Poverty and Income Inequality in Nigeria (1980- 2017)

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Abstract

This study examined the relationship between poverty and income inequality in Nigeria within the period 1980- 2017. Adopting the OLS, unit root, co-integration, ECM and Granger causality test to analyze the data from the CBN Statistical bulletin and World Bank, the study specifically determined how poverty, unemployment and life expectancy at birth affects inequality in Nigeria. The OLS result shows that 82% of the changes in the dependent variable (inequality) are explained by the independent variables (national poverty index, unemployment rate and life expectancy at birth). The F-value of 52.293 with the probability value of 0.000000 indicates that the overall model was statistically significant at 5% level. The OLS result further indicated that national poverty index was positively related to inequality but statistically not significant. Unemployment rate was positively related to inequality but not statistically significant at level. Furthermore, all the variables were stationary and show evidence of long run relationship. Meanwhile, the estimated ECM result revealed that the variation in inequality is explained by life expectancy at birth, national poverty index and unemployment rate was 67%. The coefficient of the ECM was negatively signed, adjusted the short run deviation to long run equilibrium position at the speed of 53%.The F-Statistic value of 22.09833 with the probability value of 0.001213 shows that the overall model was significant at 5% level while the Durbin –Watson value of 2.03 indicates lesser degree of serial autocorrelation. Thus, the estimated parsimonious ECM result depicts that poverty and unemployment have positive significant relationship with inequality. It was established that as poverty and unemployment rate increased, inequality increased correspondingly, inferring close links among the variables. Moreover, the Pair wise causality test results revealed a bi-directional causality between poverty and inequality over the period of the study indicating that both of them can be used in predicting the changes in the other. Based on the findings, it was recommended that deliberate effort should be made by government to creating employment opportunities as a major tool in order to combat poverty and inequality in Nigeria.

Keywords: *Poverty, Inequality, Unemployment, Life expectancy at birth.*

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Background to the Study

Staggering poverty in the midst of plenty is one of the world's unsolved issues especially in the developing countries. Poverty has multidimensional nature and can be evident in different forms such as deficiency of material income adequate to guarantee good standard of living; hunger and under-nutrition; illness; limited education and fundamental services; persistent rise in mortality and morbidity due to sickness; homelessness and insufficient housing; insecure environments and social exclusion and discrimination (Ogbeide, Nwamaka & Agu,2015).

Poverty is the principal cause of hunger and under nourishment. According to the Food Agriculture Organization (2009), more than 963 million people are hungry and malnourished globally. Most of them are found in the developing countries. Poverty kills about 25000 children each day especially in some of the poorest village 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 (World Bank 2016).

According to Kolawole and Omobitan (2015), poverty and inequality in Nigeria is a paradox. Paradox in sense that, poverty level in Nigeria contradicts the country's abundant wealth of both human and human resources. Put simply there is poverty in the midst of plenty and inequality in the face of economic growth specifically. However, in the pursuit to better the standard of living of Nigerians, several programmes were introduced and implemented at different periods by different governments such as: Operation Feed the Nation of 1977 (OFN), the green revolution of 1980, Directorate of foods, Roads and Rural Infrastructure (DFFRI), the National Directorate for Employment (NDE), Poverty Alleviation Programmes (PAP), up to the National Poverty Eradication Programme (NAPEP). The chief objective of the programmes was amongst other things to reduce and possibly eliminate poverty that has damaged the fabrics of Nigeria economy for decades and to reduce the inequality between the haves and the have not.

Statement of the problem

Nigeria is bequeathed with rich human and natural resources. Given these wealth in economic potentials, it is particularly disturbing and ironical that Nigeria is still rated as one of the poorest countries of the world, placed at 152 position out of 188 countries on HDI ranking. But Nigeria is suffering not only from poverty, income inequality, low income, unstable growth, and also from unemployment, economic instability, political and poor investment (Oxfam international, 2017). There have been studies on poverty and income inequality in Nigeria but the results have not been unanimous. In Nigeria, the scale of economic inequality has reached an extreme level, in spite of the numerous government poverty alleviation programmes initiated since 1980 till now. But the objective of the programmes was among other things to reduce poverty and inequality specifically.

However, the interest of poverty reduction is not the rate of growth, but the distribution-corrected rate of growth. The importance of inequality for poverty reduction is heavier in the poorest nations of the world, of which Nigeria is not an exception. The empirical evidence between poverty and growth exist but such between poverty and income inequality is lacking

hence the choice of this study. But the question of whether any form of relationship exists between poverty and inequality in Nigeria is why this study seeks to ask the following questions: What are the relationship between poverty and inequality in Nigeria? Is there a correlation between unemployment and inequality in Nigeria? What are the relationship between life expectancy at birth and inequality in Nigeria?

Objectives of the Study
The broad objective of the study is to examine the relationship between poverty and inequality in Nigeria. The specific objectives are to:
  i.   Determine whether any relationship exist between poverty and inequality in Nigeria.
  ii.   Examine the effect of unemployment on inequality in Nigeria.
  iii. Ascertain the relationship between life expectancy at birth and inequality in Nigeria.

Literature Review
Theoretical Literature
Theory of Social Exclusion
According to Amartya (2004) social exclusion, does not mean a limited material resources, but also   inability to enjoy social relationship normally, limited cultural and educational capital, insufficient basic services and denial of power. The idea of social exclusion tries to sum up the intricacies of trimming or denying citizens in society of power participation. It means denying citizens from participating in normal activity or normal relationship, resources, rights, goods and services that are available to the larger society in the form of economic, social, cultural or political areas. This can well influence   the standard of life of citizens and the working together of every one.

Theory of Social Capital
Social capitals are those in built resources in social relationships which makes collective action easy. Here, Social capital resources simply means: trust, norms, and networks of association representing any group which gathers always for a common purpose. Pierre (2002) argues that social capital is the totality of resources, actual, that flows to an individual or group by possessing a strong network of more or less institutionalized relationships.

Coleman (1998) believes that individual habits are shaped, redirected, constrained by the social context; norms, trust, durable networks and social groups.

Conceptual Framework
An incisive and globally accepted definition of poverty is elusive because it touches different aspects of human conditions. The basic premise is individuals are deficient and insufficient in improvising the daily necessities of life such as food, shelter and clothing. This condition is characterized by severe deprivation of basic human needs including education, health, access to basic social services and safe drinking water. This deficiency seen in the lack of income, lack of access to basic services. Which simply means the poor are hungry, lack shelter, and clothing, lack basic education and health care. They are basically more susceptible and vulnerable to negative events (Greig and Turner). World Bank report that poverty is deprivation which does

not only limited to material income needed to maintain the basic necessities of life but also non material aspects like: vulnerability, noiselessness, powerlessness and mental disposition..It can be conceptualised as a condition of being denied of well-being, being vulnerable to activities outside once control and living below the acceptable socio- economic standard of life.

Income Inequality

The notion of income inequality only refers to material dispersion across the society that have an influence on the position of individuals. These characteristics are usually resources, or goods in a broad sense, that are much in demand in the society. This suggests the spread of sharing pattern whether in material resources, consumption parameters. As cited by Osahon (2011) in Atkinson (2015) questioned how the measurement of inequality have been formulated using the explicit logic of social choice theory.

Empirical Literature

Fatukasi and Ajasin (2015) examined the upsurge of income inequality and its threat on the people's health for the past years in Nigeria. The key variables of concern are income inequality, per capita income, education, savings and health proxied by infant mortality rate and life expectancy rate. The study adopted co-integration, unit root and ordinary least square method to analyze the time series data from 1980- 2014. The variables showed stationarity in the short run and confirmed a long run stability among the variables. The study revealed that income inequality has a negative influence on the rate of mortality. But a unidirectional relationship exists between income inequality and life expectancy rate. Education, Savings and capita income used as control variables had no negative influence on health indices within Nigeria. The study concludes that health signs influence income inequality, education, savings and capita in Nigeria.

Faloye and Bakare (2015) examined the effect of economic growth on lowering poverty level in Nigeria applying time series data from 1999 -2014. The study adopted Ordinary Least Squared. Results shows that economic growth influence poverty reduction. GNI growth rate, agricultural value added growth rate, export growth rate and real interest rate influence poverty reduction but were not significant statistically. The effect of manufacturing valued added growth rate, industrial value added growth rate, service value added growth rate and gross capital formation growth rate did not agree with the *apriori* expectations. The study recommends huge input in both material and human resources , agricultural reforms, industrial sector, manufacturing and service sectors to enable unrestrictive job creation for the unemployed majority.

Methodology

Research Design

Research design is an overall strategy and method used to integrate the different components of the study in a coherent manner (Guilford, 2012). In view of this, the research design for the study is quasi- experimental design because the study is analytical in nature makes use of secondary data and also interested in the cause and effect of both the dependent and independent variables.

Data Collection Method and Sources
Data for this study were mainly time series generated from secondary sources. Data sources are from Central Bank of Nigeria statistical Bulletin and World Bank Report.

Technique of Data Analysis
Study used the ordinary least square method, unit root test, Co-integration test, causality test and Error correction mechanism.

Ordinary Least Square technique was adopted in this study to take care of the short-run behaviour of the variables in the model.

Unit Root Test
$$\Delta GINI = \Delta b_0 + \Delta b_1 NPI + \Delta b_2 UNR - \Delta b_3 LEB + U_t$$
This was used in order to avoid false results that would lead to biased estimates and unpredictability. The time series data were tested for stationary. ADF was employed to test the order of integration of the variables. $\Delta GINI = \Delta b_0 + \Delta b_1 NPI + \Delta b_2 UNR - \Delta b_3 LEB + U_t$

Co-integration Test
$$\beta GINI = \beta_0 + \beta_1 NPI + \beta_2 UNR - \beta_3 LEB + U_t$$
The study adopted the Johansen test to determine long-run relationship among the variables.
$$\beta GINI = \beta_0 + \beta_1 NPI + \beta_2 UNR - \beta_3 LEB + U_t$$

Error Correction Model
$$\alpha GINI = \alpha_0 + \alpha_1 NPI + \alpha_2 UNR - \alpha_3 LEB + U_t$$
Co-integration is confirmed to exist and the Error correction mechanism is built in to regulate the speed of adjustment of the equation from short-run to the long-run equilibrium.
$$\alpha GINI = \alpha_0 + \alpha_1 NPI + \alpha_2 UNR - \alpha_3 LEB + U_t$$

Granger Causality Test Results
$$\rho GINI = \rho b_0 + \rho b_1 NPI + \rho b_2 UNR - \rho b_3 LEB + U_t$$
Granger causality was employed to determine the cause and effect as well as the direction of causality of the variables in the model.
  i. Coefficient of determination R^2 was used to describe the goodness of fit of regression.
  ii. T-test was used to test for the significance of each of the variables in the model.
  iii. F-test: This was used to test the overall significance of the model
  iv. Durbin-Watson was used to test for serial autocorrelation.

Model Specification
Mathematically:
$$GINI = f(NPI, UNR, LEB) \qquad (1)$$

Functionally:
$$GINI = b_0 + b_1 NPI + b_2 UNR - b_3 LEB + U_t \qquad (2)$$

Where:
GINI = Inequality which is captured by Gini coefficient (the proxy)
NPI= National poverty index
UNR= Unemployment Rate
LEB= Life expectancy rate at birth
U_t = Error term
b_0= Intercept
b_1, b_2 and b_3 = coefficient
On the apriori, the study expects: $b_1 > 0$, $b_2 > 0$, $b_3 < 0$

Variables in the Model
Dependent Variables
i. **Income inequality:** This is an indicator of how material resources are distributed across the entire society. It is measured by Gini coefficients which is 0, when everybody has equal income and 1, when one individual has all the income.

Independent Variables
ii. **National Poverty Index** was obtained from the National poverty head count. Here poverty represents the condition in which income is meagre to meet the fundamental requirement of human beings like food, housing, clothing, health care and at least access to basic education.

iii. **Unemployment Rate r**efers to the ratio of labour force willing, able and vigorously looking for work but could not find work for at least 20 hours during the reference period.

iv. **Life Expectancy at Birth s**hows the mean number of years that a new born infant would live if prevailing pattern of mortality at the time of birth were to stay the same.
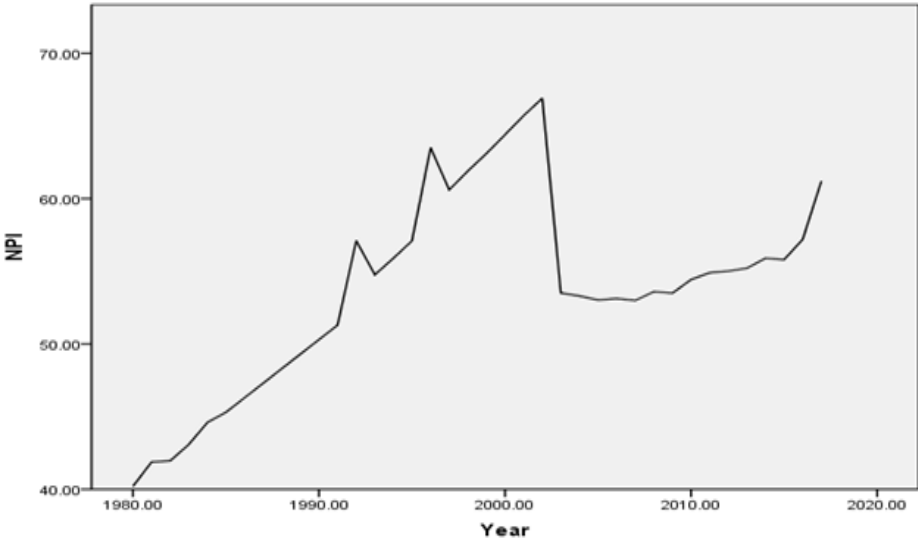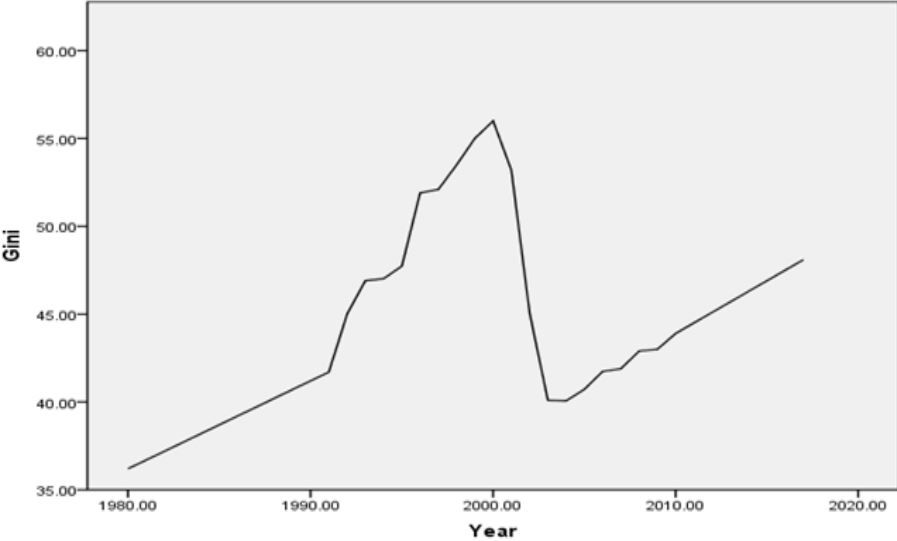
Results
Table 1: Data on Gini, NPI, UNR and LEB

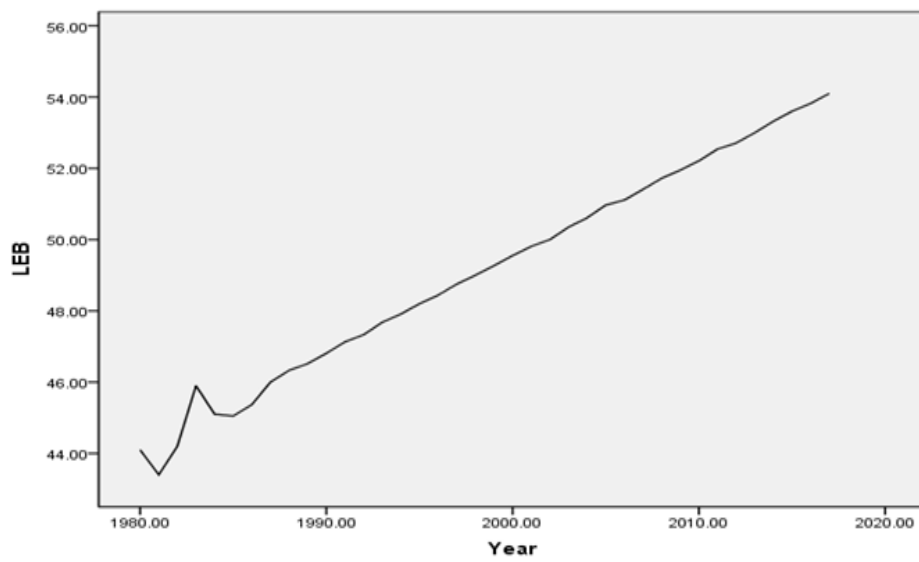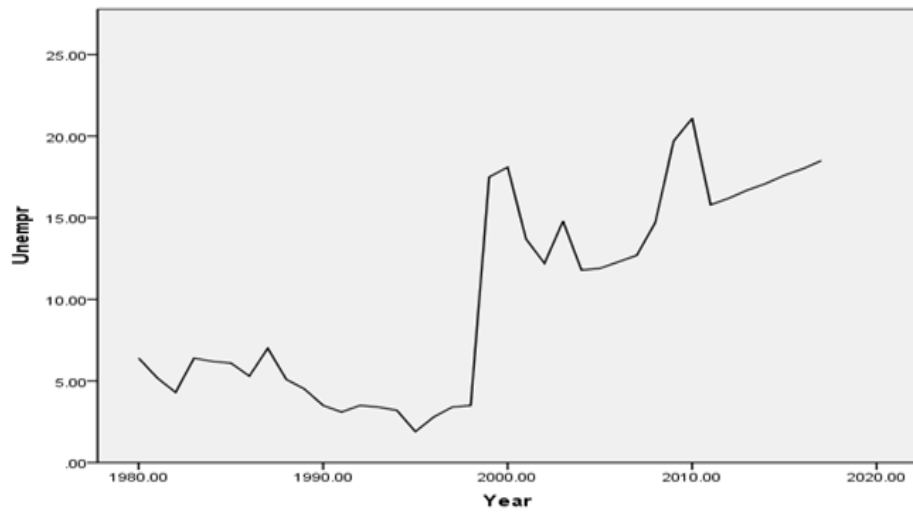| Year	Gini (%)	NPI (%)	UNR (%)	LEB (yrs)
1980	36.2	40.2	6.4	44.1
1981	36.7	41.88	5.2	43.4
1982	37.2	41.96	4.3	44.2
1983	37.7	43.08	6.4	45.9
1984	38.2	44.6	6.2	45.1
1985	38.7	45.3	6.1	45.05
1986	39.2	46.3	5.3	45.37
1987	39.7	47.3	7	46
1988	40.2	48.3	5.1	46.33
1989	40.7	49.3	4.5	46.52
1990	41.2	50.3	3.5	46.81
1991	41.7	51.3	3.1	47.13
1992	45	57.1	3.5	47.33
1993	46.9	54.76	3.4	47.68
1994	47.02	55.9	3.2	47.91
1995	47.73	57.1	1.9	48.2
1996	51.9	63.5	2.8	48.44
1997	52.1	60.6	3.4	48.75
1998	53.5	61.9	3.5	49
1999	55	63.1	17.5	49.27
2000	56	64.4	18.1	49.55
2001	53.2	65.7	13.7	49.81
2002	45.08	66.9	12.2	50
2003	40.1	53.5	14.8	50.35
2004	40.06	53.3	11.8	50.61
2005	40.72	53.02	11.9	50.97
2006	41.74	53.12	12.3	51.11
2007	41.89	52.99	12.7	51.41
2008	42.9	53.6	14.7	51.72
2009	43	53.5	19.7	51.95
2010	43.9	54.43	21.1	52.21
2011	44.5	54.9	15.8	52.54
2012	45.1	55.01	16.2	52.71
2013	45.7	55.21	16.7	53
2014	46.3	55.9	17.1	53.32
2015	46.9	55.8	17.6	53.6
2016	47.5	57.2	18	53.82
2017	48.1	61.2	18.5	54.1

Sources: World Bank Group (www.worldbank.com)
CBN Statistical Bulletin (www.cbn.gov.ng)

Table 2: Graphs for Gini and NPI

Source: Estimated by the Author using IBM-SPSS VER 19

Table 3: Graphs for UNR and LEB

Table 4: Ordinary Least Square Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.39430	10.04219	1.831703	0.0758
LEB	-0.330130	0.259126	-1.274013	0.2113
NPI	0.773303	0.073542	10.51512	0.0000
UNR	0.041081	0.109679	0.374558	0.7103

R-squared	0.821877	Mean dependent var	44.19053
Adjusted R-squared	0.806160	S.D. dependent var	5.307572
S.E. of regression	2.336779	Akaike info criterion	4.634724
Sum squared resid	185.6582	Schwarz criterion	4.807102
Log likelihood	-84.05976	Hannan-Quinn criter.	4.696055
F-statistic	52.29304	Durbin-Watson stat	0.847259
Prob(F-statistic)	0.000000		

Source: Estimated by the Author using E-views 9

Table 5: Augmented Dickey-Fuller Tests Results

Coefficients	Critical Values at 5%	ADF Values	Probability	Comments
GINI	-2.948404	-5.608707	0	I(1)
UNR	-2.945842	-5.799373	0	I(1)
LEB	-2.951125	-17.49538	0.001	I(1)
NPI	-2.948404	-10.656	0.000	I(1)

Source: Authors Computation (E-views 9.0)

Table 6: Johansen Co-integration test results

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.537283	60.10443	40.17493	0.0002
At most 1 *	0.491738	32.36138	24.27596	0.0039
At most 2	0.158178	7.998067	12.32090	0.2368
At most 3	0.048754	1.799367	4.129906	0.2115

Trace test indicates 2 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 7: Parsimonious ECM test results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	131.4331	7534.321	1.983307	0.6433
D(LEB(-1))	-28.43372	074.7511	2.721190	0.0021
D(LEB(-3))	-39.73442	321.9312	3.611551	0.0000
D(NPI(-1))	53.24362	5211.062	-1.342202	1.5723
D(NPI(-3))	43.36533	7321.144	4.313922	0.0000
D(UNR(-1))	-42.46320	6.086084	2.173391	0.0044
D(UNR(-3))	14.76277	083.1644	2.855211	0.0138
ECM(-1)	-0.532429	066.5912	-2.084421	0.0017

R-squared	0.665479	Mean dependent var		23113.25
Adjusted R-squared	0.513211	S.D. dependent var		22853.84
Sum squared resid	32.32110	Schwarz criterion		20.32113
Log likelihood	-113.8732	Hannan-Quinn criter.		20.62112
F-statistic	22.09833			
Durbin-Watson stat	2.033859			
Prob(F-stat.) = 0.001213				

Source: Estimated by Author using E-view 9

Table 8: Granger causality test Results

Null Hypothesis:	Obs	F-Statistic	Prob.
LEB does not Granger Cause GINI	33	0.20911	0.9551
GINI does not Granger Cause LEB		0.52280	0.7564
NPI does not Granger Cause GINI	33	2.72736	0.0460
GINI does not Granger Cause NPI		7.82652	0.0002
UNEMPR does not Granger Cause GINI	33	3.24078	0.0242
GINI does not Granger Cause UNR		1.33384	0.2869
NPI does not Granger Cause LEB	33	1.58026	0.2070
LEB does not Granger Cause NPI		0.34850	0.8777
UNR does not Granger Cause LEB	33	1.15785	0.3608
LEB does not Granger Cause UNR		1.52941	0.2215
UNR does not Granger Cause NPI	33	3.21716	0.0249
NPI does not Granger Cause UNR		1.01283	0.4338

Source: Estimated by the Author using E-view 9

Discussion

Descriptive Trend Analysis

The data presented in table 4.1 shows that inequality proxied by Gini coefficient which stood at 36.2% in the year 1980 increases to 38.7% in 1985. It further increased to 39.2%, 41.2, 47.73 and 55.0% in 1986, 1990, 1995 and 1999 respectively. As observed from the table, Nigeria had the highest inequality (highest Gini coefficient) in the year 2000 which stood at 56.0%. From the year 2001, inequality which stood at 53.5%, constantly decreased to 40.72% in 2005, but inclined to 43.9% and 48.1% in 2010 and 2017.

Moreover, National Poverty Index (NPI) was 40.2% in 1980, but increases to 50.3% in 1990, 64.4% in 2000 and attained maximum of 66.9% in 2002. This however declined to 54.43%, 61.2% in 2010 and 2017. Furthermore, unemployment rate (UNR) was 6.4% in 1980 which generally decreases to 3.5% in 1998 surged to 17.5% in 1999 and then to 18.5% in 2017. Finally, Life Expectancy at Birth (LEB) which stood at 44.1% years in 1980 witnessed small but upward movement all over the period of the study to 44.3 years, 51.72 years in 1981 and 2017 respectively.

Ordinary Least Square (OLS) Test
With reference to table 4.2, the result of the OLS shows that (R^2) is 0.82. This means that 82% of the changes in inequality are explained by the changes in the unemployment rate, national poverty index and life expectancy at birth. The F-value of 52.293 with the probability value of 0.000000 shows that the overall model is statistically significant at 5% level, while the Durbin-Watson value of 0.82 shows the presence of high level serial autocorrelation since it is far from 2.0.

Furthermore, the coefficient of life expectancy rate at birth was negatively related with inequality but statistically not significant at 5% level. The coefficient of national poverty index was positively related with inequality and significant, while the coefficient of unemployment rate was positively related with inequality but not significant. All the variables in the model conform to the a priori expectations.

Short-run data analysis presentation
$$GINI_t = 18.4 - 0.33LEB_t + 0.77NPI_t + 0.04UNR_t$$
t-tests = (-1.27) (10.5) (0.37)
f-test = 52.3, R^2 = 0.82, DW = 0.8

Unit root test (ADF)
The results of unit root test for stationarity using ADF in table 4.3 shows that all the variable (inequality, unemployment rate, poverty and life expectancy rate at birth) were stationary at first differencing with ADF values are higher than their critical values at 5% significance.

Johansen Co-Integration Test
The result from table 4.4 shows a long run association among the elements used with two trace statistics values higher than their critical value at 5%. Also, there are two co-integration equations which necessitate need for the Error Correction Model (ECM).

Error Correction Mechanism (ECM)
The Parsimonious ECM estimated from table 4.5 revealed that the variation in inequality explained by life expectancy at birth, national poverty index and unemployment rate is 67%. The coefficient of the ECM is negatively signed. Thus, the short run deviation are adjusted to long run equilibrium position at a speed of 53% as indicated by the coefficient (-0.532429) of the ECM.

F-statistics value of 22.09833 with the probability value of 0.01213 reveals that NPI, UNR and LEB are significant in explaining inequality over the period of this study. The Durbin-Watson value of 2.03 which is not far from 2.00 indicates lesser degree of serial auto correlation. As indicated in the result, the first and third legs of the independent variable – life expectancy rate at birth are negative and significant at 5% with inequality. This conforms to the a priori expectation.

Pairwise Granger Causality Test
Table 4.6 depicts the test result for causal association among the elements employing Granger Pairwise causality test. The result reveals a unidirectional causality runs through unemployment rate and inequality, unemployment and poverty, while life expectancy and inequality demonstrate no sign of causality. More importantly, the result indicates bidirectional causality between poverty and inequality, implying that poverty and inequality can be used in predicting changes in one another.

Conclusion
Adopting the Ordinary Least Square, Unit root, Co-integration, ECM and Granger causality test to analyze the data from CBN Statistical bulletin and World Bank, the study specifically determine how poverty, unemployment and life expectancy at birth affects inequality in Nigeria. The OLS result indicated that national poverty index was positively related to inequality and significant. Unemployment rate was positively related to inequality but not significant and life expectancy at birth was negatively related to inequality but significant at 5% level. Furthermore, all the variables were stationary and showed evidence of long run relationship. Meanwhile, the estimated ECM result revealed that poverty and unemployment have positive significant relationship with inequality. It is established from the result that as poverty and unemployment rate increased, inequality correspondingly increased, inferring closed links among these variables. Also, the Pairwise causality test results unmasked a bi-directional causality between poverty and inequality over the period of the study indicating that both of them can be used in predicting the changes in each other. From the results and main findings, the study recommends that deliberate effort by government to creating employment opportunities as a major tool to combat poverty and inequality in Nigeria.\

Recommendation
  i.   Deliberate efforts should be made by government at all levels to creating employment opportunities as a major tool to fight against poverty and inequality in Nigeria.
  ii. Policy measures by government towards the combat of poverty and inequality should not neglect the efficacy of employment generation as they are all interwoven economic problem facing the country.
  iii. Government and all the relevant agencies should provide ways of making credit available to the citizenry and also pursue policies of financial inclusion to accommodate the poor and the vulnerable either through deposit money banks or special development banks to reduce inequality in the country.
  i.   Formulate policies to reduce poverty, inequality and the health status of the citizenry. There should be improved access to affordable healthcare services.

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