Financial Development and Income Inequality in Nigeria

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Abstract

This research work investigates the impact of financial development on income inequality in Nigeria using secondary data from the World Development Indicators database and the Standardized World Income Inequality Database (SWIID) spanning from 1990- 2023. The methodology employed includes the ADF test for unit root, the Johansen Test for Co-integration, the Ordinary Least Square (OLS) Technique, and diagnostic tests like the normality test, stability test, Granger causality test, and hypothesis testing. The unit root test result shows that the variables are in the same order of stationarity at first difference. The Johansen Test for Co-integration shows that there is a long-run relationship between the variables in the model. The OLS results of the analysis show that financial deepening (FID) and bank capital to asset ratio (BCAR) have a negative relationship with income inequality in Nigeria with financial deepening having a significant relationship with income inequality; and bank capital to asset ratio have an insignificant relationship with inequality. The results also show that Credit to the private sector (CPS), population growth (POP), and trade openness (TOP) maintain a positive and insignificant relationship with income inequality in Nigeria. From the Granger Causality test, the Gini coefficient (GINI) has uni-directional causation with financial deepening (FID), bank capital to asset ratio (BCAR), population growth (POP), and trade openness (TOP) as their probability values are less 5% level of significance. Based on these findings, the study recommended that policymakers should focus on several key strategies. Firstly, promoting financial deepening through initiatives like expanding banking services to underserved areas and enhancing digital financial platforms can help reduce inequality. Secondly, strengthening banking regulation and supervision is crucial for maintaining a stable financial system and thereby contributing to economic stability and decreased income inequality to mention but few.

Keywords: *Income inequality, Diagnostic test, Financial deepening, GINI coefficient*

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Background to the Study
The linkage between financial development and income inequality has become a subject of interest in recent times. Economists, both in local and international literature are keen on examining the nexus between the two concepts. Financial development as put forward by Abdin (2016) justifies the existence of robust financial regulations and framework which is capable of attracting domestic and foreign investment. It is said to be the process of strengthening and extending a country's or region's financial system. This includes the creation of new financial institutions, markets, and infrastructure, as well as the improvement of financial services and products. Income inequality, as measured by the GINI coefficient, is a persistent phenomenon that has evolved into a major global economic problem. The global economic trend has been characterized by the degree of income inequality, which may have contributed to the uncertainty in the global economy, and Nigeria is not an exception. According to Sharma et al. (2011), income inequality refers to the unequal distribution of income among members of a certain group, an economy, or a society. The magnitude of economic disparity in Nigeria may be seen in the daily challenges the bulk of the population faces as a result of the excessive wealth amassed by a small number of people. For example, while over 100 million people in Nigeria live in poverty, the richest Nigerian man would need to spend $1 million each day for 42 years to exhaust all of his fortune Oxfam, (2017). The analysis demonstrates that the richest Nigerian may generate enough money each year from his wealth to lift 2 million people out of poverty for a full year. It would take around $24 billion to lift all Nigerians living below the $1.90 extreme poverty threshold out of poverty for a year, which is less than the total amount of wealth owned by the rich in the country. As the international community repositions itself to fulfil the Sustainable Development Goal (SDG) of "leaving no one behind," the need to address income inequality in Nigeria has persisted in receiving adequate attention, with the goal being to catch up the 2030 millennium goal. Increased and sustainable growth, social cohesion, economic progress, and peaceful cohabitation may result from the lowering of inequality Wilkinson & Pickett (2016). The Nigerian government has sought steps to eliminate inequality, and financial development comes in handy.

Financial development is critical to the reduction of income inequality. According to Tiwari et al. (2013), the rise of the financial sector contributes to increased economic growth, which reduces income disparity in two ways. Firstly, investments typically become more alluring when borrowing is more affordable. Small business owners, therefore, want to grow to increase profits. As a result, increased financial growth, employment prospects, output creation, and the welfare of the poor all move in the same direction. Secondly, because families can send their kids to receive a higher level of education and health care, which is a ladder to escape the poverty trap, borrowing at a reasonable cost will also raise the quality of human capital. Furthermore, according to Gharleghi (2020), the expansion of the financial sector is crucial in reducing income disparity since it enables people to become more productive by starting businesses and other ventures. By fostering an atmosphere that makes financial services easily accessible to the most vulnerable, a strong financial system has the potential to lower poverty and inequality. The services include credit disbursement, savings mobilization, and offering grassroots clients micro insurance services (Sara and Alessio,

2017). Additionally, it might offer training and advising services to help people develop their financial literacy. Particularly, the growth of the financial failure. More job prospects for the impoverished are made possible by the availability and ease of finance to microenterprises (Daouda,2015) while improving more equitable income distribution (Omojolaibi, 2017; Adams and Klobodu, 2016).

On the other side, given recent developments, a financial system will favour wealthy individuals since it allows them to access capital swiftly, which in turn encourages them to amass greater wealth. While the financial accessibility for the underprivileged society is limited. As a result, this tendency will promote greater economic expansion while escalating income inequality. This justification is also reinforced by Gharleghi's (2020) assertion that financial development may lead to a rise in income inequality as a result of higher returns to the wealthy and financial services while having little to no effect on the financial empowerment of the less fortunate. Additionally, the rapid expansion of the financial sector may result in a widening income inequality, which would worry the nation's leaders greatly. More specifically, stronger economic growth may result in higher inflation, making inflation one of the potential factors influencing the degree of income disparity in this study. In addition to economic growth, several diverse elements that contribute to inequality in developing nations have been found in earlier studies. For instance, economists have talked extensively about the increasing internationalization of economic activity and how it affects income inequality. In the case of Nigeria, the increase in internationalization is one of her core goals which implies a growing economic openness among countries to trade (TO) and foreign direct investment (FDI).

Looking at these two nexuses of financial development on income inequality, it becomes a necessity for research work to be conducted in the Nigerian context to determine how financial development affects income inequality. This study examines the effects of financial development indicators and other chosen macroeconomic indicators, such as financial deepening, domestic credit (% of GDP), broad money (% of GDP), bank capital-to-asset ratio, foreign direct investment, age dependency ratio, and trade openness, towards income distribution in Nigeria in recognition of the financial development issues linked to rising income inequality. As a result, special attention needs to be paid to finding a potential macroeconomic solution that can reduce the income gap. The rest of the paper is organized as follows: Section 2 presents relationship between monetary policy and unemployment in Nigeria; Section 3 showcase the theoretical Underpinning of the Study and the reviews of related literature; Section 4 dealt with the empirical framework and econometric models; Section 5 undertakes the empirical analyses and presents results; and Section 6 concludes the paper with policy implications and recommendations.

Theoretical Framework and Review of Related Literature
Different studies have been conducted on financial development and its impacts on the income inequality of different economies. However, some such studies have been selected as essential for this research. This work is anchored on the following theories:

Financial Imperfection Theory

The research is based on the financial imperfection theory. The financial imperfection theory was proposed by Galor and Zeira (1993). The hypothesis is based on the existence of market economic constraints that impede access to finance. These constraints exist in the form of transaction and information costs and they limit people's access to finance, and these constraints arise because of imperfections in the market system. Therefore, financial imperfection causes financial development to negatively affect income inequality (Mookerjee and Kalipioni, 2010). This theory points to the need for differentiating between financial access and financial depth (mostly used to capture financial development) dimensions. Thus, the presence of financial constraints is harmful as it can be responsible for excluding people from accessing financial products and services, which affects the ability of an individual to invest in human capital, thereby leading to persistence in income inequality (Kling et al., 2022).

Proponents (Banerjee and Newman, 1993; Galor and Moav, 2004; Galor and Zeira, 1993) of the theory offered that financial constraints will be eased as the financial system develops, thereby improving access to finance. Consequently, the development of the financial system should not be solely based on the evaluation of the size of the financial system. Financial development without increased access to finance would foster income inequality. In this vein, financial development could facilitate capital allocation efficiency (Thornton and Tommaso, 2020; Zhang and Naceur, 2019). Therefore, this study evaluates how financial development dimensions affect income inequality in Nigeria.

The Kuznets Theory of Inequality

Kuznets proposed the Kuznets theory of inequality in 1955 when he wrote about the movement of disparity in rich and poor countries. The United States and the United Kingdom were among the countries with the greatest reductions in income disparity ever recorded in history, along with rapid economic expansion. The Kuznets hypothesis was chosen because it accurately depicts the relationship between income inequality and major economic factors like per capita income. According to the Kuznets inverted 'U' hypothesis, an indicator of income inequality (Gini coefficient) should first be positively correlated with per capita income growth or economic development; then, after the economy has reached the apex of the curve, an inverse relationship between the two variables should be observed in a subsequent period. Although Kuznets originally linked economic growth to inequality, the concept has lately been expanded to incorporate other macroeconomic concerns such as pollution, poverty, and technology (Cassette, Fleury& Petit, 2012; Gruber & Kosack, 2014). Kuznets developed the inverted 'U' hypothesis to explain the growth of income disparity as an economy transit from an agriculturally dominant structure to a more sophisticated, industrialized, or service-based economy.

The following are the starting conditions that exist before the inverted 'U' Kuznets hypothesis takes effect: First, in an agrarian economy, where relatively low per capita income abounds and there is unlikely to be a considerable degree of income inequality. Second, in comparison to the rural agricultural sector, the industrial urban component of the economy will be small.

This industrial urban sector will be distinguished by higher per capita income and, possibly, a larger degree of income inequality. Different studies have been conducted on financial development and its impacts on income inequality in different economies and Nigeria.

Okafor, Olurinola, Bowale, and Osabohien (2023) empirically examine how financial development affects income inequality in Africa. Financial development dimensions, access, depth, efficiency, and stability were considered to achieve the study's objective. The study applied the system generalized method of moments (SGMM) to analyse data and the findings showed that each dimension of financial development had a varying impact on income inequality. Access, stability, and efficiency components of financial development reduce income inequality, while the depth dimension of financial development exacerbates income inequality in Africa. Therefore, the study recommends that policymakers should not neglect other dimensions of finance in facilitating economic development.

Sotiropoulou, Georgopoulos, and Giakoumatos (2022) investigated the causality between financial development, economic growth, and income inequality using panel data for 23 European Union countries over the period 1987- 2017. Various proxies of financial development are chosen to represent the depth, efficiency, and stability of the banking system and stock markets. For the empirical analysis, the study performs the Granger non-causality test in heterogeneous panels. The findings are contradictory and sensitive to the measures of financial development. Most importantly, the results reveal a one-way causality from financial development to economic growth when private credit, stock market capitalization, net margin interest rate, and Z-score are chosen as financial development indicators. In addition, a two-way causality exists between bank assets, liquid liabilities, non-performing loans, and economic growth, and a one-way causality from economic growth to value traded and turnover ratio. However, the results show no causality between stock price volatility and economic growth. The results indicate a one-way causality running from income inequality to economic growth. Finally, a one-way causality runs from income inequality to financial development for most measures of financial development except for a one-way causality running from private credit to income inequality, a two-way causality between bank assets and inequality, and an absence of causality between income inequality and turnover ratio, Z-score and stock price volatility.

Igwegbe and Metu (2021) assessed the determinants of income inequality in Nigeria using annual time series data from 1981 to 2018. The data were estimated using the fully modified ordinary least square (FMOLS) technique. Factors identified as having affected income inequality during the period include the level of economic development attained, technology, globalization, fiscal policy, rural-urban drift, and financial access. The result also showed that the relationship between income growth and income inequality over time was linearly monotonic, rather than inverted U-shape as stipulated in the Kuznets hypothesis. Based on the findings, it is recommended, among others, that there should be a strengthening of technological progress through the adoption, adaptation, and diffusion of existing technologies to address technology-induced inequality in Nigeria. Jauch and Watzka (2011) investigated the link between financial development and income inequality for a broad

unbalanced dataset of 138 developed and developing countries over the years 1960 to 2008. Using credit-to-GDP as a measure of financial development, their results rejected theoretical models predicting a negative impact of financial development on income inequality measured by the Gini coefficient. Controlling for country-fixed effects and GDP per capita, they find out that financial development has a positive effect on income inequality. These results are robust to different measures of financial development.

Sabir, Asghar, and Rasul (2021) investigated the nexus between financial deepening and income equality in developing countries. Two indicators of income inequality, the Gini coefficient, and the income share of the bottom quintile of the population were used for this analysis of 31 developing countries spanning the period 1996 to 2019. The system generalized method of moment (GMM) is used to tackle the problem of endogeneity. This study finds the inverted U-shaped relationship between gross domestic product (GDP) per capita and income inequality, while a non-linear relationship is observed between financial deepening and income inequality. This implies that at an early stage of financial development income inequality increases and as a certain threshold level of financial development is marked, income inequality decreases. Moreover, educated and healthy human capital has negative impacts on income inequality in developing countries. Therefore, this study infers to enhance human capital development in developing countries to crush income inequality.

Ridzuan et al. (2020), undertook a study on the Nexus between Financial Development and Income Inequality before Pandemic Covid-19: Does Financial Kuznets Curve Exist in Malaysia, Indonesia, Thailand, and the Philippines? The bound test was applied to examine the long-run and short-run relationships based on the sample period beginning from 1970 until 2016. The results confirmed the existence of a long-run relationship between the variables. Financial development in Malaysia, Indonesia, and Thailand had successfully reduced income inequality, however, a different effect was recorded in the Philippines where income distribution was worsened. Furthermore, economic growth brought a positive effect on income distribution in Malaysia and Indonesia, but not in Thailand and the Philippines. Inflation, trade openness, and foreign direct investment provided mixed results for all countries. Among the policies recommended are there should be more easy accessibility for entrepreneurs to reach a wide range of financial services including conventional and Islamic financial products, the expansion of the capital market, as well as giving proper attention to the financial sector. Besides, granting access to capital markets for low-income groups or underprivileged individuals might be helpful to them either by developing entrepreneurial skills or involvement in productive activities and receiving better salaries. This policy will give insight to the policymakers to strengthen their financial institutions, especially during the pandemic of Covid-19.

Olohunlana and Dauda (2019), examined the short and long-run implications of the four measures of financial development on poverty reduction and income inequality in Nigeria within the period 1996-2017. The study employs the Autoregressive distributed lag (ARDL) long-run co-integration approach. The results revealed a positive but economically insignificant relationship between financial development, poverty, and inequality both in the

short and long run. The study further revealed that corruption and inflationary levels exhibited a positive effect on poverty reduction and income inequality. These results advocated for the establishment of more bank branches as well as the development of informal/micro-financial institutions in rural areas. Since the result particularly pointed out the significance of the financial institution's efficiency and stability as germane to foreign and domestic investment attraction, the government should embark on policies that strengthen the efficiency and stability of the sector. It also recommends that since the control of corruption has been highlighted as a panacea for poverty and inequality reduction, the government should tilt toward policies that would address corruption which is the most important element in institutional quality.

Though there is extant literature that connects financial development to income inequality, the researcher consulted few that have examined and underscored the subject matter in Nigeria and other economies of the world. The empirical findings on the impact of financial development on income inequality carried out by these studies are somewhat not conclusive for generalization and in answering the research questions, even as they have different results. Albeit, the findings are in so far revealing and satisfactory. The cause of discrepancies in results may be attributed to model specification, nature of data, and research design. Furthermore, the scopes of their literature were not able to capture recent trends, as most of them stopped in 2013 and 2017. Recent economic events from 2018-2021 are not taken into consideration, thereby questioning their applicability in a dynamic economy like Nigeria. Nevertheless, the researcher equally gave credit to these findings and found them to be somewhat relevant in contributing to the body of knowledge. Based on the aforementioned claims, this study attempts to cover the gap identified, by empirically examining the link between financial development and income in Nigeria for the period 1990-2023.

Empirical Framework and Econometric Modelling with Data Sources
The study employs the econometric technique since the study is of time series, some pre-test assessments was carried out. For instance, the unit root test is important as it allows us to examine whether a time series data is stationary or not, to avoid spurious regression. Again, a co-integration test is carried out to ensure the long-run relationship of the variables while the appropriate econometric test will be determined by our unit root test results. Hence, for this study, there is a need for the results to be evaluated based on the economic a priori criteria, statistical criteria, and econometric criteria.

The method of data collection is documentary. Current, relevant, and rich data/literature were sourced from the World Development Indicators (WDI) database. Unfortunately, the WDI does not provide sufficient data on income inequality. In response to the problem, the Standardized World Income Inequality Database (SWIID), proposed by Solt (2016), was utilized. Our choice was largely based on data availability. Together with emerging countries, the SWIID also covers income inequality data for other countries, constituting a database of 192 countries, with the first observation dated back to 1960. Note that only the Gini coefficient is provided in the SWIID database, Data was also sourced from the Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) for variables which are found in Nigeria as the

scope of study. In line with this, the data used for this study are time series data covering 1990 to 2023.

To evaluate financial development and income inequality in Nigeria, we specify the following functional model, which is anchored on the financial imperfection theory.
$$GINI = f\,(FID, CPS, BCAR, POP, TOP) \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

In its mathematical form, the model is presented as:
$$GINI = \beta_o + \beta_1 FID + \beta_2 CPS + \beta_3 BCAR + \beta_4 POP + \beta_5 TOP \ldots\ldots\ldots (2)$$

The model when specified in its econometric form becomes:
$$GINI = \beta_o + \beta_1 FID + \beta_2 CPS + \beta_3 BCAR + \beta_4 POP + \beta_5 TOP + U_t \ldots\ldots (3)$$

Where:
GINI   = Gini coefficient (a proxy for income inequality)
FID   = Financial deepening
CPS   = Credit to private sector
BCAR = Bank capital to asset ratio
POP   = Population growth
TOP   = Trade openness
β_o = Intercept or constant term
β_1-β_5 = Parameters to be estimated. They measure the effect of the independent variables on the dependent variables.
U_t = Stochastic term. This takes care of other variables not computed in the model.

The null hypothesis of no cointegration among variables in equation 4 can be tested as
H0: $\beta1 + \beta2 + \beta3 + \beta4 + \beta5 + \beta6 = 0$ against the alternative hypothesis of
HI: $\beta1 \neq \beta2 \neq \beta3 \neq \beta4 \neq \beta5 \neq \beta6 \neq 0$

Log Form of the Model
The variables financial deepening, credit to private sector, bank capital to asset ratio, population growth, trade openness, and Gini coefficient will be logged for the estimation procedure and descriptive analysis of the data. The log transformation of a variable helps to scale down variables and for easy interpretation in elasticity.

$$LGINI = \beta_o + \beta_1 LFID + \beta_2 LCPS + \beta_3 LBCAR + \beta_4 LPOP + \beta_5 LTOP + U_t$$

Results and Discussion
Descriptive Statistics.
The table below shows the median, maximum, and maximum standard deviation, skewness, kurtosis, and Jaque-Bera test for the normality of the Model variables. The mean values simply tell us the average value of each of the variables. The descriptive statistics result below presents the mean of the Gini coefficient (GINI), financial deepening (FID), credit to the private sector (CPS), bank capital to asset ratio (BCAR), population growth (POP), and trade

openness (TOP)as 41.37087, 17.93508, 10.27539, 4.449377, 2.604159, and36.16016 respectively. The media values tell the middle value of each of the variables. The Median variable taken from the highest to the lowest value falls between credit to the private sector (CPS) and financial deepening (FID) with values of 9.395146 and 15.84434 respectively. Trade openness (TOP) takes the maximum value of 53.27796, while the bank capital to asset ratio (BCAR) has the minimum mean value of 0.000000from the given observation. The standard deviation shows that the degree of variability of Gini coefficient (GINI), financial deepening (FID), credit to the private sector (CPS), bank capital to asset ratio (BCAR), population growth (POP), and trade openness (TOP), is lower than their various mean. This implies that the series is more spread out.

The skewness results below show that financial deepening (FID), credit to the private sector (CPS), bank capital to asset ratio (BCAR), and trade openness (TOP)are positively skewed. This implies that the distribution has a long right tail and mean, and median values are greater than the mode for each variable. The Gini coefficient (GINI) and population growth (POP) are negatively skewed, implying that the distribution has a long-left tail and mean and median values are less than the mode for each variables. The Kurtosis of Gini coefficient (GINI), financial deepening (FID), bank capital to asset ratio (BCAR), population growth (POP), and trade openness (TOP) is greater than 3 which implies that the distribution is assumed to be peaked (leptokurtic) relative to normal while credit to the private sector (CPS) are less than 3 (platykurtic), suggesting that their distributions were flat relative to a normal distribution. The Jarque−Bera statistics show that the series is normally distributed since the p-values of all the series are not statistically significant at the 5% level. Thus, informing the acceptance of the null hypothesis that says each variable is normally distributed.

Table 1: Summary Descriptive Statistics

	GINI	FID	CPS	BCAR	POP	TOP
Mean	41.37087	17.93508	10.27539	4.449377	2.604159	36.16016
Median	41.55000	15.84434	9.395146	0.000000	2.588849	36.54016
Maximum	42.80000	27.37879	19.62560	17.95485	2.764062	53.27796
Minimum	39.52432	9.063329	4.957522	0.000000	2.406363	16.35219
Std. Dev.	1.150126	6.071568	3.540875	5.566909	0.100915	9.393959
Skewness	-0.287230	0.082702	0.820455	0.807210	-0.084493	-0.157258
Kurtosis	1.597155	1.374326	3.349267	2.364727	1.837692	2.465263
Jarque-Bera	3.063970	3.560233	3.752763	4.013231	1.839355	0.513151
Probability	0.216106	0.168619	0.153143	0.134443	0.398648	0.773696
Sum	1323.868	573.9225	328.8123	142.3801	83.33308	1157.125
Sum Sq. Dev.	41.00651	1142.782	388.6716	960.7048	0.315697	2735.641
Observations	32	32	32	32	32	32

Source: Authors computation (2023).

Test for Stationarity
The Augmented Dickey-Fuller (ADF) unit root test was performed to ascertain the order of integration. The results of the stationarity test are presented in Table 2

Table: 2: Stationarity Test Results

Variables	Order of Integration	Critical Values			ADF Statistics	Prob.
		1%	5%	10%		
Δ (GINI)	I (1)	-3.670170	-2.963972	-2.621007	-3.048522	0.0417
Δ(FID)	I (1)	-3.670170	-2.963972	-2.621007	-4.486711	0.0013
Δ (CPS)	I (1)	-3.689194	-2.971853	-2.625121	-5.056574	0.0003
Δ (BCAR)	I (1)	-3.679322	-2.967767	-2.622989	-7.810908	0.0000
Δ (POP)	I (1)	-3.711457	-2.981038	-2.629906	-4.148610	0.6804
Δ (TOP)	I (1)	-3.679322	-2.967767	-2.622989	-5.422172	0.0001

Source: Author's computation (2023).

Note:

Δ = Difference operator

I(d) = Numbers of times of integration.

Levels= 10%, 5%, 1% levels of significance

The table above, reveals that all the series are stationary; hence has no unit root. Model estimation relating to time series data that are not stationary is sure to produce unreliable regression results. Gini coefficient (GINI), financial deepening (FID), credit to the private sector (CPS), bank capital to asset ratio (BCAR), population growth (POP), and trade openness (TOP) were stationary at the first difference at a 5% significance level. As can be seen, the probability values are less than 0.05 for each of the variables tested. The unit root test result shows that the order of integration of the variables comprises 1(1), as such the most appropriate model to be adopted in analyzing data remains the Ordinary Least Square (OLS) Model and the appropriate co-integration method to be adopted is Johanssen co-integration method.

Johansen Co-Integration Test

Under the Johansen Co-integration test, Co-integration is said to exist if the values of computed Eigen values are significantly different from zero or if the trace statistics is greater than the critical value at 5 percent level of significance. The results of the co-integration in table 3 below indicated a co-integrating equation. This is because trace statistics is greater than the critical value at 5 percent level of significance in three of the hypothesized equations.

Table 3: Johansen Co-Integration Test Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.779272	131.0105	95.75366	0.0000
At most 1 *	0.670882	85.68578	69.81889	0.0016
At most 2 *	0.565371	52.34561	47.85613	0.0178
At most 3	0.411090	27.34776	29.79707	0.0934
At most 4	0.310224	11.46332	15.49471	0.1845
At most 5	0.010665	0.321679	3.841466	0.5706

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Authors computation (2023).

Ols Estimates

Table: 4.: Ols Estimates Results

Dependent Variable: GINI
Method: Least Squares
Date: 03/23/25   Time: 21:45
Sample: 1990 2023
Included observations: 33

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FID	-0.163364	0.033963	-4.810009	0.0001
CPS	0.034482	0.050977	0.676419	0.5047
BCAR	-0.018142	0.030298	-0.598790	0.5545
POP	0.465796	1.245855	0.373877	0.7115
TOP	0.012486	0.013634	0.915839	0.3682
C	42.36270	2.994967	14.14463	0.0000

R-squared	0.812255	Mean dependent var	41.37087
Adjusted R-squared			

Source: Author's computation (2023).

The obtained R-squared and Adjusted R-squared values, 0.812255 and 0.776150 respectively, indicate that the explanatory variables collectively account for over 81% and 77% of the variability observed in the dependent variable. Furthermore, the F-Statistics p-value, which is less than 5% (specifically 0.000000< 0.05), signifies the statistical significance of the F-Statistics. Consequently, the null hypothesis is rejected, affirming that the explanatory variables jointly exert a significant influence on the dependent variable, income inequality. In addition, the Durbin-Watson statistic, with a value of 2.711495, suggests the absence of autocorrelation, as this falls within the acceptable range for applied research without autocorrelation.

Upon examination of Table 4b, it becomes evident that the estimates of the value of financial deepening, represented as FID, is statistically significant at a 5% level of significance because its probability value of 0.0001 is less than 0.05. The estimate exhibits a negative coefficient of 0.163364with income inequality during the evaluation period. This implies that a percentage increase in financial deepening will bring about a 16.3364 percent decrease in income inequality in Nigeria during the evaluation period. Likewise, credit to the private sector (CPS) returns a positive sign of 0.034482 and it exhibits an insignificant relationship with inequality as its probability value of 0.5047 is greater than a 5% level of significance. These results imply that a percentage increase in credit to the private sector (CPS) will lead to a 3.4482 percent increase in income inequality in Nigeria.

Bank capital to asset ratio (BCAR) returns a negative sign of 0.018142 and it is statistically insignificant with income inequality in Nigeria. These results imply that a percentage increase in the Bank capital-to-asset ratio (BCAR) will lead to a reduction in income inequality by 1.8142 percent in Nigeria. Furthermore, population growth (POP) returns a positive sign of 0.465796 and is statistically insignificant to income inequality in Nigeria. These results imply that a percentage increase in population growth (POP) will lead to a 46.5796 percent increase in income inequality in Nigeria. Lastly, the estimates of trade openness (TOP) show that trade openness returns a positive value of 0.012486 and is statistically insignificant with income inequality. This implies that a percentage increase in trade openness will lead to a 1.2486 percent increase in income inequality in Nigeria.

Table 4b: Error Correction Result

Dependent Variable: D(GINI)
Method: Least Squares
Date: 03/23/25   Time: 22:57
Sample (adjusted): 1991 2023
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FID)	-0.001801	0.011071	-0.162716	0.8721
D(CPS)	0.006273	0.011676	0.537253	0.5960
D(BCAR)	0.001342	0.005043	0.266116	0.7924
D(POP)	-0.510220	0.564632	-0.903633	0.3752
D(TOP)	0.000539	0.002110	0.255708	0.8004
ECM(-1)	-0.077654	0.044932	1.728250	0.0468
C	-0.098852	0.018998	-5.203362	0.0000

R-squared	0.169841	Mean dependent var	-0.092764
Adjusted R-squared	-0.037698	S.D. dependent var	0.098204
S.E. of regression	0.100038	Akaike info criterion	-1.570857
Sum squared resid	0.240182	Schwarz criterion	-1.247053
Log likelihood	31.34828	Hannan-Quinn criter.	-1.465305
F-statistic	0.818356	Durbin-Watson stat	1.231331
Prob(F-statistic)	0.566542		

Source: Author's computation (2023)

ECM: The sign of the short-run dynamic interactions is consistent with that of the long-run relationship. The estimated error correction coefficient of -0.077654(0.0468) is significant, has the correct sign, and implies a very low speed of adjustment to equilibrium after a shock. Over 7% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year.

Diagnostic Tests
Normality Test
The models are examined for normal distribution. The Jarque-Bera (JB) statistics is used to test for the normality of the models. The null hypothesis is that the models are normally distributed. The decision rule is to reject the null hypothesis if the p-value is less than 0.05 level of significance.

**Figure 1a:** Normality test of the Models of the Study
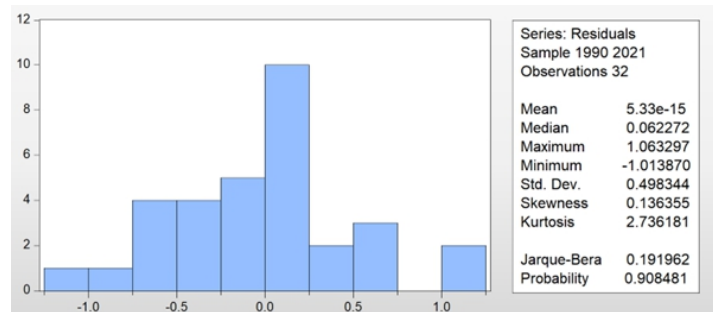
Source: Author's computation (2023).

In the figure above, the Jaque-Bera statistics are used to test for the normality of the model. The Jaque-Bera p-value of 0.908481 is greater than 0.05, thus, there is a normal distribution. That is, the study, therefore, accepts the null hypothesis that the model is normally distributed.

Stability Test
To determine the stability of the model, CUSUM and CUSUM of squares were used. The estimated model is stable if its recursive residuals lie within the two critical bounds. On the other hand, if residuals fall outside the two critical lines the model is said to be unstable. The results of the stability test are presented in Figures 1a and 1b. The analysis in Figures 1a and 1b indicates the graph of CUSUM was unstable because the recursive residuals fall outside the critical line while that of CUSUM of squares was stable, meaning that they are all within the 5 % critical bounds. This result implies that the estimated parameters for the study are both stable and unstable for the period under investigation.

Figure 1b: Plot of Cumulative Sum of Recursive Residuals
CUSUM Result
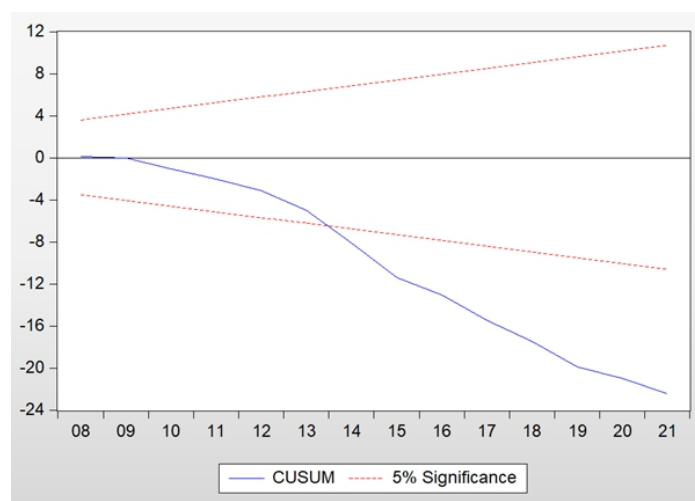
Figure 2: CUSUM of Squares Test
Cusum of Squares
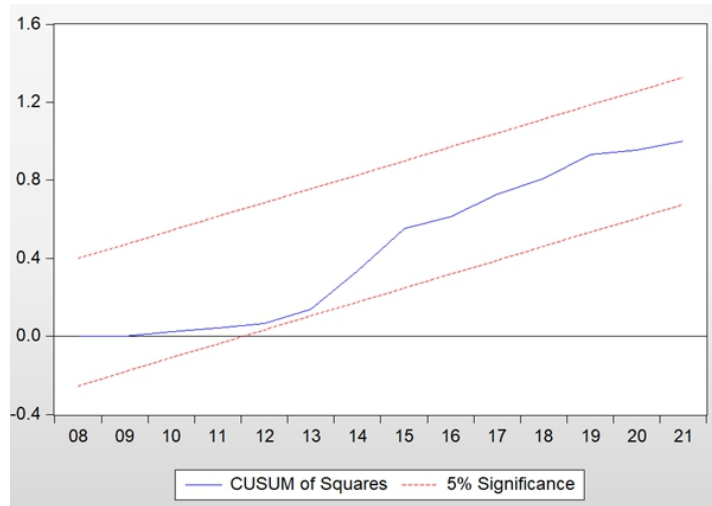
Granger Causality

Cointegration between two variables does not specify the direction of a causal relation, if any, between the variables. Economic theory guarantees that there is always Granger Causality in at least one direction Order, D. and L. Fisher, (1993). Before the Granger causality test, we assume that the variables are stationary, and the residuals are uncorrelated. To examine the hypothesis of the Granger causality test, the probability values of the F-statistics are appointed. We accept the null hypothesis if the P-value is greater than 5% otherwise reject Ho. Hence, this aspect of the work seeks to verify the direction of Granger Causality between monetary policy and investment. Estimation results for Granger causality between the very variables are presented below:

Table 5: Causality Test Results

Pairwise Granger Causality Tests
Date: 03/23/25 Time: 21:25
Sample: 1990 2023
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
FID does not Granger Cause GINI	30	0.13600	0.8735
GINI does not Granger Cause FID		5.19272	0.0130
CPS does not Granger Cause GINI	30	1.16148	0.3293
GINI does not Granger Cause CPS		2.96707	0.0698
BCAR does not Granger Cause GINI	30	0.01617	0.9840
GINI does not Granger Cause BCAR		5.42299	0.0111
POP does not Granger Cause GINI	30	1.97549	0.1598
GINI does not Granger Cause POP		3.44075	0.0479
TOP does not Granger Cause GINI	30	1.69794	0.2035
GINI does not Granger Cause TOP		5.38906	0.0113
CPS does not Granger Cause FID	30	0.34183	0.7137
FID does not Granger Cause CPS		2.01898	0.1539
BCAR does not Granger Cause FID	30	3.56029	0.0436
FID does not Granger Cause BCAR		2.59256	0.0948
POP does not Granger Cause FID	30	0.76200	0.4773
FID does not Granger Cause POP		4.28141	0.0252
TOP does not Granger Cause FID	30	0.62031	0.5458
FID does not Granger Cause TOP		1.39282	0.2670
BCAR does not Granger Cause CPS	30	8.97777	0.0012
CPS does not Granger Cause BCAR		2.77428	0.0816
POP does not Granger Cause CPS	30	1.05902	0.3618
CPS does not Granger Cause POP		0.71808	0.4975
TOP does not Granger Cause CPS	30	0.00335	0.9967
CPS does not Granger Cause TOP		0.89206	0.4225
POP does not Granger Cause BCAR	30	1.05273	0.3639
BCAR does not Granger Cause POP		0.75951	0.4784
TOP does not Granger Cause BCAR	30	0.30035	0.7432
BCAR does not Granger Cause TOP		1.71620	0.2003
TOP does not Granger Cause POP	30	0.63976	0.5358
POP does not Granger Cause TOP		3.53749	0.0444

Source: Author's computation (2023).

From the table above, it was also observed that Gini coefficient (GINI) has uni-directional causation with financial deepening (FID), bank capital to asset ratio (BCAR), population growth (POP), and trade openness (TOP) as their probability values is less 5% level of significance.

Hypotheses Testing

The test of hypotheses will be based on the probability values from the OLS results is assigned.

H$_{01}$: There is no relationship between financial deepening and income inequality in Nigeria.

To examine the hypothesis of the significant relationship between financial deepening and income inequality in Nigeria, the probability values of the T-statistics in the OLS test are appointed. We accept the null hypothesis if the P-value is greater than 5% otherwise reject Ho. From OLS test results, we find out that the probability of the financial deepening, 0.0001 is less than 0.05, hence, we reject the null hypothesis, and accept the alternate hypothesis, that is, there is a significant relationship between financial deepening and income inequality in Nigeria.

H$_{02}$: There is no influence between credit to the private sector and income inequality in Nigeria.

To examine the hypothesis of the influence between credit to private sector and income inequality in Nigeria, the probability values of the T-statistics in the OLS test are appointed. We accept the null hypothesis if the P-value is greater than 5% otherwise reject Ho. From the OLS test results, we find out that the probability of credit to the private sector,0.5047, is greater than 0.05 in the short run, hence, we accept the null hypothesis, that there is no influence between credit to the private sector and income inequality in Nigeria.

H$_{O3}$: There is no effect between the bank capital-to-asset ratio and income inequality in Nigeria.

To examine the hypothesis of the effect between the bank capital-to-asset ratio and income inequality in Nigeria, the probability values of the T-statistics in the OLS test are appointed. We accept the null hypothesis if the P-value is greater than 5% otherwise reject Ho. From the OLS test results, we find out that the probability of the T-statistic, 0.5545is greater than 0.05, hence, we accept the null hypothesis and reject the alternate hypothesis, that is, there is no effect between the bank capital-to-asset ratio and income inequality in Nigeria.

Summary of Major Findings

The Study examined the impact of financial development and income inequality in Nigeria. The explanatory variables are financial deepening (FID), credit to the private sector (CPS), bank capital to asset ratio (BCAR), population growth (POP), and trade openness (TOP) in Nigeria between the periods of 1990 through 2021 while the dependent variable is the Gini coefficient (GINI) proxy for financial development. The study adopted an ex-post facto research design and used secondary data obtained from the CBN Statistical Bulletin. The study covered a period of 31 years (1990 to 2021). The data were subjected to the Augmented Dicker Fuller stationarity test to determine the best suitable econometric tool for analyses. The Autoregressive Distributive Lag (ARDL) was used for the model estimation.

Conclusion

The OLS results of the analysis show that financial deepening (FID) and bank capital to asset

ratio (BCAR) have a negative relationship with income inequality in Nigeria with financial deepening having a significant relationship with income inequality; and bank capital to asset ratio have an insignificant relationship with inequality. The results also show that Credit to the private sector (CPS), population growth (POP), and trade openness (TOP)maintain a positive and insignificant relationship with income inequality in Nigeria. The test of hypothesis shows that bank capital to asset ratio (BCAR) and Credit to the private sector (CPS) have an insignificant relationship with income inequality while financial deepening (FID) has a significant relationship with income inequality in Nigeria. Therefore, it is necessary for policy makers and government to promote financial development in Nigeria so as to bail the economy out of rising income inequality.

Recommendations

The study's findings yield several noteworthy recommendations of significance to policymakers, financial institutions, and investors.

1. Facilitating Financial Deepening: In light of the discernible inverse correlation between financial deepening and income inequality, it is imperative that policymakers accord precedence to endeavors aimed at fostering financial inclusivity and expanding access to financial services across all demographic strata. Such initiatives encompass the broadening of banking services' geographical reach to encompass underserved regions, the promotion of digital financial platforms, and the provision of support for financial literacy initiatives.

2. Reinforcing Banking Regulatory Oversight: Despite the insignificance of the relationship between BCAR (Bank Capital Adequacy Ratio) and income inequality, it remains incumbent upon the government to uphold the stability of the banking sector. Strengthening the framework of banking regulation and supervision holds the potential to uphold a robust financial system, thereby contributing to both economic stability and the mitigation of income inequality.

3. Advocating Prudent Lending Practices: To augment the constructive ramifications of financial deepening on income inequality, it is advisable for the government to actively endorse judicious lending practices within financial institutions. This encompasses the implementation of regulations designed to counteract predatory lending practices, the assurance of equitable interest rates, and the fostering of transparency in financial transactions.

4. Facilitating Credit Accessibility for Productive Sectors: Given the statistically insignificant connection between CPS (Credit to Private Sector) and income inequality, policymakers can channel their efforts towards directing credit towards sectors that exhibit the potential to engender employment opportunities and ameliorate income disparities. This could be realized through the institution of targeted lending programs and incentives tailored for enterprises operating within such sectors.

5. Managing Demographic Growth: In light of the positive yet statistically insignificant correlation between population growth and income inequality, the government ought to deliberate on policies that tackle the challenges associated with demographic expansion, encompassing measures such as ensuring access to quality education and

family planning services. Education, in particular, assumes a pivotal role in the long-term reduction of income inequality.

6. Advancing Inclusive Trade Policies: Although trade openness was found to exhibit a positive yet statistically insignificant link with income inequality, it behooves the government to adopt trade policies that prioritize inclusivity. This entails ensuring that the benefits of trade are equitably distributed across various segments of the population and offering support to industries that hold the potential to ameliorate income inequality.

7. Establishing Systematic Monitoring and Assessment: Policymakers should institute a rigorous system for the systematic monitoring and evaluation of the efficacy of these recommendations in mitigating income inequality. Such an approach will enable data-driven adjustments to policies and programs as necessitated by evolving circumstances.

8. Enriching Social Safety Nets: In tandem with these measures, the government should persist in its investments in social safety nets and targeted welfare programs to provide a protective buffer for vulnerable demographics that may not realize immediate benefits from financial deepening and other economic policies.

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Appendices
Data presentation
This chapter focuses on the presentation of data used in estimating the model as developed and enumerated in chapter three. The data were sourced mainly from World Development Indicators from 1990-2021.

Table 1: Data Presentation

YEAR	GINI	CPS	BCAR	FID	TOP	POP
1990	42.4	4.95752	0	11.6354	30.9247	2.628598955
1991	42.5	5.2411	0	13.3999	37.0216	2.562201236
1992	42.6	8.23451	0	14.2474	38.2274	2.523727963
1993	42.7	7.00772	0	15.7877	33.7198	2.555767624
1994	42.7	8.03729	0	15.0919	23.0592	2.574829449
1995	42.8	6.50871	0	10.2819	39.5284	2.557189798
1996	42.8	6.17444	0	9.06333	40.2577	2.526852594
1997	42.7	7.03059	0	9.72527	51.461	2.522964745
1998	42.6	7.61945	0	10.939	39.2786	2.516033896
1999	42.4	8.16881	0	12.7634	34.4578	2.542619887
2000	42.3	8.24899	0	14.6696	48.9956	2.60286877
2001	42.1	9.88081	0	15.901	49.6805	2.651265494
2002	42	8.08434	0	13.527	40.0352	2.682889956
2003	41.9	8.90948	0	13.0266	49.335	2.692767906
2004	41.8	8.46166	0	11.7588	31.8959	2.695503465
2005	41.6	8.4351	0	11.3005	33.0595	2.693693418
2006	41.5	8.12036	0	11.729	42.5666	2.695925823
2007	41.4	13.797	15.6635	19.2911	39.3369	2.709626937
2008	41.2	18.633	17.9549	23.8119	40.7968	2.719686803
2009	41.1	19.6256	4.07968	25.1442	36.0587	2.727384843
2010	40.9	13.4907	1.49041	21.3558	43.3208	2.744378852
2011	40.7	11.0436	10.6178	22.479	53.278	2.764062379
2012	40.5	10.6047	10.8206	24.9282	44.5324	2.749288878
2013	40.3	11.5332	10.3923	25.448	31.0489	2.697474043
2014	40.2	13.297	10.429	22.6896	30.8852	2.628123853
2015	40	13.0787	12.3757	22.3668	21.3327	2.541187462
2016	39.9	14.608	11.3717	27.3788	20.7225	2.507034086
2017	39.8	12.852	6.84371	24.7814	26.3476	2.52731692
2018	39.7	10.2466	8.48837	25.3625	33.0078	2.496644904
2019	39.6	11.1576	7.76912	23.9296	34.0239	2.448200698
2020	39.6434	12.1319	6.77537	25.2216	16.3522	2.440608885
2021	39.5243	13.5918	7.30791	24.8862	22.5765	2.406363381

Source: World Development Indicators (2021)

Table 1 depicts the annual time series data of financial deepening (FID), credit to the private sector (CPS), bank capital to asset ratio (BCAR), population growth (POP), trade openness (TOP), and Gini coefficient (GINI) in Nigeria between the periods of 1990-2021. The available data forms the basis for our test and analysis.