12/08/23 Time: 20:55				
Sample: 1995-2019				
Included observations: 25				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	47.30740	1.475127	32.07006	0.0000
TTR	-0.005413	0.002969	-1.822939	0.0813
R-squared	0.626243	Mean dependent var		45.26400
Adjusted R-squared	0.588253	S.D. dependent var		5.021195
S.E. of regression	4.794509	Akaike info criterion		6.049438
Sum squared resid	528.7083	Schwarz criterion		6.146948
Log likelihood	-73.61798	Hannan-Quinn criter.		6.076483
F-statistic	3.323106	Durbin-Watson stat		0.653632
Prob(F-statistic)	0.081339			

Table 3 shows the result of ordinary least square estimate for equation 3. The objective was to evaluate the separate impact of TTR on the dependent variable (GIN), that is, the impact of tax revenue on income inequality in Nigeria. A prior expectation for total tax revenue (TTR) is negative. From the estimated results, the coefficient of TTR =- 0.005413 confirms with a prior expectation, and also insignificant at less than 1 percent. This result means that as total tax revenue increases, the income inequality in Nigeria decreases insignificantly for the period under investigation (1995-2022). The estimated results of the R2 at 0.626243 and adjusted R2 =0, 588253 are the coefficients of determination or explainability of the independent variable (TTR) for the dependent variable (GIN). About 63 percent of the changes in the dependent variable (GIN) are caused by changes in TTR which is a reasonable goodness of fit.

Inequality of personal and household income is driven by four factors: the dispersion of hourly earnings among those who have a full-time job; the share of part-time workers; the unemployment rate; and household formation. Tax and transfer systems play a key role in lowering overall income inequality. Tax revenue has redistributive effect on income inequality and poverty. However, the redistributive impact of cash transfers varies widely across countries, reflecting both the size and progressivity of these transfers. The Organization of Economic Cooperation and Development (OECD)

(2012) reported that in some countries like Australia, the United Kingdom , cash transfers are small in size but highly targeted on those in need. In some others such as France and Germany, large transfers redistribute income mainly over the life-cycle rather than across individuals, and their progressivity is often low.

In Nigeria, cash transfers are often times targeted at the poor as palliatives, especially the unemployed youth, artisan, farmers and women who are engaged in small scale businesses. However, the effectiveness of the cash transfer policy depends on the inclusiveness. Inclusiveness has made it questionable as per whether these transfers are well targeted. The Introduction of the N-power as part of the Federal Government social investment program could have provided an opportunity for some unemployed youths to access cash for specified period of time, on the assumption that this will enable them to raise money that would make them employers of labour instead of job seekers. Personal income tax tends to be progressive, while social security contributions, consumption taxes and real estate taxes tend to be regressive. However, progressivity could be strengthened by cutting back tax expenditures that benefit mainly low-income groups such as tax relief on mortgage interest. Government fiscal operations (recurrent expenditure from tax payers' money) tend to widen income inequality and increase poverty in Nigeria. The aggregative impacts of inequality of inequality are inflation, low standard of living for a greater proportion of the population and economic underdevelopment of Nigeria. High electricity tariff, subsidy removal, high costs of governance, food price inflation etc have their toll on low income earners, making income inequality very visible, thereby increasing instead of reducing poverty in Nigeria. The authorities have adopted a national plan aiming to raise the tax revenue-to-GDP ratio to 15 percent by 2025 (BOF, 2022), which means that if policy measures are not carefully implemented, more people will drop into poverty by 2025.

NORMALITY TEST

This study carried out a normality test to match the skewness and kurtosis of the data to forecast if it follows a normal distribution or not. A normal distribution has a skew of zero (i.e., it's perfectly symmetrical around the mean) and a kurtosis of three; kurtosis tells how much data is in the tails and gives an idea about how peaked the distribution is. The normality test that was used in this study is Jarque-Bera (JB) test of normality

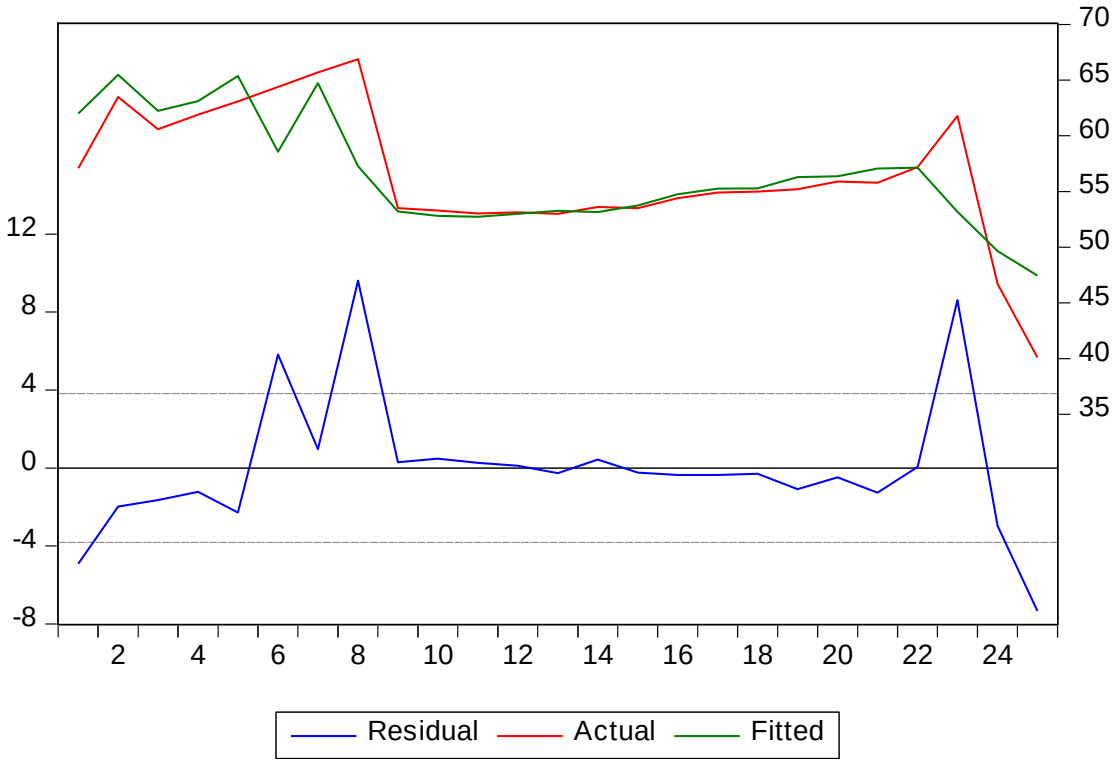
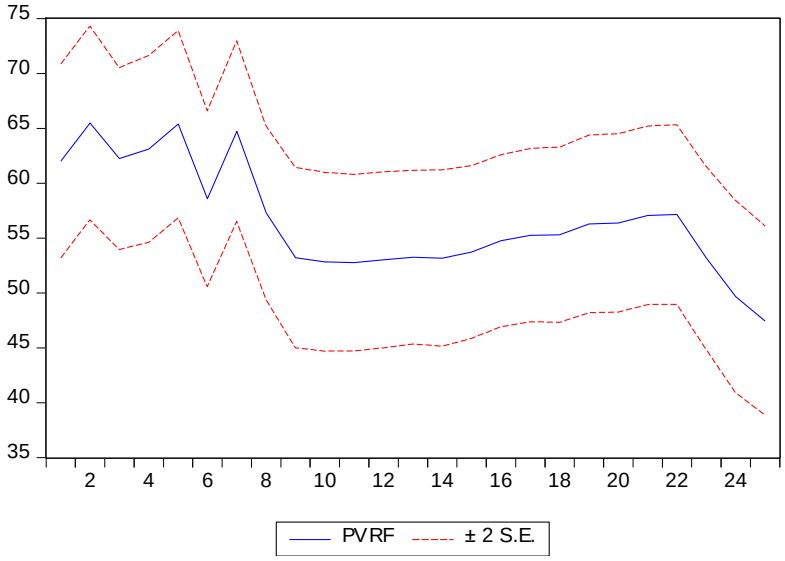


Figure 1. Normality Forecast

Table 5. Pairwise Granger Causality Tests

Date: 12/08/23 Time: 20:05			
Sample: 1 25			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
CPT does not Granger Cause PVR	23	0.37184	0.6946
PVR does not Granger Cause CPT		5.53127	0.0134
GIN does not Granger Cause PVR	23	6.81271	0.0063
PVR does not Granger Cause GIN		2.41398	0.1178
TTR does not Granger Cause PVR	23	1.17526	0.3313
PVR does not Granger Cause TTR		2.65891	0.0973
GIN does not Granger Cause CPT	23	4.80236	0.0213
CPT does not Granger Cause GIN		0.21765	0.8065
TTR does not Granger Cause CPT	23	5.24001	0.0161
CPT does not Granger Cause TTR		0.71628	0.5020
TTR does not Granger Cause GIN	23	0.87187	0.4351
GIN does not Granger Cause TTR		1.69776	0.2111

Table 5 was used to examine the causal relationship between total tax revenue (TTR), income inequality and poverty in models 1, 2 and 3. The granger causality test was carried out. The causal relationship between these variables is one of the main focuses of our empirical investigation. Generally, the granger causality test helps to determine the direction of relationship between the variables. The rule of thumb states that the probability of F-statistic must be less than the level of significant (0.05) to show a causal relationship.



Forecast: PVRF	
Actual: PVR	
Forecast sample: 1 25	
Included observations: 25	
Root Mean Squared Error	3.496965
Mean Absolute Error	2.133852
Mean Abs. Percent Error	3.777961
Theil Inequality Coefficient	0.030792
Bias Proportion	0.000000
Variance Proportion	0.107519
Covariance Proportion	0.892481
Theil U2 Coefficient	0.766769
Symmetric MAPE	3.789925

Figure. 2Cusum Stability Test

The stability test examines whether the parameters of a model are stable across various sub-samples of the data. The CUSUM test is based on the cumulative sum of the recursive residuals. This option plots the cumulative sum together with the 5% critical lines. The test finds if the parameter instability of the cumulative sum goes outside the area between the two critical lines. The covariance proportion of this analysis is 0.892481.

4. Recommendations

The following recommendations are put for policy actions based on the findings:

The Federal government and other tax authorities should improve their tax policies by adopting the use of other types of tax such as pay as you earn (PAYE) or progressive tax so as to reduce inequality gap of its citizens and hence reduction in poverty rate.

The Federal Inland Revenue Service (FIRS), the state board of Internal Revenue Service, the Joint Tax Board (JTB) should gear up at improving the dividend of taxation for better revenue generation such as tax expenditure on infrastructures and other network of basic services.

Tax base broadening through improved business environment in Nigeria. This will expand existing businesses and create new ones to pay tax. Efficient and accountable fiscal operations, using tax proceeds as government expenditure on infrastructure such as electricity, transportation and road networks, education and health in order to reduce poverty.

The Federal government and other tax authorities should bring about constant awareness to citizens (using the mass media) of the need for paying tax to government and its advantages or benefits to citizens. If the tax revenue is properly accounted for and utilized for public benefits, it will encourage citizens to pay more taxes. Why should the government squander the tax payers' money to buy luxury cars and apartments for senators, governors, ministers etc.? There is the need to review tax policies, especially the value added tax (VAT) with the aim to avoid multiple taxation on the poor. VAT should be streamlined to exempt more of basic items consisting of a larger share of the poor's consumption basket, with increased public provision of mass transport infrastructure and health insurance schemes, including primary health centers. Excise duties and VAT should be raised for cigarettes, wine, beer, whisky and imported beverages. Every home-made should have high tax on its imported substitutes.

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