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Inequality in the Income and Wealth Distribution: Nigerian Experience

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This research investigates the inequality in income and wealth distribution in Nigeria from 2010-2021. Auto-regressive distribution lags model (ARDL) based on the unit root and granger casualty test was used to determine effect of four major factors: literacy rate, life expectancy rate, poverty rate, and unemployment rate on real gross domestic product (RGDP) which represents economic growth. The findings from the empirical point of view show a positive relationship of gross domestic product (GDP) with poverty rate, per capita income while literacy rate, life expectancy rate, and unemployment rate show a negative relationship with gross domestic product (GDP). Also, poverty rate, literacy rate, life expectancy, and unemployment rate are all not significant at all levels of significance.

Keywords: inequality, poverty and wealth distribution

Introduction

One of the macroeconomic objectives of nations is to achieve sustained economic growth and overall, enhance social welfare function. Economic growth is therefore a necessary condition for attainment of other macroeconomic objectives. This is because, economic growth brings about improvement in income earnings through employments generation, income on the other hand is the determinant of consumption and wealth acquisition.

It is hypothesized by Kuznets (1959) that economic growth affects income inequality first and improves it later at a higher stage of economic development known as the inverted-U. Besides the position of Kuznets (1959), there are other empirical findings such as Adams (2013) that suggests an inverse relationship between economic growth and poverty reduction. The implication of this is that a reduction in poverty implies a redistribution of income and by extension, a reduction in inequality.

This study seeks to apply and test these hypotheses on Nigeria economy and see the economic growth and inequality nexus therein. The reason for this is that Nigeria is believed to have met one of the conditions for improvement in inequality which is economic growth. The country has existed for over 100 years and attained independence for over 60 years.

For example, before 2016 when the economy went into recession Nigeria had experienced positive growth for more than a decade beginning from the year 2001. Particularly, between 2001 and 2011, an average growth rate of 7.83 percent was recorded. The Nigerian economy maintained a moderate rate of growth of real GDP,

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which reached 5.92 per cent in 2001, from the yearly average of 3.3 per cent since 1995. The growth performance during those periods was driven principally by the non-oil sector and was achieved in an atmosphere of weakening economic fundamentals such as inflationary pressures, interest rates increase, and the foreign exchange rate of the naira depreciated sharply. The government's fiscal position was not too pleasant as it declined in 2001 while there was increased expenditure and proportional decline in revenue generation.

The aggregate performance of the economy in 2003 was mixed as excess liquidity in the system arose from fiscal dominance and posed serious challenges to the conduct of monetary policy. However, despite the challenges, the economic growth target of 5 per cent was surpassed by almost 24 percent, as the GDP growth was reported at 7.35 percent in 2003 from 15.33 in 2002 (NBS, 2016). The growth rate inclined to 9.25 percent in 2004 and there has been fluctuation in growth, though with a very high average growth rate of 6.46 percent between 2005-2008.

Nigeria rebased her GDP in 2013 making the country overtake South Africa to become the largest economy in Africa with a GDP size of over USD 514 billion. However, the economy slid into recession in 2016 with a negative annual growth rate of -1.58 percent. It recovered from the recession in 2017 with an average annual growth rate of 1.67 percent before another recession in 2020 with a growth rate of -1.97 percent. Throughout the period under review, the Services sector had been the major contributor to the aggregated GDP followed by the industry sector at an average 45.89 percent and 29.88 percent respectively between 2001-2011.

Despite the seemingly sustained and pleasant growth recorded by the Nigerian economy as highlighted from the foregoing, the country is not even amongst the class of medium level human development, but low human development. Tunisia, Botswana, Libya, South Africa, and Egypt are all countries in Africa that are found with higher human development cadres than Nigeria. The HDI report of 2020 shows that Nigeria has HDI value of 0.539 in 2019, 0.42 less than Norway that ranked first on the index with HDI value of 0.957 (UNDP, 2020).

According to the report, though Mauritius is the only country in Africa amongst the very high HDI cadre with HDI value of 0.804 and a rank of 66. Nigeria's rank on the index is 161, a value higher than the figure reported in 2018 and 0.21 HDI value less than Algeria which is the second in Africa with a rank of 91 and HDI value of 0.748. Growth in economic activities is expected to trickle down to its component units and have direct effects on the population of the Country, hence the need to investigate the relationship between the rate of economic growth, inequality, and wealth distribution.

Similarly, according to Global Wealth report 2021, wealth inequality is on the increased trajectory in Nigeria. Between 2000-2020, the Gini coefficient for wealth was 85.8 in Nigeria. The richest 1% of Nigerians own 28.3% of the total wealth in the year 2000 and increased to 44.2% in 2020. The question is, at what point is Nigeria on the pedestrian of inverted U? The objective is to see the trend and performance of Nigeria in this regard within the period under review.

Conceptual Review and Theoretical Framework

Inequality

The Inequality-adjusted Human Development Index (IHDI) adjusts the Human Development Index (HDI) for inequality in distribution of each dimension across the population. It is based on a distribution-sensitive class of composite indices proposed by Foster, Lopez-Calva, and Szekely (2005), which draws on the Atkinson (1970) family of inequality measures. The Inequality Human Development Index (IHDI) can be defined as an improvement over the Human Development Index with the adjustment made for inequality in the distribution of the dimension of Education, Income, and Health (NBS, 2016). Gender Inequality Index (GII) is defined as the percentage of potential human development lost due to gender inequality (NBS, 2016).

Inequalities due to differences in circumstances often reflect social exclusion arising from weaknesses of the existing systems of property and civil rights, and thus should be addressed through public policy interventions (Furman, 2014). Inequalities due to differences in efforts reflect and reinforce market-based incentives needed to foster innovation, entrepreneurship, and growth. First, the impact of growth on poverty reduction is higher when the initial level of inequality is lower and/or inequality declines over time. Second, economic growth makes poverty reduction efforts more effective by focusing on creating productive employment opportunities and making them equally accessible for all, while addressing extreme poverty through social safety nets and, therefore, moving away from the targeting approach to development (World Bank, 2012).

Income

Income is the adding value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees, property income, and transfer income) from abroad.

Relative income poverty refers to the share of people whose household disposable income is below 50% of the national median (i.e. relative income poverty), and to the difference in this measure across different population groups. All these indicators are based on the concept of household disposable income, as measured in microdata, i.e. the market income received by all household members (gross earnings, self-employment income, capital income), plus current cash transfers received, net of income and wealth taxes and social security contributions paid by workers, and net of current transfers paid to other households. Household disposable income is “adjusted” by an equivalence scale that divides household income by the square root of household size, to account for economies of scale in household needs (i.e. the notion that any additional household member needs less than a proportionate increase of household income in order to maintain a given level of welfare). Data are drawn from the *OECD Income Distribution Database*.

Wealth Distribution

Household wealth refers to the sum of non-financial (e.g. dwellings) and financial assets (e.g. deposits, shares, and equity), net of their financial liabilities (e.g. loans), held by private households’ resident in the country, as measured in microdata (household surveys and, more rarely, administrative records). Household wealth is reported for the median household (rather than as the mean across all households) to reduce the impact of differences across countries in measuring the top end of the distribution (where most wealth is concentrated). Inequalities are measured by the share of household wealth held by the 10% of wealthiest households, and by gaps in median wealth across households headed by people with different characteristics. Values are expressed in USD using purchasing power parities (PPPs) for household private consumption; when analysing changes over time, these values are adjusted for changes in the consumer price index (CPI).

Well-Being

Quality of life (QOL) is the general well-being of individuals and societies outlining negative and positive features of life. It observes life satisfaction, including everything from physical health, family, education, employment, wealth, safety, security to freedom, religious beliefs, and the environment. QOL has a wide range of contexts, including the fields of international development, healthcare, politics, and employment.

According to Costanza, Ali, and Snapp (2007), quality of life is the extent to which objective human needs are fulfilled in relation to personal or group perceptions of subjective wellbeing. QOL as a measure is important for: planning clinical care of patients; outcome measurement in clinical trials and health services management; health needs assessment of populations in descriptive studies; and for resource allocation and health economics. Of all these uses the most important are in health services research and as an outcome measure in clinical trials. Health related Quality of Life is used to assess impact of chronic illnesses like cancers and asthma on health status of individuals with such conditions.

Welfare is the dream of every person and every society, even every country. The prosperous conditions of community and state life are idealized (Soetomo, 2014). Welfare by some people is always associated with the concept of quality of life. The concept of quality of life is a picture of a good state of life. The World Health Organization (WHO) defines quality of life as an individual's perception of life in society in the context of existing cultural and value systems related to goals, expectations, standards, and also attention to life. This concept provides broader meaning because it is influenced by the physical condition of the individual, psychological, level of independence, and individual social relations with the environment. In the context of statehood, welfare is used in order to show that his government provides broad social services to its citizens (Fahrudin, 2012).

According to Todaro and Smith (2015), community welfare shows a measure of community development outcomes in achieving a better life which includes: first, capacity building and distribution of basic needs such as food, housing, health, and protection; second, increase in living levels, income levels, better education, and increased attention to culture and human values; and third, expanding the scale of the economy and the availability of social choices from individuals and nations.

The concept of human development index (HDI) is the current definition of assessing the living standards of individuals in a given society. HDI emphasises that people and their capabilities should be the ultimate criteria for assessing the development of a country, not only economic growth alone. The HDI is therefore a summary measure of average achievement in key dimensions of human development, a long and healthy life, being knowledgeable and having a decent standard of living; it is the geometric mean of normalized indices for each of the dimensions (UNDP, Human Development Report, 2016).

A robust analysis of the reverse transmission mechanism on human development is contained in the work of Ranis and Stewart (2004). According to them, there are two chains which provide a causal relationship between EG and HD (A and B).

Ranis and Stewart theory of growth and human development chain A: GDP growth perspective. GDP contributes to HD through household and government activity, community organizations, and NGOs. However, the same level of GDP has variant performance on HD based on how GDP is allocated to these various groups and to distribution within each category. The tendency of households to spend their income on goods and services that contribute most directly to the promotion of HD such as food, potable water, education, and health, differs based on the level and distribution of income across households, and who oversees the allocation of expenditure within households. On the average, a rise in income of the poor, ceteris paribus, leads to a rise in the percentage of their income that is spent on human development goods and services. We can deduce therefore that a higher and a fairly distributed growth is most likely to improve HD expenditures and ultimately, HD products, and Services.

The government. The government plays a critical role in the allocation of resources to improve HD. This is based on how total public sector expenditure is allocated, the percentage of it flows to the HD sectors, and the manner in which it is allocated within these sectors. This can be expressed in the form of three ratios.

(A) The public expenditure ratio is defined as the proportion of GDP spent by the various levels of government: Total consumption less Household consumption. (B) The social allocation ratio is defined as the percentage of aggregate government expenditure spent on HD-sectors such education, health, Research and Development, etc. (C) The priority ratio that is seen as the portion of total HD-sector expenditure allocated to priorities within these sectors. For clarity within HD-sectors, expenditures that are more productive and help to achieve advancements in HD than others such as basic education are referred to as priority sectors. However, the precise definition of a sector that is regarded as a priority area is a function of a country's stage of development.

The Human Development Index (HDI) is a tool used to measure welfare levels between countries or between regions (Todaro & Smith, 2015). Priambodo and Noor (2016) emphasized the achievement of community welfare that can be calculated by the Human Development Index (HDI). Starting in 1990, the United Nations Development Program (UNDP) published public welfare indicators known as the Human Development Index (HDI).

In 2010, UNDP made changes in the preparation of the HDI indicator, namely on the dimensions of education and living standards. The indicator of literacy rates in the education dimension is replaced by the expectations of school length, while the indicator of GDP per capita in the dimensions of living standards is replaced by an indicator of gross national income (GNI) per capita. The HDI aggregation method undergoes improvements, health indexes, and expenditure indexes from arithmetic averages to be geometric averages.

Likewise, the education index changes from a geometric average to an arithmetic average. The calculation of these three indices is done by standardizing the minimum and maximum values of each index component. Each of these components is first calculated so that the value is between 0 (worst) and 1 (best). To facilitate the analysis, this index is usually multiplied by 100.

Methodology

Sources of Data

The data source comprises of: surveys on establishments, households, Non-Profit Serving Institutional households, Administrative data from the relevant Ministries, Agencies and MDAs, Federal Inland Revenue Tax Returns, Fiscal, Financial Intermediation and Indirectly Measured and Balance of Payment data taken as reported by Central Bank of Nigeria, Insurance data taken as reported by Nigerian Insurance Corporation and Accountant Genera's Report of Federal, States and Local Government Area.

Taxes and transfers relied on macroeconomic data from the Ministry of Finance Budget and National Planning (FMBNP). Data on indirect taxes and subsidies for primary products and energy were taken from the relevant department of the Ministry of Finance Budget and National Planning. Data on direct taxes include only income tax and were estimated according to the tax rate of each level of income. Data on social security contributions take up as reported in the fiscal survey conducted by Central Bank of Nigeria. Data on direct transfers take up as reported by the Ministry of Finance Budget and National Planning. In-kind transfers were estimated from the Budget of Ministry of high education for tertiary education, from Ministry of Education for primary and secondary education, and from Ministry of Health for health expenditures.

Model Specification

The independent variable is economic development measured by the level of quality of life, which includes the Poverty rate, Life Expectancy rate, Unemployment rate, and Gross National Income (GNI) per capita by Purchasing Power Parity (PPP), which considers exchange rates and inflation adjustments when determining individual wealth while dependent variable is the real Gross Domestic Product (GDP) growth rate. This study uses unit root test, granger causality test, and regression analysis. This study adapted modified version of the Math model, to take care of those variables not captured in the previous study. The modified version of the model is specified as follows:

This study will adapt a modified version of the mathematical model, to take care of those variables not captured in the original model. The modified version of the model is specified using endogenous growth model, the equation is given as:

Y = f(AKL)

where,

K = the stock of capital

L = the labour input

A = the level of technical knowhow

But f(AKL) is influenced by AEG, ALR, ALPR, UR.

where,

Y = total production proxied by GDP

LR = literacy rate

LER = life expectancy rate

PR = poverty rate

UR = unemployment

However,

Well-being proxied by Human Development Index, W

then

W = f(Y) = f(PR, LER, UR)

Then by law of transitivity:

GDP = f(PR, LER, PR, UR) which will represent our operational model.

A Priori Expectation

Our priori expectations are that:

(1) If quality of life (QL) in Nigeria increases, real gross domestic product (RGDP) in the country is expected to rise. Thus, $\beta 1 > 0$.

(2) As Life Expectancy rate rises, real gross domestic product (RGDP) in the country is expected to rise. Therefore, $\beta 2 > 0$.

(3) As Poverty rate decreases, real gross domestic product (RGDP) in the country is expected to increase. Hence, $\beta 3 > 0$.

(5) As Unemployment rate decreases, real gross domestic product (RGDP) in the country is expected to increase. Hence, $\beta 3 > 0$.

Data Presentation

Trend Analysis

The trends in the variables are captured in separate figures below. This is to give an insight regarding the existence of any unique characterization of the Nigerian economy over the study period.

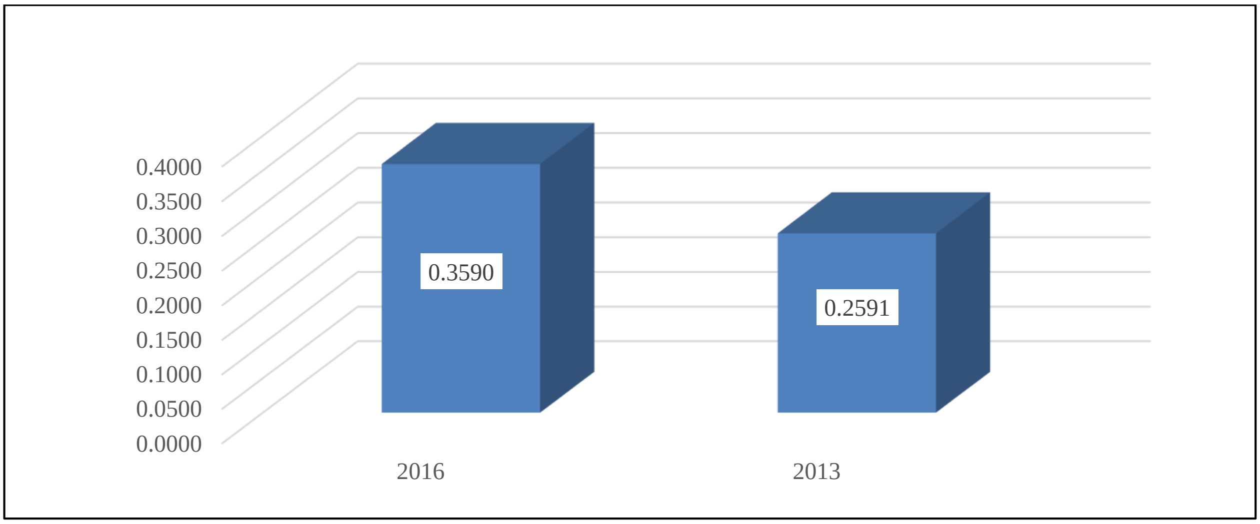

Figure 1. Inequality human development index (IHDI) 2013 and 2016. Source: Researcher's own computation.

The value of the Human Development Index (HDI) is 0.5114 in 2016 and 0.2712 in 2013 while the Inequality Human Development IndexI (HDI) is 0.3590 in 2016 and 0.2591 in 2013. The values indicate an increase over the previous computation in 2013.

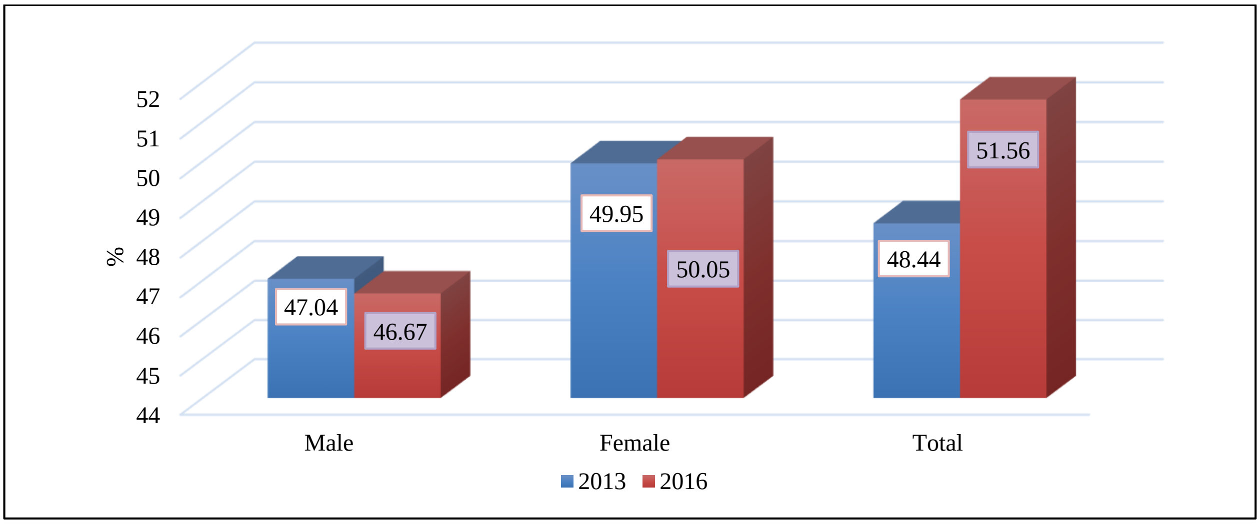

Figure 2. Health-life expectancy index. Source: Researcher's own computation.

The life expectancy for the country is 48.44 this shows a slight increase over the value for 2013 which was 51.56. However, there is a slight drop in male life expectancy at birth from 47.04 in 2013 to 46.67 in 2016 and a slight increase in female life expectancy from 49.95 in 2013 to 50.05 in 2016. The probability of a child surviving to age 20 is 0.7833 while the probability of a child surviving to age 70 is 0.6453.

Data Analysis and Interpretation

In this analysis, income is proxied by the Per Capital Income (PCI). We assume here that unemployment and poverty is correlated with income earning inequality and Life expectancy. A lack of employment leads to economic and social deprivation and ultimately, poverty leads to inequality. Unemployment and poverty are assumed to have direct proportionality with inequality on one hand, and inverse relationship with growth. Similarly, economic growth is assumed to have inverse relationship with inequality, poverty, unemployment but direct positive relationship with income and wellbeing.

Table 1

Trends of Some Selected Nigeria's Macro-economic Indicators From 2010-2021

Year	RGDP growth rate (%)	PCI growth rate (%)	Poverty rate (%)	Life expectancy rate (%)	Unemployment rate (%)	Inequality
2012	6.22	13.17	68.67	50.87	24.23	35.5
2015	4.83	0.27	72.00	52.67	25.12	35.9
2018	0.75	2.47	51.42	54.67	28.59	35.10
2021	1.25	(1.04)	40.10	53.57	30.12	35.50

Source: Researcher's own computation.

An analysis of some macro indicators for Nigeria as shown in Table 1, indicated that there were positive GDP growth rates over time between 2010-2021, except for 2016 and 2020 where the growth rates were negative. Many other indicators of wellbeing such as per capita income, unemployment, life expectancy, and inequality has been on the downward and negative side. In particular, there was three-year average growth rate of GDP of 6.22 and a per capital income growth rate of 13.17, poverty rate of 68.67 percent, life expectancy of 50.87 percent, unemployment and inequality of 24.23 percent and 0.355 percent respectively. Similarly, between 2013-2015, the GDP recorded a growth rate 4.83 percent, though a decline from the previous three years average growth and the per capita income indicator had more than proportionate decrease in value to 0.27 percent, poverty 72.00 percent, but life expectancy improved marginally to 52.67 percent while unemployment and inequality were 25.12 percent and 35.9 percent respectively. Again, GDP growth rate of 0.75 percent was observed between 2016-2018 while per capita income was 2.47 and unemployment rate of 28.59 percent, life expectancy of 54.67 percent and unemployment rate of 51.42 percent while inequality was 0.351 within the same period. Lastly, when GDP growth rate was 1.25 percent, the growth rate of per capita income in the country was -1.04 percent, poverty rate was 40.10 percent, life expectancy of 53.57 percent and inequality of 35 percent all between 2019 and 2021.

The conclusion from the foregoing is that unemployment rate in the country increases with GDP growth. The performance of life expectancy in relation to economic growth is mixed with fluctuating values over time. The behavioral pattern of inequality is like that of life expectance with fluctuating values over the years as seen in Table 2. All the indicators behave contrary to the theory which stipulates that economic growth leads to improvement income and welfare of the populace.

Table 2

Summary of the Description of Variables and Their Corresponding Unit and Sources

Variable	Description	Unit	Source
RGDP	Real gross domestic product growth rate	Percentage	NBS/Derived
PCIR	Per CAPITA INCOME GROWth rate	Percentage	NBS/Derived
PR	Poverty rate	Percentage	NBS

Table 2 to be continued

LE	Life expectancy rate	Percentage	NBS/Derived
UR	Unemployment rate	Percentage	NBS

Source: Researcher's own computation.

Table 3

Descriptive Statistics

Descriptive statistics	RGDPR	PR	PCIR	LER	UR
Mean	3.170364	63.36301	1.433068	52.40650	26.78950
Median	3.092351	72.00000	8.151510	53.32650	26.09850
Maximum	9.132070	74.07091	20.00234	55.01800	33.33000
Minimum	-1.923934	40.09508	-19.98420	46.26700	21.40000
Std. Dev.	3.198173	14.21174	12.63746	3.053904	3.645489
Skewness	0.024296	-1.075269	-0.425810	-1.343362	0.670231
Kurtosis	2.482181	2.253541	1.872535	3.401330	2.644249
Jarque-Bera	0.135249	2.591007	0.998218	3.689775	0.961698
Probability	0.934612	0.273760	0.607071	0.158043	0.618258
Sum	38.04436	760.3561	17.19681	628.8780	321.4740
Sum Sq. Dev.	112.5114	2221.710	1756.759	102.5896	146.1855
Observations	12	12	12	12	12

Source: Researcher's own computation.

Descriptive Statistics

Table 3 reveals that real gross domestic product growth rate (RGDPR) has a mean of 3.170364 and varies from a minimum of -1.923934 to a maximum of 9.132070 and a standard deviation of 3.198173 with a probability value of 0.934612. Poverty rate (PR) has a mean of 63.36301 and varies from a minimum of 40.09508 to a maximum of 74.07091 and a standard deviation of 14.21174 with a probability value of 0.273760. Per capita income (PCI) has a mean of 1.433068 and varies from the minimum of -19.98420 to a maximum of 20.00234 with a standard deviation of 12.63746 and probability of 0.607071. Furthermore, Life Expectancy rate (LER) has a mean of 52.40650 and varies from the minimum of 46.26700 to a maximum of 55.01800 with a standard deviation of 3.053904 and probability value of 0.158043. Lastly, unemployment rate (UR) has a mean of 26.78950 and varied from a minimum of 21.40000 to a maximum of 33.33000 and a standard deviation of 3.645489 with a probability value of 0.618258. Consequently, real gross domestic product growth rate, poverty rate, per capita income, life expectancy rate, and unemployment rate were positively skewed while poverty rate, life expectancy rate, and unemployment rate were negatively skewed.

Table 4

Augmented Dickey-Fuller (ADF) Unit Root Test

Variable	ADF test statistics	5% Critical value	*p*-value	Order of stationarity
RGDPR	-6.225640	-3.403313	0.0025	2(1)
PCIR	-3.212696	-3.212696	0.0482	1(1)
LER	-3.351407	-3.212696	0.04406	1(1)
PR	-3.236836	-3.212696	0.0482	1(1)
UR	-3.304628	-3.259808	0.0489	1(1)

Source: Output of E-Views 9.0, 2022.

Augmented Dickey-Fuller (ADF) Unit Root Test

The results of unit root test shown in Table 4 above revealed that all the absolute values of ADF test statistics are greater than their critical values at 5% as well as probability values of probability benchmark are stationary at 5%, implying that RGDPR, PCIR, LER, and UR are stationary at 5%. It is integrated of order level 1 and 2 that is, 1(1) and 2(1). The results also showed that all the variables are stationary at 5% since their absolute values of ADF statistics are respectively greater than their critical values at 5% as well as probability benchmark values less than probability values calculated.

Table 5

Granger Causality Test

H_0	*F*-stat/*p*-value	Conclusion
PR→LER	0.20486 (0.8213)	PR ↔LER
LER→PR	0.26914 (0.4822)	
PCIR→GDPR	3.77782 (0.1001)	PCIR→GDPR
GDPR→PR	0.48684 (0.6409)	
LER→GDPR	0.95429 (0.4456)	TCN ↔LER
GDPR→LER	1.54647 (0.3000)	
UR→GDPR	2.05669 (0.2230)	UR→GDPR
GDPR→UR	1.00012 (0.4312)	

Source: Author’s computation using E-Views 9.0, 2023.

Granger Causality Test

The results of granger causality test presented in Table 5 above, reveal that the direction of relationship flows from PR to GDPR, and then from GDPR to PR (since the *F*-statistics values of PR close to *F*-statistics values of GDPR). This implies that the relationship between GDPR and PR is bi-directional and that change in real gross domestic product rate does precede changes in quality of life in the period under review. This suggests that, to a large extent GDPR tends to exhibit strong influence on quality of life (2010-2021).

However, results of granger causality test presented in Table 5 reveal that the direction of relationship flows from PCIR to GDPR and then from GDPR to PCIR (since the *F*-statistics values of PCIR greater than *F*-statistics values of GDPR). This implies that the relationship between PCIR and GDPR is uni-directional and that change in per capita income rate precedes changes in gross domestic product rate in the period under review. This suggests that, to a large extent GDPR tends to exhibit strong influence on per capital income (2010-2021).

Similarly, results of granger causality test presented in Table 5, reveal that the direction of relationship flows from LER to GDPR, and then from GDPR to LER (since the *F*-statistics values of GDPR greater than *F*-statistics values of LER). This implies that the relationship between LER and GDPR is uni-directional and that change in real gross domestic product growth rate precedes changes on life expectancy rate in the period under review. This suggests that, to a large extent RGDPR tends to exhibit weak influence on life expectancy rate (2010-2021).

Moreover, results of granger causality test presented in Table 5, reveal that the direction of relationship flows from UR to GDPR, and then from GDPR to UR (since the *F*-statistics values of UR greater than *F*-statistics values of GDPR). This implies that the relationship between UR and RGDP is uni-directional and that change in real gross domestic product growth rate does not precede changes in unemployment rate in the period under review. This suggests that, to a large extent GDPR tends to exhibit strong influence on unemployment rate (2010-2021).

Discussion of Results

The result of the regression result (see Appendix 8 attached) revealed the following:

Model: RGDPR= 19.162-0.141PR+0.218PCIR+0.943LER-0.5398UR+Ut

(0.559) (2.112) (1.702) (0.999) (-1.319)

R^2 = 913, adjusted R^2 = 568, F-statistics = 2.646, D-W = 2.055

The equation above shows that α = 19.162 which is the intercept. This is the base level of prediction for the dependent variable when all the independent variables are equal to zero. The coefficients of the independent variables measure how a percentage change in independent variables affects the dependent variable.

1% increase in poverty rate (PR) leads to about -0.14% decrease in real gross domestic growth rate (RGDPR). It was found that coefficient of poverty rate (PR) is negative, indicating negative relationship between RGDPR and PR in the country during the periods 2010-2021, and this is in line with a priori expectation that output impacted on the living standard of the citizenry of the citizen. This result is not statistically significant at 5% with the *p*-value of 0.6179. The standard error measures the statistical reliability of the coefficient estimates—the larger the error, the more statistical noise in the estimates. The standard error is 0.066590% which is small or significant and thus shows that PR is statistically reliable to predict RGDPR proxies for economic growth in the country.

1% increase in per capita income growth rate (PCIR) leads to about 0.22% increase in real gross domestic product growth rate (RGDPR). It was found that coefficient of per capita income growth rate (PCIR) is positive, indicating positive relationship between PCIR and RGDPR in the State during the periods 2010-2021, and this is in line with a priori expectation that real gross domestic product growth rate impacted on the living standard of the citizenry of the country. This result is not statistically significant at 5% with the *p*-value of 0.2309. The standard error measures the statistical reliability of the coefficient estimates—the larger the error, the more statistical noise in the estimates. The standard error is 0.128208% which is small or insignificant and thus shows that PCIR is statistically reliable to predict increase RGDPR proxies for economic growth in the country.

1% increase in life expectancy rate (LER) leads to about 0.94% increase in real gross domestic product growth rate. It was found that coefficient of expectancy rate (LER) is positive, indicating negative relationship between LER and RGDPR in the country during the periods 2010-2021, and this is not in line with a priori expectation that real gross domestic product growth rate impacted on the living standard of the citizenry of the country. This result is not statistically significant at 5% with the *p*-value of 0.4228. The standard error measures the statistical reliability of the coefficient estimates—the larger the error, the more statistical noise in the estimates. The standard error is 0.943715% which is small or significant and thus shows that LER is statistically reliable to predict real domestic product growth rate proxies for economic growth in the country.

1% increase in unemployment rate (UR) leads to about -0.54% decrease in real gross domestic product growth rate (RGDPR). It was found that coefficient of unemployment rate (UR) is negative, indicating negative relationship between UR and RGDPR in the country during the periods 2010-2021, and this is not in line with a priori expectation that real gross domestic product growth rate impacted on the living standard of the citizenry of the country. This result is not statistically significant at 5% with the *p*-value of 0.3179. The standard error measures the statistical reliability of the coefficient estimates—the larger the error, the more statistical noise in the estimates. The standard error is 1.167321% which is small or significant and thus shows that UR is statistically reliable to predict real domestic product growth rate proxies for economic growth in the country.

Conclusion

This research work was conducted to find out the impact of economic growth proxies RGDPR on the reduction of inequality and wealth distribution in Nigeria. This study was necessitated by the fact that the economy is often said to be growing in terms of real Gross Domestic Product growth rate (RGDPR) and yearly budgetary provisions running into trillions of Naira but poverty keeps on increasing on the populace. However, such growth is insufficient in the real sense of it, as many Nigerians are still living below the poverty line, with high level unemployment rate, lower per capita income, and low human development index. Therefore, this study employed the unit root test, granger causality test, ARDL model, and other diagnostic tests to investigate whether or not real gross domestic product growth rate has impacted on quality of life on the citizenry in Nigeria. This study made use of four explanatory variables which included: poverty rate, per capita income, life expectancy rate, and unemployment rate, while real gross domestic product (RGDPR) growth rate serves as a proxy for economic growth.

Policy Recommendations

Therefore, policy makers should take advantage of the individually and collective influence of real gross domestic product growth rate on quality of life as a proxy's for economic development (PR, PCIR, LER, and UR) and further explore more avenues such as National Development Programme (NDP) 2021-2025, National Economic Council (NEC), National Economic Sustainable Committee (NESC), Federal Ministry of Finance and National Planning, Central Bank of Nigeria among others to come out with policies that will serve as a growth enabler with a view to growth real sector of the economy that have direct impact on the populace. Also, they should engage relevant stakeholders, formulate social inclusive policies as well as use participatory approach in delivering dividends of democracy to the people capable of lifting people out of poverty line of one dollar per day since about 40.1 percent of the populace live below the poverty line as reported by National Bureau of statistics (NBS, 2021).

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Appendix 1: Original Sourced Data

Year	RGDPR	PCIR	PR	LER	UR
2010	9.13	20.00	64.90	46.27	21.40
2011	5.31	10.63	69.10	46.27	23.90
2012	4.21	8.87	72.00	51.79	27.40
2013	5.49	9.06	72.00	52.23	24.70
2014	6.22	7.43	72.00	52.67	25.10
2015	2.79	-15.67	72.00	53.11	25.57
2016	-1.58	-19.98	72.00	53.54	26.63
2017	0.82	-9.43	72.00	53.95	27.68
2018	1.91	9.39	74.07	54.33	28.74
2019	2.27	9.66	40.10	54.69	23.70
2020	-1.92	-11.65	40.10	55.02	33.33
2021	3.40	-1.12	40.10	55.02	33.33

Source: National Bureau of Statistics.

Appendix 2: Null Hypothesis: D(RGDPR,2) Has a Unit Root

Null Hypothesis: D(RGDPR,2) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic-based on SIC, maxlag = 2)

		t-statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.225640	0.0025
Test critical values:	1% level	-4.803492	
	5% level	-3.403313	
	10% level	-2.841819	

* MacKinnon (1996) one-sided *p*-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 7

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDPR,3)
Method: Least Squares
Date: 10/28/22 Time: 12:48
Sample (adjusted): 2015 2021
Included observations: 7 after adjustments

Variable	Coefficient	Std. error	*t*-statistic	Prob.
D(RGDPR(-1),2)	-4.102599	0.658984	-6.225640	0.0084
D(RGDPR(-1),3)	2.017131	0.475089	4.245793	0.0239
D(RGDPR(-2),3)	1.272844	0.332606	3.826885	0.0314
C	0.854316	1.027735	0.831261	0.4668
R-squared	0.940499	Mean dependent var		1.438262
Adjusted *R*-squared	0.880999	S.D. dependent var		7.611204
S.E. of regression	2.625603	Akaike info criterion		5.064058
Sum squared resid	20.68138	Schwarz criterion		5.033149
Log likelihood	-13.72420	Hannan-Quinn criter.		4.682035
F-statistic	15.80654	Durbin-Watson stat.		1.973818
Prob(*F*-statistic)	0.024195			

Appendix 3: Null Hypothesis: D(PR) has a unit root

Null Hypothesis: D(PR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic-based on SIC, maxlag=2)

		t-statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.236836	0.0482
Test critical values:	1% level	-4.297073	
	5% level	-3.212696	
	10% level	-2.747676	

* MacKinnon (1996) one-sided *p*-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 10
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PR,2)
Method: Least Squares
Date: 10/28/22 Time: 13:24
Sample (adjusted): 2012 2021
Included observations: 10 after adjustments

Variable	Coefficient	Std. error	*t*-statistic	Prob.
D(PR(-1))	-1.115858	0.344737	-3.236836	0.0119
C	-3.187876	3.752248	-0.849591	0.4202
R-squared	0.567032	Mean dependent var		-0.420000
Adjusted *R*-squared	0.512911	S.D. dependent var		16.55412
S.E. of regression	11.55342	Akaike info criterion		7.908696
Sum squared resid	1067.851	Schwarz criterion		7.969213
Log likelihood	-37.54348	Hannan-Quinn criter.		7.842309
F-statistic	10.47711	Durbin-Watson stat		2.059598
Prob(*F*-statistic)	0.011934			

Appendix 4: Null Hypothesis: D(PR) has a unit root

Null Hypothesis: D(PR) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic-based on SIC, maxlag=2)				
			t-statistic	Prob.*
Augmented Dickey-Fuller test statistic			-3.236836	0.0482
Test critical values:	1% level		-4.297073	
	5% level		-3.212696	
	10% level		-2.747676	
* MacKinnon (1996) one-sided *p*-values.				
Warning: Probabilities and critical values calculated for 20 observations				
and may not be accurate for a sample size of 10				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(PR,2)				
Method: Least Squares				
Date: 10/28/22 Time: 15:50				
Sample (adjusted): 2012 2021				
Included observations: 10 after adjustments				
Variable	Coefficient	Std. error	*t*-statistic	Prob.
D(PR(-1))	-1.115858	0.344737	-3.236836	0.0119
C	-3.187876	3.752248	-0.849591	0.4202
R-squared	0.567032	Mean dependent var		-0.420000
Adjusted *R*-squared	0.512911	S.D. dependent var		16.55412
S.E. of regression	11.55342	Akaike info criterion		7.908696
Sum squared resid	1067.851	Schwarz criterion		7.969213
Log likelihood	-37.54348	Hannan-Quinn criter.		7.842309
F-statistic	10.47711	Durbin-Watson stat		2.059598
Prob(*F*-statistic)	0.011934			

Appendix 5: Null Hypothesis: D(LER) has a Unit Root

Null Hypothesis: D(LER) has a unit root			
Exogenous: Constant			
Lag Length: 0 (Automatic-based on SIC, maxlag=2)			
		t-statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.351407	0.0406
Test critical values:	1% level	-4.297073	
	5% level	-3.212696	
	10% level	-2.747676	
* MacKinnon (1996) one-sided *p*-values.			
Warning: Probabilities and critical values calculated for 20 observations			
and may not be accurate for a sample size of 10			
Augmented Dickey-Fuller Test Equation			
Dependent Variable: D(LER,2)			
Method: Least Squares			
Date: 10/28/22 Time: 16:10			
Sample (adjusted): 2012 2021			
Included observations: 10 after adjustments			

Variable	Coefficient	Std. error	*t*-statistic	Prob.
D(LER(-1))	-1.168050	0.348525	-3.351407	0.0101
C	1.022161	0.621297	1.645203	0.1385
R-squared	0.584025	Mean dependent var		0.000000
Adjusted *R*-squared	0.532028	S.D. dependent var		2.502164
S.E. of regression	1.711692	Akaike info criterion		4.089698
Sum squared resid	23.43911	Schwarz criterion		4.150215
Log likelihood	-18.44849	Hannan-Quinn criter.		4.023311
F-statistic	11.23193	Durbin-Watson stat		0.770453
Prob(*F*-statistic)	0.010059			

Appendix 6: Null Hypothesis: D(UR) has a unit root

Null Hypothesis: D(UR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic-based on SIC, maxlag=2)

		t-statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.304628	0.0469
Test critical values:	1% level	-4.420595	
	5% level	-3.259808	
	10% level	-2.771129	

* MacKinnon (1996) one-sided *p*-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 9
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UR,2)
Method: Least Squares
Date: 10/28/22 Time: 16:18
Sample (adjusted): 2013 2021
Included observations: 9 after adjustments

Variable	Coefficient	Std. error	*t*-statistic	Prob.
D(UR(-1))	-2.860546	0.865618	-3.304628	0.0163
D(UR(-1),2)	0.948616	0.576969	1.644138	0.1513
C	1.856812	1.183836	1.568471	0.1678
R-squared	0.840996	Mean dependent var		-0.388889
Adjusted *R*-squared	0.787995	S.D. dependent var		6.999676
S.E. of regression	3.222929	Akaike info criterion		5.439660
Sum squared resid	62.32363	Schwarz criterion		5.505401
Log likelihood	-21.47847	Hannan-Quinn criter.		5.297790
F-statistic	15.86750	Durbin-Watson stat		2.395294
Prob(*F*-statistic)	0.004020			

Appendix 7: Pairwise Granger Causality Tests

Pairwise Granger Causality Tests
Date: 05/18/23 Time: 16:25
Sample: 2010 2021
Lags: 2

Null Hypothesis	Obs	*F*-Statistic	Prob.
PR does not Granger Cause GDPR	10	0.20486	0.8213
GDPR does not Granger Cause PR		0.26914	0.7744

PCIR does not Granger Cause GDPR	10	3.77782	0.1001
GDPR does not Granger Cause PCIR		0.48684	0.6409
LER does not Granger Cause GDPR	10	0.95429	0.4456
GDPR does not Granger Cause LER		1.54647	0.3000
UR does not Granger Cause GDPR	10	2.05669	0.2230
GDPR does not Granger Cause UR		1.00012	0.4312
PCIR does not Granger Cause PR	10	2.62585	0.1661
PR does not Granger Cause PCIR		1.50936	0.3070
LER does not Granger Cause PR	10	0.80017	0.4995
PR does not Granger Cause LER		0.01567	0.9845
UR does not Granger Cause PR	10	1.77187	0.2620
PR does not Granger Cause UR		0.91012	0.4602
LER does not Granger Cause PCIR	10	0.50380	0.6319
PCIR does not Granger Cause LER		1.21558	0.3714
UR does not Granger Cause PCIR	10	1.47704	0.3133
PCIR does not Granger Cause UR		12.0130	0.0123
UR does not Granger Cause LER	10	0.43865	0.6675
LER does not Granger Cause UR		0.74805	0.5197

Appendix 8: Dependent Variable: GDPR

Dependent Variable: GDPR
Method: ARDL
Date: 05/18/23 Time: 16:59
Sample (adjusted): 2011 2021
Included observations: 11 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): PR PCIR LER UR
Fixed regressors: C
Number of models evalulated: 16
Selected Model: ARDL(1, 0, 1, 1, 1)

Variable	Coefficient	Std. error	*t*-statistic	Prob.*
GDPR(-1)	0.058923	0.528494	0.111492	0.9214
PR	0.141306	0.066590	2.122018	0.1679
PCIR	0.218162	0.128208	1.701624	0.2309
PCIR(-1)	-0.459714	0.324703	-1.415797	0.2925
LER	0.943358	0.943715	0.999622	0.4228
LER(-1)	-0.338271	0.479608	-0.705309	0.5537
UR	-1.539854	1.167321	-1.319136	0.3179
UR(-1)	0.355627	0.376420	0.944761	0.4445
C	19.16170	34.31173	0.558459	0.6327
R-squared	0.913679	Mean dependent var		2.629091
Adjusted *R*-squared	0.568397	S.D. dependent var		2.715063
S.E. of regression	1.783701	Akaike info criterion		3.926874
Sum squared resid	6.363179	Schwarz criterion		4.252424
Log likelihood	-12.59780	Hannan-Quinn criter.		3.721659
F-statistic	2.646182	Durbin-Watson stat		2.054629
Prob (*F*-statistic)	0.303092			