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Asymmetric Relationship Between Income Inequality and Economic Growth in Nigeria

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ABSTRACT

Nigeria's case is ironic, with so much wealth both human and material yet inequality in income and poverty is evident. Therefore, this study focuses on the asymmetric relationship between income inequality and economic growth in Nigeria (1986-2022) with the intension of understanding whether growth reduces or increases income inequality. The study explored the Non-linear Autoregressive Distributed lag (NARD) model approach with the intent of enabling both the short run and long run asymmetric effect. The findings indicated that, asymmetry is only obvious in the long run and that the early stage of growth does not reduce income inequality. However, in the long run evidence of growth reducing income inequality abounds if the growth reaches 5.5% as indicated by the outcome of Kuznets turning point. Based on these findings the study recommends that; poverty alleviation programmes should be targeted at the real poor and such programmes should last enough to make real impact. Public institutions saddled with the responsibility of equipping the youths with skills should be well funded and giving the freedom they deserve to function effectively. Access to quality higher education should be widen and affordable, because when people are educated at this level there are better chances for economic mobility.

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INTRODUCTION

Globally, human capacities have created dichotomy between the incomes we earn as individuals, social status and the opportunities available to us. Hence, the issue of income inequality will continually be raised across the world, however people will continue to earn in respect to their earning abilities. Extant literature lay emphasis more on differences in the income we earn rather than the opportunities that developed these capacities that enable individuals to earn higher incomes. Therefore, the need for creating a favourable environment to enable people to develop requisite skills according to their abilities should be the main concern. This is paramount as incomes are not distributed but earn through multiple transactions that takes place across the globe on daily basis (Sowell, 2016). According to Abdulazeez (2024) and Mayah et al. (2017), sixty-two people had as much wealth as the poorest half of humanity and the richest one percent owned much wealth than the rest of the world

put together.

The high inequalities in income across the Sub-Saharan Africa is more on the opportunities that created them than the incomes people earned. Bhorat & Naidoo (2018) buttressed further that the most unequal societies are largely located in Africa, and that recent attention has shifted toward Africa's high, and in most cases growing, levels of income inequality, as well as the potential risks this poses for Africa's poverty dynamics in the near future. The Gini index for Kenya stood at 41.6% implying high income inequality (Adan et al., 2023). To mitigate this incidence of high inequality in income, the Kenyan authorities had implemented some programmes, these includes public spending in human capital especially in health and education targeted at reduction of income inequality and improving livelihoods of the citizens (Adan et al., 2023). While for Ghana studies indicated that poverty level has reduced but income inequality has not (Omoniyi et al., 2021). However, Ghana is making efforts at addressing income inequality through fiscal policy measures such as taxation and social programmes. Furthermore, the authorities adopted sustainable agricultural technologies which include, Purdue Improved Crop Storage bags which have so far decreased postharvest losses and improving farm revenue. This has help in reducing income inequality among farmers in Ghana (Adams et al., 2024). Similarly, in Nigeria, the disparity in income is evident even in public institutions, salaries earned are unequal, while the majority endures with the minimum wage at staggering double-digit inflation, very few in prestigious institutions (mostly children of the rich and affluent) earned above similar institutions in more developed and stable economies. Little wonder, the richest Nigerian man earns from his personal investment in a year enough to lift 2 million Nigerians out of poverty for a year, furthermore $24 billion will lift all Nigerians living below the poverty line of $1.9 out of poverty for a year, ironically the wealth of five richest Nigerians totaled $29.9 billion (Mayah et al., 2017). Nigerian can learn from Ghana and Kenya in the fight against income inequality and poverty to enhance growth.

Economic growth takes into cognizance the expansion of economic activities in an economy that leads to creation of job opportunities and distribution of income and resources across all divide and reduction in the general poverty level. These will enable households to have access to quality education and better health services. The case of Nigeria seems dicey, with growth recorded in some years inequality and poverty still persist, in 2014 Nigeria's real gross domestic product stood at ₦ 984196.6 (Central Bank of Nigeria, 2023) Income inequality stood at 46.3 and in 2015 at 46.9 (World Bank, 2024), while poverty rate stood at 56.4 percent (World Bank, 2024) at the same period. Hence, this question come to mind; is economic growth reducing or increasing inequality in income in Nigeria. This paper intends to examine the asymmetric relationship between income inequality and economic growth in Nigeria. The study explores the Non-linear Auto Regressive Distributed Lag (NARDL) model approach. The superiority of this technique rest in its ability to decompose the effect of the independent variables on the dependent variable into its positive and negative components.

METHOD

Empirical Review

There are three factors determine the outcome of a study; duration, methodology and location. Therefore, the various literature consulted have varied outcomes based on these factors.

Using the Auto Regressive Distributed lag (ARDL) model approach, Abdulazeez (2024)interrogated disparity in income, globalization and growth in Nigeria between 1986 to 2022. Result from the study indicated that, globalization has negatively significant effect on the Nigerian economy. Therefore, the study suggested that, to benefit from globalization, the Nigerian authorities should enhance her infrastructure especially energy and security to encourage local processing of products especially from the extractive industry and to create favourable economic conditions that encourage local industries to grow sustainably. While for Asongu & Eita (2023) it was the differences in poverty effect and the inequality in income on economic growth across sub-Saharan Africa. They used GINI index for the measure of income inequality and head count ration for poverty for 42 nations across the sub-Sahara Africa. They used quartile regression for analysis, results showed that decrease in economic growth showed to be negative on poverty. They concluded that, across the sub-Sahara region, incidence of poverty affect growth.

The link between growth, poverty and inequality across the SSA region was interrogated by Naufal & Fikriah (2023). They used the granger causality test to analyse data and outcome indicated existence of a bidirectional causality between poverty and economic growth while a unidirectional causality between inequality and economic growth. The study recommended strategies to mitigate inequality for enhanced economic growth across the SSA region. Using dynamic panel threshold Shen & Zhao (2022) investigated reasons income inequality affect growth of the economy at different income level. The study found that, income inequality delays growth, however, the delay becomes irrelevant when fertility is put under control in an economy. The delay consequence of inequality in income on GDP growth takes place at low-income levels than at high income levels. Based on these outcomes the study recommended that at low-income stage, relevant authorities should rise the percentage of salaries to the work force, this will improve the reduction in the income gap.

Impact of growth and unfair distribution of income on Central Sulawesi Province poverty rate between 2011 to 2020 by Darise (2023). Multiple linear regression technique was employed for analysis of secondary data obtain for the study. Outcome showed that, wage pull has a negligible and positive impact on poverty, however, in the long run, growth has slight effect on poverty reduction. Income source and tragedy of increasing inequality and poverty was analysed by Makarenko et al. (2022). They sourced data from the Russian longitudinal Monitoring Survey Higher School of economics for 2000 to 2018. Findings from their study revealed that social transfer to poor households do not reduce income inequality.

Difference GMM, system GMM and three-stage least square regression techniques were used by Alao et al. (2020) for critical analysis on aid and inequality across the

African continent. Findings indicated an inverse link between international aid and income inequality across the African continent within the study period, it also exposes a positive link between; poverty rate, income per capita and income inequality. Based on this outcome the study recommended stringent checking and channeling of aid towards poverty reduction programs in a bid to reduce the level of income inequality across the African continent. Furthermore, a comparative review on growth-poverty-inequality triangle in Sub-Saharan Africa, Latin America and Caribbean Countries was carried out by Adeleye et al. (2020). Fixed effects and system GMM approach was used for data analysis. Findings indicated that; growth, poverty alleviation properties, inequality rate of growth increases poverty and that the growth-poverty-inequality triangle differs across income groups and region. For Isiaka (2020) he looked at inequality among EU countries about 15; he questioned social benefits; whether they are pro-poor, pro-middle class of pro-rich. For analysis he employed various statistical techniques; static panel regression model estimated with pooled ordinary least squares and least squares dummy variables technique. Outcome showed that, on aggregate level on inequality, social benefits have negative but significant effect, furthermore it indicated that for low- and middle-class social benefits have positive effect, for the higher income groups share it indicated negative effect. The study recommended that, rising disparity in income needs to be attend to by policy makers as this will improve on social benefits.

Disparity in income and the matrix of Nigeria's economy was interrogated by Okafor (2016), using the Vector Auto-regressive (VAR) model and the Engel Granger causality technique. Result indicated that, economic growth has no impact on income inequality and poverty reduction in Nigeria due to its non-inclusive growth nature. Hence, the study recommended that government should develop stronger economic institutions that are capable of reorganising the productive base and reward system in the economy to promote and guarantee economic efficiency, equity and macroeconomic stability. Lahouij (2017) studied the effect of income inequality on economic growth: evidence from Middle East and Africa (MENA) countries. The study employed the panel data procedure and result showed that income inequality decelerates the percentage of variations in economic growth. The study recommends that countries in the MENA region should shift focus to human capital development and investment as they appear to accelerate the rate of change of economic growth in the region. However, poverty alleviation and growth of the Nigerian economy was the focus of the study by Ijaiya et al. (2011) the study explored multiple regression technique for estimation. Outcome of the study indicated that, early level of growth does not alleviate poverty, and does not reduce income inequality while later stages of growth alleviate poverty and reduce income inequality in Nigeria. Based on the outcome they recommended sustained rate of growth to mitigate the effect of poverty and income inequality in the Nigerian economy

Kuznet Theory of Income Inequality

Kuznets (1955) propounded that, when an economy is at the low stage of per capital income, the level of income inequality is high, mostly because income is still

concentrated at the upper level of the economy (the rich that have capital for investment). Furthermore, the level of income inequality increases as the economy keeps growing, it gets to a point where increase growth leads to reduction in income inequality, this point is referred to as the turning point. At this stage there is rise in per capita income which leads to more savings and this translates to more investment, more jobs created and rise in the productive capacities of the economy. For this study, the importance of Kuznet theory lies in its ability to explain the rise and fall in income inequality in respect to the economy, hence this study chooses to understand the Nigerian experience, whether rise in growth reduces or increases income inequality. Hence creating the need for ascertaining the point at which this change in growth and income inequality occur.

Nature and Sources of Data

The study uses time series data, real gross domestic product (RGDP) and gini coefficient (GINI) from Central Bank of Nigeria (CBN) Statistical Bulletin, Human Capital (HC) from Penn World Table, poverty rate (POVR) and unemployment rate (UEPR) from World Development Indicator (WDI) between 1986 to 2022.

Model Specification

The Non-linear Auto Regressive Distributed Lag (NARDL) model was used to analyse the asymmetric effects of income inequality on economic growth in Nigeria. NARDL model permits understanding the asymmetric effects of the negative and positive variations in the independent variables on the dependent variable.

$$GDPGR=f(GINI^{t}, GINI^{-}, POVR, HC, UEPR)$$

$$GDPGR_t=\alpha_0 +\alpha_1 GINI^{+}_t+\alpha_1 GINI^{-}_t+\alpha_3 POVR_t+\alpha_4 HC_t+\alpha_5 UEPR_t$$

$$GDPGR_t=\alpha_0 +\alpha_1 GINI^{+}_t+\alpha_1 GINI^{-}_t+\alpha_3 POVR_t+\alpha_4 HC_t+\alpha_5 UEPR_t+ \mu_t$$

$$\Delta GDPGR_t=\alpha_0 +\rho GDPGR_{t-1}+\theta^{+} GINI^{+}_{t-1}+\theta^{-} GINI^{-}_{t-1}+\beta_1 POVR_{t-1}+\beta_2 HC_{t-1} + \beta_3 UEPR_{t-1}+ \sum_{i=1} p\text{-}1 +\gamma i\Delta GDPGR_{t-1}+ \sum_{i=0} q_1 \left(\pi^{+} i\Delta GINI^{+}_{t-i}+\pi^{-} i\Delta GINI^{-}_{t-i}\right)+ \sum_{i=0} q_2 \varphi i\Delta POVR_{t-i}+ \sum_{i=0} q_3 \delta i\Delta HC_{t-i}+ \sum_{i=0} q_4 \psi i\Delta UEPR_{t-i}+\mu_t$$

Where:

GDPGR	: Gross domestic product growth rate
$GINI^{+}$ and $GINI^{-}$	: Proxy for income inequality
POVR	: Poverty rate
HC	: Human capital development
UEPR	: Unemployment rate
α_0 to α_5	: Indicates unknown vector parameters
μ_t	: Depicts stochastic term
Δ	: First difference operator
p	: Lag order of the dependent variable

q1, q2, q3, q4 : Lag orders of the independent variables
θ^+ and θ^- : Long-run effects of positive and negative changes in GINI
π^+ and π^- : Short-run effects of positive and negative changes in GINI
ρ : Speed of adjustment parameter
μ_t : Error term.

Expectation

Table 1. Apriori Expectation

Variable	Expected Sign	Source	Explanation
RGDP		CBN	The value in Naira of all currently produced goods and services sold in the market during a given year.
GINI	Negative (-)	CBN	Indication of how resources are been distributed across the society. Ranges from 0 to 1, 0 = perfect equality, 1 = perfect inequality.
POVR	Negative (-)	WDI	Poverty is not healthy for an economy
HC	Ambiguous (+/-)	PWT	High level of human capital (skills) attracts investment thereby enhance growth while low level of human capital discourage investment, especially in tech industries.
UEPR	Negative (-)	WDI	Unemployment in an economy increases the rate of poor people and they cannot contribute meaningfully to the economy like in payment of taxes.

RESULT AND DISCUSSION

Augmented Dickey Fuller (ADF) Unit Root Test

Table 2. Unit Root Test Result

Variables	T. stat	Prob.	Stationarity	Order
RGDP	-5.242208*	0.0001	Stationary	I(1)
GINI	-5.902286*	0.0000	Stationary	I(1)
POVR	-4.733201*	0.0432	Stationary	I(1)
HC	-6.22320*	0.0185	Stationary	I(0)
UEMPR	-3.451454**	0.0161	Stationary	I(1)

The outcome of the ADF unit root test in Table 2 indicated a mix order of stationarity, real gross domestic product (RGDP), Gini coefficient (GINI), poverty rate (POVR) and unemployment rate (UEMPR) were stationary at first difference, while human capital (HC) was stationary at level.

NARDL Bounds Test

Table 3. Bounds Test Result

Model Specification	F-Statistics	K	Lower Bound (5%)	Upper Bound (5%)	Conclusion
Non-Linear ARDL	27.37713	6	2.27	3.28	Cointegration

The outcome of the NARDL bounds test showed that there is long run relationship (cointegration) among income inequality and economic growth in Nigeria, hence the F-Statistics is greater that the value of both the lower and upper bound. This outcome necessitates the need for estimation of both the long and short run NARDL model.

Wald Test

Table 4. Wald Test Result

Test Statistics	Values	df	Prob. Values
T statistics	-1.996032	20	0.0597
F statistics	3.984144	(1, 20)	0.0597

Table 4 showed the outcome of the Wald test which indicated significance, this implies presence of asymmetric relationship between income inequality and economic growth.

NARDL Asymmetric Short Run and Long Run Model

Table 5. NARDL Asymmetric Short Run and Long Run Model Result

Variables	Coefficient	P- values
LRGDP (-1)	0.087144	0.3030
$LGINI^{+}$	-10.38973	0.0000
$LGINI^{-}$	0.798218	0.0568
$POVR^{+}$	-0.016033	0.3806
$POVR^{-}$	0.013335	0.0284
LHC^{+}	1.489767	0.3201
LHC^{-}	-335.3593	0.0000
$UEMPR^{+}$	-0.053265	0.0038
$UEMPR^{-}$	0.723845	0.0000
D(LGINI)	-8.132144	0.0001
D(POVR)	0.002093	0.8890
$D(LHC^{+})$	-10.91902	0.0144
$D(LHC^{-})$	-7.498800	0.7822
D(UEMPR)	-0.006867	0.6836
R-squared	0.788438	
A.R- squared	0.747344	
D. Watson	1.057469	
Prob. (F-statistic**)**	0.000000	

Outcome of the result in Table 5 indicated that the independent variables, gini coefficient (GINI), poverty rate (POVR), human capital (HC) and unemployment rate (UEMPR) explained about 78% of the of the total variations in economic growth

(RGDP) while the remaining 22% is capture by the stochastic term. A look at the prob(F-statistics) value of 0.00000 an indication that the overall model is robust.

In the long run, the outcome of the estimation on Table 5 indicates that the coefficient of the positive and negative components of gini are statistically significant at 5% although, the coefficient of the positive component is negative and that of the negative is positive. This imply that in the long run shocks in the economy resulting from the positive and negative effects of income inequality are not the same. The estimated coefficient of positive gini in the long run is -10.38973, this implies that in the long run 1% surge in income inequality will lead to contraction in economic growth by 10.3%. While the estimated coefficient of negative gini is 0.798218, implying that in the long run, decrease in income inequality will lead to expansion in economic growth by 0.7%. This means that in the long run both positive and negative gini will have effect on economic growth. The negative and positive coefficient imply that growth in the early stage might not affect income inequality because it has not trickle down to rise income level and create more jobs, income is still concentrated at the upper level of the economy. Theoretically, this finding agrees with Kuznets (1955) income inequality theory, however, this finding is in tandem with the findings of Ijaiya et al. (2011).

Poverty has a negative coefficient on the positive component and statistically insignificant, while the negative component has positive coefficient but statistically significant. An indication that in the long run shocks in the economy resulting from the negative and positive effect of poverty are not the same. The estimated coefficient of the positive component of poverty is -0.016033, this implies that in the long run a unit surge in poverty will cause contraction in the economy by 0.01%. Increase in poverty in the long run will have a negative effect on the economy and stifle growth, this is a clear negation of the tenets of pro-poor growth and so because most poverty reduction programmes in Nigeria have an interventionist approach, which are usually short lived and don't last long to cause meaningful effect in the long run. This finding is in tandem with the findings of Okafor (2016) where he found that economic growth has no effect on income inequality and poverty due to non-inclusive nature of growth. The estimated coefficient of the negative component of poverty is 0.013335, an implication that in the long run, reduction in poverty will cause expansion of about 0.01% in the economy. While a reduction in poverty in the long run will cause an expansion in the economy because the disposable income of the poor has improved and their active participation in the economy is evident through improved consumption. Theoretically, this is in tandem with the Keynesian school of thought.

For human capital, the positive component has a positive coefficient and statistically insignificant, while the negative component has a negative coefficient and statistically significant. The estimated coefficient of the positive component of human capital is 1.489767, implying that in the long run decrease in huma capital will cause a contraction in the Nigerian economy that is likely to be above 5%. While the coefficient of the negative component of human capital is -335.3595, implying that in the long run increase in human capital will stimulate expansion in the Nigerian economy by approximately 5%. Decrease in human capital in the long run will lead to negative shocks in the economy as investors will be forced to look beyond the shores of the

economy for talent to keep their investment afloat. This breeds capital flight and not healthy for a growing economy like Nigeria. On the other hand, increase in human capital will stimulate investment, an implication of increased investment in education, health and skills acquisition. However, Nigeria has a short fall in investment in education, health and enhancement of technical education, emphasis is placed on certificate over skills, although, there is a gradual improvement with consistency this might change over time.

The coefficient of unemployment on the positive component is negative and significant, while that of the negative component is positive and statistically significant. This means that in the long run the positive component of unemployment has an estimated coefficient of -0.053265, this implies that in the long run rise in unemployment rate will cause a contraction in the Nigerian economy by approximately 5%. While the estimated coefficient of the negative component of unemployment is 0.723845, an indication that in the long run reduction in unemployment will cause and expansion in The Nigerian economy by approximately 5%. Theoretically, allowable percentage of unemployment is healthy for the economy but high rate of unemployment is unhealthy for an economy. Rise in unemployment lead to increase in income inequality and poverty in the economy.

In the short run, coefficient of estimated component of gini D(LGINI) is -8.132144 negative and significant statistically at 5%, this implies that a unit decrease in income inequality will lead to increase of approximately 8.1% in economic growth (RGDP). This implies that in the short run income inequality is non asymmetric and a unit decrease will initiate expansion in the Nigerian economy. This is an indication that should income inequality reduce it will initiate process that has the potential that can lead to growth. For the component of poverty, the estimated coefficient is 0.002093 which is positive and not significant at 5%, this implies that a unit increase in poverty in the short run will initiate decrease in economic growth (RGDP). In the short run poverty is non asymmetric, hence, increase in poverty will initiate a process of contraction in the economy. Human capital is asymmetric in the short run, with both negative coefficient for the positive and negative components, implying that in the short run shocks resulting from the positive and negative components of human capital are the same. The positive component has a coefficient of -10.91902 and significant at 5%, implying that in the short run, a unit decrease in the positive component of human capital will initiate a process of contraction in economic growth at about 5%. The negative component has a coefficient of -7.498800 and not significant at 5%, this means a unit decrease in the negative component of human capital will initiate a process of contraction in the economy above 5%. In the short run, increase or decrease in human capital will affect the economy negatively. Unemployment is not asymmetric in the short run, with a negative coefficient of -0.006867 and not significant at 5%, this means that a unit decrease in unemployment rate in the short run will initiate a contraction in the economy that is above 5%.

The Kuznets Turning Point

The Kuznets turning point refers to a point at which the increase in economic growth

with increase in income inequality reverses to increase in economic growth with reduction in income inequality.
Empirically thus;

$$t = -0.5(-\beta_1 / (2\beta_2))$$

Where:
t = Where the dependent variable RGDP (in this case) reaches its maximum value for Nigeria it was 2014.
β_1 = Coefficient of the linear income inequality (GINIC)
β_2 = Coefficient of the squared income inequality ($GINIC^2$)

for the purpose of this study:
t = taken at 2014, where the dependent variable is at its maximum
β_1 = 46.3
β_2 = 2143. 69

Therefore:
$t = -0.5\ (-46.3/\ 2(2143.69))$
$t = -0.5\ (-46.3/\ 4287.38)$
$t = -0.5\ (-0.01079913607)$
$t = 5.496$ or 5.5

Based on the empirical outcome of the turning point, it indicates that for every 5.5% increase in economic growth (RGDP) income inequality (GINI) will decrease by a unit in Nigeria. Implying that growth in the Nigerian economy has to reach 5.5% to reduce income inequality by a unit. However, the Nigerian case is dicey because from 1989 to 1990 still within the purview of this study, data indicated that the Nigerian economy grew by 9%, however income inequality increased from 40.7% in 1989 to 41.2% in 1990 (WDI, 2023), increase of about 6%, instead of reduction. The Nigerian case might imply that growth don't actually lead to rise in the general income level and job creation as Nigeria rely so much on importation of virtually everything, this has the potential to negatively affect the process of job creation. The extractive industry that has the potential to create jobs is short changed in the value chain of processing for dearth of infrastructure especially energy, basic inputs and poor security.

CONCLUSION

This study interrogated the asymmetric relationship between income inequality and economic growth in Nigeria using annual data between 1986 to 2022. Employing the Non-Linear Auto Regressive Distributed Lag (NARDL) model approach, which allows for the plausible examination of the short run and long run asymmetric effect between the variables of interest between 1986 to 2022. The turning point between income inequality and economic growth in Nigeria within the same study period was also ascertained, this is the contribution of this study to literature. Furthermore, modelling income inequality and economic growth using linear method only in respect to Nigeria might be ambiguous. The outcome of the study indicated that asymmetry between

income inequality and economic growth in Nigeria exist only in the long run. The study found that initial growth does not reduce income inequality but consistent growth in the long run can reduce income inequality. While for the Kuznets turning point, it indicated income inequality will reduce by a unit, should the Nigerian economy grow by 5.5%. Based on the outcome of this study the following recommendations were arrived at; poverty alleviation programmes should have a more organised plan and targeted at the real poor people and not those who are linked to politicians and such programme should last enough to make real impact. Public institutions saddled with the responsibility of equipping the youths with skills should be well funded and giving the freedom they deserve to function effectively. Access to quality higher education should be widen and affordable because when people are educated at this level there are better chances for economic mobility.

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