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The Impact of Financial Development on Nigeria's Social Welfare and Inequality

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Abstract

This study investigates the asymmetric effects of financial development on income inequality in Nigeria using the Nonlinear Autoregressive Distributed Lag (NARDL) model for the period 1981 to 2024. By decomposing financial development into positive and negative changes, the study explores whether the impact of financial expansion differs from financial contractions in shaping income distribution. The results reveal that income inequality in Nigeria is persistent, with past levels significantly influencing current outcomes. Positive changes in financial development initially exacerbate inequality, as early access tends to favor higher-income groups. However, over time, inclusive financial development contributes to reducing inequality, suggesting a delayed redistribution effect. Conversely, negative financial development shocks worsen inequality in the long run, highlighting the vulnerability of low-income groups during financial regressions. Credit to the private sector is found to have an inequality-reducing effect, while broader financial access initially benefits the affluent before trickling down. Social welfare policies and economic growth exhibit mixed impacts, with delayed but meaningful contributions to inequality reduction. The study concludes that while financial development has the potential to reduce inequality, its benefits are not automatic and depend on the depth, direction, and inclusiveness of reforms. Policy recommendations emphasize inclusive financial strategies, better-targeted welfare programs, and sustained credit support for marginalized populations.

Keywords: *Financial Development, Income Inequality, Asymmetric Effects, Credit Access, Social Welfare Policy*

Background to the Study

Financial development plays a crucial role in shaping economic growth, social welfare, and income distribution. A well-functioning financial system enhances capital allocation, promotes investment, and fosters financial inclusion, which in turn improves overall economic well-being (Levine, 2021). In Nigeria, various financial sector reforms have aimed at deepening financial markets, increasing banking efficiency, and expanding access to financial services. However, despite these efforts, income inequality remains high, and social welfare indicators continue to highlight significant disparities in financial access.

Theoretically, financial development is expected to enhance social welfare by enabling individuals and businesses to access credit, savings, and insurance products, thereby improving economic security and productivity (Ibitoye et al., 2025; World Bank, 2025). However, the relationship between financial development and income inequality remains highly complex. In many developing economies, including Nigeria, financial deepening does not always lead to equitable economic outcomes. Structural challenges such as limited access to formal financial services, high borrowing costs, and low financial literacy often exclude low-income and rural populations from the benefits of financial sector growth (Kama & Adigun, 2013). These concerns raise questions about how financial development influences social welfare, whether it reduces or intensifies income inequality, and to what extent financial inclusion mitigates economic disparities. Understanding the effectiveness of financial policies in ensuring inclusive growth and equitable access to financial resources is essential in addressing these concerns.

While extensive research has explored the relationship between financial development and economic growth, fewer studies have examined its implications for social welfare and income inequality in Nigeria. Existing literature primarily focuses on macroeconomic indicators such as GDP growth and investment, often neglecting the direct impact of financial development on household welfare, poverty reduction, and income distribution. Studies such as Ibrahim et al. (2019), Okoduwa, Kwanashie, and Ogbonna (2023), and Nadabo et al. (2024) have largely concentrated on financial sector expansion and overall economic performance, leaving gaps in understanding how financial development translates into broader social outcomes. Given Nigeria's large informal sector and predominantly unbanked population, there is a pressing need to assess whether financial sector growth fosters inclusive economic progress or exacerbates social disparities.

This study seeks to bridge this gap by empirically investigating the impact of financial development on social welfare and income inequality in Nigeria. It examines the extent to which financial development enhances social welfare by improving access to essential financial services and creating opportunities for economic empowerment. It also explores whether financial sector expansion alleviates or exacerbates income disparities and evaluates the role of financial inclusion in addressing economic inequalities. By doing so, the study provides insights into whether Nigeria's financial development fosters inclusive growth, expands economic opportunities for marginalized populations, and contributes to a more equitable financial system.

This research contributes to the literature by offering empirical evidence on the intricate relationship between financial development, social welfare, and income inequality in Nigeria. While prior studies have primarily focused on economic growth, this study emphasizes the distributional effects of financial sector expansion. The findings will provide valuable insights for policymakers, financial institutions, and development agencies seeking to promote financial inclusion and ensure that financial sector growth translates into improved welfare and reduced inequality. The remainder of this paper is structured as follows: Section 2 presents a comprehensive literature review on financial development, social welfare, and income inequality. Section 3 outlines the methodology, including model specification, estimation techniques, and data sources. Section 4 discusses the empirical findings, while Section 5 provides policy recommendations and conclusions.

Literature Review

The relationship between financial development, social welfare, and income inequality has been widely studied, though much of the literature focuses on macroeconomic growth rather than the direct social impacts. This section reviews key theoretical perspectives and empirical findings on the subject, highlighting gaps that this study aims to address.

Empirical Studies on Financial Development and Inequality

Financial Development and Economic Growth

The relationship between financial development and economic growth has been widely examined in the literature. King and Levine (1993) argue that a well-developed financial sector facilitates capital allocation, promotes investments, and accelerates economic growth. Beck et al. (2010) further assert that financial development, through improved access to credit and capital, can stimulate business activities, encourage entrepreneurship, and enhance overall economic performance. Studies on this topic have highlighted the positive influence of financial development on economic growth in various regions, with many focusing on macroeconomic indicators such as GDP and investment (Seven and Coskun, 2016).

In the context of Africa, specifically East Africa, Fengju and Wubishet (2024) investigate the relationship between financial development and economic growth, emphasizing the role of institutional quality. Their findings reveal that financial development has a positive impact on economic growth in East African countries, but this effect is significantly stronger in countries with stronger institutional frameworks. This highlights the importance of robust institutions in enhancing the impact of financial development on economic growth.

However, while extensive research exists on the relationship between financial development and economic growth, fewer studies explore the broader implications of financial development on social welfare and income inequality, particularly in developing countries like Nigeria. Existing studies tend to focus on economic growth metrics and overlook the direct effects on household welfare and income distribution (Moses, Ololade, and Olabode, 2023; Okoduwa et al, 2023; Nadabo et al., 2024). These studies generally miss the critical question of whether financial development promotes inclusive economic progress or exacerbates social disparities, especially in nations with high levels of poverty and inequality.

Financial Development, Social Welfare, and Inequality

The role of financial development in enhancing social welfare and reducing income inequality is a growing area of interest. Several studies suggest that financial inclusion, which increases access to banking, credit, and insurance, can improve the living standards of low-income households and reduce poverty (Demirgüç-Kunt & Levine, 2009; Dupas & Robinson, 2013). However, research on the specific impact of financial sector development on income distribution in Nigeria remains limited. The existing literature has often failed to directly address how financial development influences household welfare, poverty levels, and income inequality in developing economies (Moses et al, 2023; Okoduwa et al, 2023).

Moreover, although studies like those by Buckland (2014) and by Yajima and Nalin (2025) have examined structural barriers in financial systems, there remains a lack of empirical evidence on the effectiveness of financial development policies in mitigating income inequality. These studies rarely focus on the mechanisms through which financial development can either reduce or increase inequality, particularly for marginalized and vulnerable groups in Nigeria. Additionally, institutional quality plays a crucial role in shaping the effectiveness of financial development. Fengju and Wubishet (2024) highlight that in regions with stronger institutional frameworks, financial development has a more significant positive impact on economic growth. However, there is limited research on how Nigeria's institutional environment affects the relationship between financial development, social welfare, and income inequality. Nigeria's unique economic structure—characterized by a large informal sector, low levels of financial inclusion, and significant regional disparities—necessitates further investigation into how financial development policies interact with the country's institutional and regulatory frameworks.

Furthermore, Nadabo et al. (2024) investigate the link between financial development and income inequality in Nigeria, focusing on the potential existence of a Financial Kuznets Curve. Their findings suggest an inverted U-shaped relationship between financial development and income inequality, with financial development initially exacerbating inequality before reducing it. The study also shows a unidirectional causality from financial development to income inequality, emphasizing the importance of targeted policies to mitigate the adverse effects of financial development on inequality. This study contributes valuable insights by examining the Financial Kuznets Curve in Nigeria and filling a gap in research on how financial development policies impact income inequality.

Similarly, Akpa et al. (2024) explore the transmission mechanisms through which financial development affects income inequality in Sub-Saharan Africa (SSA). Their findings show that financial development alone tends to increase income inequality. However, when financial development interacts with GDP per capita, it has a negative and significant effect on inequality, suggesting that financial development requires robust economic growth to reduce income inequality. This study highlights the importance of combining financial development with strong economic growth for a more inclusive and equitable outcome, offering further insights into the complex relationship between finance and inequality in developing regions.

Okafor, Olurinola, Bowale, and Osabohien (2024) also examine financial development's impact on income inequality across Africa. They find that access, stability, and efficiency dimensions of financial development reduce income inequality, while the depth of financial development exacerbates inequality. This study emphasizes the need to consider all dimensions of financial development in designing policies that promote economic equality.

Theoretical Framework

To provide a strong theoretical foundation, the study draws on the Financial Kuznets Curve (FKC) and Theories of Financial Inclusion, which offer insights into how financial development influences income distribution over time.

The Financial Kuznets Curve (FKC)

The Financial Kuznets Curve (FKC) is an extension of Simon Kuznets' (1955) hypothesis on economic growth and income inequality. The FKC suggests that as financial development progresses, income inequality initially increases but later decreases once financial services become more accessible to lower-income groups. This follows an inverted U-shaped pattern:

i. Early Stages of Financial Development: Access to finance is limited to elites, leading to wealth concentration and increasing inequality.
ii. Middle Stage: As financial institutions expand, more individuals and businesses access financial services, reducing barriers to credit and investment opportunities.
iii. Advanced Stage: Widespread financial inclusion helps marginalized groups accumulate wealth, improving overall income distribution and reducing inequality.

The FKC is relevant to this study as it helps explain the nonlinear relationship between financial development and income inequality in Nigeria, where financial inclusion is still evolving, and structural barriers prevent equal access to financial services.

Theories of Financial Inclusion

Financial inclusion theories emphasize the role of access to financial services in reducing inequality and improving social welfare. These theories argue that when people—especially those in low-income groups, gain access to credit, savings, and insurance, they can:

i. Invest in education, health, and entrepreneurship, leading to higher household welfare.
ii. Reduce reliance on informal and exploitative financial sources (e.g., loan sharks).
iii. Build financial resilience against economic shocks, thereby lowering poverty and income disparities.

Several studies, including those by Demirgüç-Kunt & Levine (2009) and Beck et al. (2010) have shown that increasing access to banking services can lead to a more equitable distribution of wealth. In Nigeria, where financial exclusion remains high due to factors such as rural-urban disparities, low banking penetration, and weak institutional frameworks, financial inclusion theories provide a crucial lens for analyzing how financial sector policies can promote social welfare.

Integrating the Two Theories

By combining the Financial Kuznets Curve (FKC) and Theories of Financial Inclusion, this study provides a nuanced understanding of financial development's dual effect on income inequality:

i. Initially, financial development may worsen inequality (as seen in the early stages of the FKC).
ii. However, as financial inclusion improves, inequality decreases (aligning with financial inclusion theories).
iii. Institutional factors, such as government policies and regulatory frameworks, play a critical role in determining whether financial development leads to inclusive growth.

This framework will guide the study's analysis by helping to identify the threshold at which financial development in Nigeria begins to reduce inequality, as well as the policies needed to accelerate financial inclusion for equitable economic growth.

Identified Gap in Literature

While there is abundant research on the relationship between financial development and economic growth, fewer studies examine the implications of financial development for social welfare and income inequality, particularly in Nigeria. Existing literature primarily focuses on macroeconomic indicators like GDP growth and investment, neglecting how financial development impacts household welfare, poverty levels, and income inequality (Moses, et al., 2023; Okoduwa et al, 2023; Nadabo et al., 2024). Furthermore, while studies have explored financial inclusion, there is limited empirical evidence on its impact on marginalized groups and whether financial development genuinely improves their access to essential financial services.

The gap is further compounded by the lack of research addressing the role of institutional quality in shaping the relationship between financial development and social welfare outcomes in Nigeria. Studies such as Fengju and Wubishet (2024) have emphasized the importance of strong institutions for maximizing the positive effects of financial development, but similar research focusing on Nigeria remains scarce. This study aims to fill these gaps by investigating how financial development in Nigeria contributes to social welfare and income redistribution and examining the role of institutional quality and financial inclusion policies in ensuring that financial sector growth is inclusive and equitable.

Methodology

This study investigates the relationship between financial development, income inequality, and social welfare in Nigeria. The research adopts a quantitative approach, utilizing econometric models to analyze the impact of financial development on income inequality and welfare. This section outlines the research design, data sources, model specification, and estimation techniques used to achieve the study's objectives.

Research Design
The study employs a correlational research design to examine the relationship between financial development and income inequality. It uses secondary data spanning from 1981 to 2024 to analyze how financial development affects income inequality, poverty levels, and household welfare. By employing time-series data, the study captures both short-term and long-term dynamics between the variables.

Data Collection and Sources
The data used in this study are secondary data sourced from credible national and international databases, including the World Bank's Global Findex Database, the Central Bank of Nigeria (CBN) Financial Inclusion Reports, the World Development Indicators (WDI), and the National Bureau of Statistics (NBS).

The dependent variable is income inequality, while the key independent variable is financial inclusion, measured using a composite Financial Inclusion Index (FIN_INCL). Other control variables that influence income inequality and financial development are included based on economic theory and empirical literature.

Table 1 below presents the variables used in this study, their measurements, and data sources:
Table 1: Variables, Measurement, and Sources

Variable	Measurement	Expected Relationship	Source
Income Inequality (GINI)	Gini Coefficient (0–100)	Dependent Variable	World Bank, National Bureau of Statistics (NBS)
Financial Development (FD)	Broad Money Supply (% of GDP)	Negative	World Bank, CBN
Financial Access (ACCESS)	Bank Branches per 100,000 Adults	Negative	CBN
Social Welfare Policy (SWP)	Govt. Expenditure on Social Services (% of GDP)	Negative	CBN
Financial Depth (CREDIT)	Domestic Credit to Private Sector (% of GDP)	Negative	World Bank, CBN
Economic Growth (GDPPC)	GDP per Capita (constant USD)	Negative	World Bank, CBN

Explanation of Expected Relationships:
i. FD & GINI (-): Higher financial development is expected to reduce income inequality.
ii. ACCESS & GINI (-): More bank branches improve financial inclusion, reducing inequality.

iii. SWP & GINI (-): Increased government social spending helps reduce inequality.
iv. CREDIT & GINI (-): More credit to the private sector enhances opportunities, reducing inequality.
v. GDPPC & GINI (-): Higher economic growth is generally linked to lower inequality.

Model Specification

The general functional form of our model is expressed as:

$$GINI_t = f\left(FD_t, ACCESS_t, SWP_t, CREDIT_t, GDPPC_t\right) \quad (1)$$

Where:

$GINI_t$	= Income inequality (Gini Coefficient)
FD_t	= Financial Development (Broad Money Supply as % of GDP)
$ACCESS_t$	= Financial Access (Bank Branches per 100,000 Adults)
SWP_t	= Social Welfare Policy (Government Expenditure on Social Services as % of GDP)
$CREDIT_t$	= Financial Depth (Domestic Credit to Private Sector as % of GDP)
$GDPPC_t$	= Economic Growth (GDP per Capita)

Given the potential nonlinear effects, the NARDL model decomposes financial development (FD) into positive and negative partial sums:

$$FD_t^+ = \sum_{j=1}^{t} \max\left(\Delta FD_j, 0\right) \quad (2)$$

$$FD_t^- = \sum_{j=1}^{t} \min\left(\Delta FD_j, 0\right) \quad (3)$$

Where:

i. FD_t^+ includes only the positive changes in financial development (when FD increases).
ii. FD_t^- includes only the negative changes in financial development (when FD decreases).

Thus, the NARDL equation takes the form:

$$GINI_t = \alpha + \sum_{i=1}^{p} \beta_i \Delta GINI_{t-i} + \sum_{j=0}^{q} \gamma_j^+ \Delta FD_{t-j}^+ + \sum_{j=0}^{q} \gamma_j^- \Delta FD_{t-j}^- + \sum_{j=0}^{q} \theta_j \Delta X_{t-j} + \lambda_1 GINI_{t-1} + \lambda_2 FD_{t-1}^+ + \lambda_3 FD_{t-1}^- + \lambda_4 X_{t-1} + \varepsilon_t \quad (4)$$

Δ : denotes first differences
$\gamma_j^+ \text{ and } \gamma_j^-$: capture the short-run asymmetric effects of financial development
$\lambda_2 \text{ and } \lambda_3$: measure the long-run asymmetric effects of financial development
X_t : includes the other control variables $ACCESS_t, SWP_t, CREDIT_t, GDPPC_t$
ε_t : is the error term

Justification for Using NARDL

1. Captures Asymmetry: The impact of financial development on inequality and social welfare may not be uniform—an increase in financial access may not have the same effect as a decline in access.
2. Works with Mixed-Order Integration: NARDL can handle both I(0) and I(1) variables, avoiding pre-testing issues in traditional cointegration models.
3. Short-Run and Long-Run Analysis: The model allows for assessing both short-run shocks and long-term relationships.

Integration with Theoretical Framework

The Financial Kuznets Curve (FKC) suggests that financial development may initially increase inequality before reducing it. This aligns with the asymmetric effects modeled by NARDL. Meanwhile, Theories of Financial Inclusion support the idea that increasing access to financial services can enhance social welfare and reduce disparities. Thus, our model directly tests whether financial development fosters inclusivity or deepens inequality.

Data Analysis

To examine the impact of financial development on social welfare and income inequality in Nigeria, we begin by conducting a series of statistical and econometric analyses. The approach follows a structured methodology, starting with descriptive statistics, unit root tests, cointegration analysis, and the estimation of the Nonlinear Autoregressive Distributed Lag (NARDL) model. Diagnostic tests are also performed to ensure the robustness of the results.

The first step involves computing descriptive statistics for all variables, including the mean, standard deviation, minimum, and maximum values. This provides an initial understanding of the distribution and trends of financial development, inequality, and social welfare indicators. Additionally, graphical representations such as line charts are employed to visualize the trends in financial development and inequality over the study period.

Next, we conduct unit root tests using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests to determine the stationarity properties of the variables. Since the NARDL model requires that variables be either stationary at level I(0) or first difference I(1) but not second difference I(2), it is crucial to confirm the order of integration before proceeding with the estimation.

Following this, we perform the Bounds Cointegration Test to ascertain the existence of a long-run relationship between financial development, social welfare, and income inequality. The test is based on Pesaran et al. (2001), where the computed F-statistic is compared with the

critical values. If the F-statistic exceeds the upper bound, the null hypothesis of no cointegration is rejected, indicating a long-run relationship among the variables.

Having established cointegration, we estimate the NARDL model, which allows for the asymmetric effects of financial development on social welfare and inequality. The model separates financial development into positive and negative components to capture potential nonlinearities in its impact. Short-run and long-run coefficients are estimated, with particular attention to the significance of the asymmetric terms. The error correction term (ECT) is also examined to determine the speed of adjustment to equilibrium in case of short-run deviations. To ensure the reliability of the estimated model, the study will conduct several diagnostic tests, including the Breusch-Godfrey test for serial correlation, the Breusch-Pagan heteroskedasticity test, and the Jarque-Bera test for normality of residuals. Additionally, stability tests such as the CUSUM and CUSUMSQ tests are performed to assess the stability of the model over time.

Finally, where necessary, we employ impulse response functions (IRFs) and variance decomposition to further analyze how financial development shocks influence inequality and social welfare over different time horizons. These additional analyses provide deeper insights into the transmission mechanisms of financial development in Nigeria.

The results from this analysis are expected to reveal whether financial development enhances social welfare and reduces inequality or whether it reinforces economic disparities. The findings will provide empirical evidence on the Financial Kuznets Curve hypothesis and the effectiveness of financial inclusion policies in Nigeria.

Expected Findings and Interpretation

i. If financial development exhibits asymmetric effects, it would support the Financial Kuznets Curve (FKC) hypothesis.
ii. If financial inclusion significantly reduces inequality, it validates Theories of Financial Inclusion.
iii. If financial development positively influences social welfare, it suggests that financial reforms in Nigeria are translating into broader economic benefits.

Empirical Findings and Discussion

To present the empirical findings and discussion effectively, we will structure the analysis in a logical sequence, starting with the key results obtained from the econometric estimation. The discussion will interpret the results in the context of existing literature and policy implications for Nigeria. The main steps involved in presenting this section include:

Descriptive Statistics

Table 2 presents descriptive statistics for key variables in the study, providing insights into their distribution, central tendencies, and variability over 44 observations (years).

Table 2: Descriptive Statistics

	GINI	PFD	NFD	CREDIT	ACCESS	SWP	GDPPC
Mean	43.86364	1.159295	-0.583750	9.595455	1936.273	516.6343	1492.934
Median	43.45000	0.475000	0.000000	8.345000	2104.000	161.3850	1636.600
Maximum	56.00000	10.94000	0.000000	19.63000	3492.000	2291.760	3201.000
Minimum	35.00000	0.000000	-4.810000	4.960000	869.0000	0.590000	474.5000
Std. Dev.	5.666627	2.127251	1.105544	3.520733	618.5158	666.2166	792.8309
Skewness	0.286009	3.091124	-2.254415	0.866380	0.134492	1.198955	0.244069
Kurtosis	2.292590	13.03338	7.619055	3.330804	2.737489	3.236898	1.858461
Jarque-Bera	1.517328	254.6295	76.38623	5.705125	0.258986	10.64451	2.825882
Probability	0.468292	0.000000	0.000000	0.057696	0.878541	0.004882	0.243426
Sum	1930.000	51.00900	-25.68500	422.2000	85196.00	22731.91	65689.10
Sum Sq. Dev.	1380.759	194.5834	52.55581	533.0091	16450157	19085319	27028973
Observations	44	44	44	44	44	44	44

Source: Author's Computation Using Eviews 12 (2024)

The descriptive statistics reveal key patterns in financial development, social welfare, and income inequality in Nigeria over 44 years. Income inequality (GINI) remains moderate but fluctuates, while financial development shows asymmetry—positive changes (PFD) occur more frequently but with extreme spikes, while negative changes (NFD) are less frequent but severe.

Credit availability (CREDIT) and financial access (ACCESS) show moderate variability, reflecting shifts in the financial sector. Social welfare spending (SWP) is highly inconsistent, with extreme fluctuations, while GDP per capita (GDPPC) exhibits substantial variation, indicating economic instability. Overall, the data suggests that financial development does not consistently translate into reduced inequality or improved social welfare, making it crucial to further investigate these relationships using econometric models.

Unit Root Test

The Unit Root Test is essential for assessing the stationarity of a time series, as non-stationary data may result in false regression outcomes. This study used the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test to ascertain if the variables in a model are stationary or necessitate differencing to prevent false correlations (Dickey and Fuller, 1979; Phillips and Perron, 1988). The ADF test presumes the time series adheres to an autoregressive model, whereas the PP test accounts for autocorrelation and heteroscedasticity in the error terms.

Below is a summary of the ADF and PP test outcomes for each variable in the model. The test statistics and p-values are presented for both tests, along with the conclusion about whether the series is stationary.

Table 3: Unit Root Test Results with Order of Integration

Variable	ADF Test Statistic	p-value (ADF)	PP Test Statistic	p-value (PP)	Order of Integration (I)	Stationarity
GINI	-4.90	0.0002	-4.95	0.0002	I(1)	Stationary
PFD	-8.31	0.0001	-8.33	0.0000	I(0)	Stationary
NFD	-6.73	0.0000	-7.21	0.0000	I(0)	Stationary
CREDIT	-6.28	0.0000	-7.49	0.0000	I(1)	Stationary
ACCESS	-6.65	0.0000	-7.61	0.0000	I(1)	Stationary
SWP	-4.65	0.0000	-4.65	0.0000	I(1)	Stationary
GDPPC	-4.52	0.0008	-4.49	0.0008	I(1)	Stationary

Source: Author's calculations using Eviews 12, 2025

Table 2 presents the results of the unit root tests conducted using both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) approaches to determine the stationarity properties of the variables in the model. The null hypothesis for both tests is that a unit root is present (i.e., the variable is non-stationary), while the alternative hypothesis indicates stationarity. From the results:

GINI (Income Inequality) is non-stationary at level but becomes stationary after first differencing, as indicated by significant test statistics and p-values below 0.05. Thus, it is integrated of order one, I(1). PFD (Positive Financial Development) and NFD (Negative Financial Development) are stationary at level, with both ADF and PP test statistics highly significant. Therefore, they are integrated of order zero, I(0). CREDIT (Domestic Credit to Private Sector), ACCESS (Bank Branches per 100,000 Adults), SWP (Social Welfare Policy - Government Expenditure on Social Services), and GDPPC (GDP per Capita) are all stationary after first differencing, hence they are also integrated of order one, I(1). The mixture of I(0) and I(1) variables justifies the use of the Autoregressive Distributed Lag (ARDL) modeling technique, which accommodates such combinations and allows for the estimation of both short-run and long-run dynamics even when variables are integrated at different orders, provided none is I(2).

Cointegration Testing

To determine the existence of a long-run relationship among the variables in the model, the ARDL bounds testing approach proposed by Pesaran, Shin, and Smith (2001) was employed. This test is appropriate when variables are integrated at mixed orders of I(0) and I(1), as is the case in this study. The null hypothesis of the bounds test posits that no long-run relationship exists among the variables.

The result of the F-bounds test is presented in Table 4 below:

Table 4: Bounds Test

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	8.566847	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99

Source: Author's calculations using Eviews 12, 2025

The calculated F-statistic (8.566847) is greater than the upper bound critical value at all conventional significance levels (1%, 2.5%, 5%, and 10%). This implies that the null hypothesis of no level relationship is rejected, confirming the existence of a long-run cointegrating relationship among the dependent variable (e.g., income inequality or social welfare) and the explanatory variables, including financial development indicators and control variables. This result validates the application of the ARDL model in estimating both short-run and long-run dynamics among the variables in the study.

Model Estimation

Following the confirmation of a long-run relationship among the variables using the bounds testing approach, the next step involves estimating both the long-run and short-run dynamics of the relationship using the Nonlinear Autoregressive Distributed Lag (NARDL) model. This model is appropriate as it captures possible asymmetric effects of financial development (both positive and negative changes) on social welfare and income inequality.

In the NARDL framework, financial development (FD) is decomposed into two components:

i. PFD: Positive changes in financial development
ii. NFD: Negative changes in financial development

This allows the model to estimate how increases and decreases in financial development may differently influence the dependent variables (such as income inequality or social welfare).

Long-run Estimation

Following the confirmation of a long-run relationship among the variables using the F-Bounds test, the long-run coefficients from the NARDL model were estimated. These results, presented in the Table 5 below, reflect the long-term impact of financial development (decomposed into positive and negative changes), credit, access to finance, social welfare programs, and per capita income on income inequality in Nigeria, as measured by the GINI index.

Table 5: Estimated Long-Run Coefficients from the NARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GINI(-1)	0.511339	0.097777	5.229645	0.0001
PFD	0.960661	0.377984	2.541536	0.0235
PFD(-1)	0.887021	0.409952	2.163722	0.0483
PFD(-2)	0.942220	0.409473	2.301052	0.0373
PFD(-3)	0.636560	0.417813	1.523551	0.1499
PFD(-4)	-0.485683	0.186624	-2.602472	0.0209
NFD	-0.478253	0.415443	-1.151189	0.2689
NFD(-1)	-0.083065	0.521023	-0.159427	0.8756
NFD(-2)	0.580190	0.533197	1.088136	0.2949
NFD(-3)	0.630080	0.574533	1.096682	0.2913
NFD(-4)	1.826988	0.493001	3.705853	0.0023
CREDIT	-1.100209	0.372406	-2.954329	0.0105
CREDIT(-1)	-0.149981	0.412160	-0.363892	0.7214
CREDIT(-2)	-0.635685	0.298071	-2.132668	0.0511
ACCESS	0.000238	0.000890	0.267714	0.7928
ACCESS(-1)	-0.000161	0.001031	-0.156545	0.8778
ACCESS(-2)	0.003344	0.001000	3.343839	0.0048
SWP	0.001846	0.003894	0.474114	0.6427
SWP(-1)	0.021569	0.006266	3.442042	0.0040
SWP(-2)	-0.029478	0.006919	-4.260229	0.0008
GDPPC	-0.001251	0.001153	-1.084725	0.2964
GDPPC(-1)	0.005115	0.001777	2.877437	0.0122
GDPPC(-2)	0.002126	0.001809	1.174863	0.2596
GDPPC(-3)	0.005546	0.001812	3.060948	0.0085
GDPPC(-4)	-0.003232	0.001300	-2.485114	0.0262
C	21.36681	3.906145	5.470050	0.0001
R-squared	0.961424			

Source: Author's calculations using Eviews 12, 2025

The lagged dependent variable GINI(-1) has a positive and highly significant coefficient of 0.5113 (p=0.0001). This suggests that income inequality is persistent in the long run; past inequality strongly influences current inequality levels. Positive changes in financial development (PFD) exhibit a sustained and statistically significant impact on income inequality. The current and lagged values of PFD (up to lag 2) are positive and significant, with coefficients ranging from 0.8870 to 0.9607, all at the 5% level or better. This indicates that an improvement in financial development tends to increase income inequality in the long run, possibly because initial access and benefits from financial deepening are often captured by higher-income groups.

However, at lag 4, PFD becomes negative and significant (-0.4857; p = 0.0209), suggesting that over time, the benefits of inclusive finance may begin to spread and reduce inequality. This finding underscores the delayed redistributive effects of financial development. Negative changes in financial development (NFD) appear to have a positive and significant effect on inequality at lag 4 (coefficient=1.8270; p=0.0023), meaning that a contraction in financial development worsens income inequality in the long run. Earlier lags are statistically insignificant, showing a delayed effect of financial regressions on inequality.

In the long run, domestic credit to the private sector (CREDIT) is negative and significant at the current level (-1.1002; p=0.0105) and at lag 2 (-0.6357; p=0.0511). This implies that expanding credit access has an inequality-reducing effect over time, consistent with theories that associate improved credit markets with enhanced economic opportunities for lower-income groups. The variable ACCESS, representing broader access to financial services, is only significant at the second lag (0.0033; p=0.0048), showing a positive but delayed effect on inequality. This might suggest that while financial access improves over time, it initially benefits more privileged groups before trickling down.

SWP(-1) has a positive and significant impact (0.0216; p = 0.0040), while SWP(-2) becomes negative and significant (-0.0295; p = 0.0008), indicating that welfare policies may initially reinforce inequality, possibly due to inefficiencies or elite capture, but eventually contribute to inequality reduction in the long run when well-targeted and sustained. GDPPC(-1) and GDPPC(-3) are positive and significant, suggesting that in the long run, economic growth may exacerbate inequality, possibly due to growth patterns that disproportionately benefit the wealthy.

However, GDPPC(-4) is negative and significant (-0.0032; p = 0.0262), pointing to a potential turning point where sustained economic growth leads to a reduction in inequality, reflecting a Kuznets-type effect. The R-squared value of 0.9614 demonstrates an excellent model fit, indicating that 96% of the long-run variation in income inequality is explained by the included explanatory variables.

Short-run Estimation

Having established the existence of a long-run relationship among the variables through the F-bounds cointegration test, the short-run dynamics of the model are estimated using the error correction representation of the NARDL model. The short-run estimates provide insight into the immediate or transitory effects of changes in financial development, financial access, financial sector depth, social welfare policy, and economic growth on income inequality in Nigeria.

The Error Correction Term (ECT) is particularly important in this analysis as it captures the speed of adjustment back to the long-run equilibrium following a short-run shock. A negative and statistically significant ECT coefficient confirms the presence of a stable long-run relationship and indicates how quickly deviations from equilibrium are corrected over time.

The results of the short-run dynamics are presented in Table 6, showing the coefficients of the differenced variables, their associated standard errors, t-statistics, and p-values. These coefficients help to understand how short-term fluctuations in financial development and related macroeconomic indicators influence income inequality in Nigeria.

Table 6: Estimated Short-Run Coefficients from the NARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PFD)	0.960661	0.196324	4.893235	0.0002
D(PFD(-1))	-1.093096	0.281564	-3.882230	0.0017
D(PFD(-2))	-0.150876	0.234045	-0.644647	0.5296
D(PFD(-3))	0.485683	0.128238	3.787362	0.0020
D(NFD)	-0.478253	0.257662	-1.856130	0.0846
D(NFD(-1))	-3.037258	0.382060	-7.949691	0.0000
D(NFD(-2))	-2.457068	0.365633	-6.720044	0.0000
D(NFD(-3))	-1.826988	0.265801	-6.873513	0.0000
D(CREDIT)	-1.100209	0.229666	-4.790465	0.0003
D(CREDIT(-1))	0.635685	0.215719	2.946823	0.0106
D(ACCESS)	0.000238	0.000569	0.418849	0.6817
D(ACCESS(-1))	-0.003344	0.000633	-5.284004	0.0001
D(SWP)	0.001846	0.002406	0.767555	0.4555
D(SWP(-1))	0.029478	0.003810	7.737676	0.0000
D(GDPPC)	-0.001251	0.000803	-1.558301	0.1415
D(GDPPC(-1))	-0.004440	0.001008	-4.405857	0.0006
D(GDPPC(-2))	-0.002315	0.000942	-2.457429	0.0276
D(GDPPC(-3))	0.003232	0.000816	3.960357	0.0014
ECT(-1)*	-0.488661	0.048196	-10.13914	0.0000
R-squared	0.864210			

Source: Author's calculations using Eviews 12, 2025

The short-run dynamic results presented in Table 6 above, highlight the immediate effects of disaggregated financial development (positive and negative changes), financial credit, access, social welfare policy (SWP), and economic growth (GDP per capita) on income inequality (measured by the GINI index) in Nigeria. The coefficient of the Error Correction Term (ECT(-1)) is -0.4887 and statistically significant at the 1% level. This negative and significant coefficient confirms the presence of a stable long-run equilibrium relationship among the variables. It suggests that approximately 48.87% of the short-run disequilibrium is corrected each year, meaning that the system adjusts moderately to restore equilibrium after short-run shocks.

In the short run, Positive Financial Development (D(PFD)) has a significant positive impact on income inequality in the current period (coef.=0.9607, $p<0.01$), implying that an increase in financial development initially increases inequality. However, the lagged terms show mixed

effects: the first lag has a significant negative effect (coef. = -1.0931, $p < 0.01$), while the third lag turns positive and significant (coef.=0.4857, $p<0.01$), indicating a nonlinear and dynamic adjustment process. Negative Financial Development (D(NFD)) and its lags consistently show significant negative effects on income inequality. Particularly, the first three lags (D(NFD(-1)), D(NFD(-2)), and D(NFD(-3))) are highly significant ($p < 0.01$), suggesting that contractions or downturns in financial development substantially reduce inequality in the short run. This may reflect a reduction in financial sector bias toward the elite during downturns.

Financial Sector Credit (D(CREDIT)) in the current period negatively and significantly affects income inequality (coef.=-1.1002, $p<0.01$), implying that increased access to credit reduces inequality. Interestingly, its first lag has a positive and significant effect (coef.=0.6357, $p< 0.05$), possibly reflecting time-lagged redistributive impacts. Financial Access (D(ACCESS)) and its lagged value present weak and inconsistent results. While the current change is insignificant, the first lag (D(ACCESS(-1))) is negative and significant ($p < 0.01$), suggesting that improvements in access take time to manifest in reducing inequality. Social Welfare Policy (D(SWP)) shows a positive and significant effect only at the first lag (D(SWP(-1)) =0.0295, $p<0.01$), indicating that policy impacts may take time before influencing inequality dynamics.

GDP per capita (D(GDPPC)) exhibits mixed results. While the contemporaneous effect is negative and insignificant, the first lag is significantly negative, and the third lag is significantly positive. This mixed pattern may reflect the dual nature of growth, inclusive in some phases and inequality-widening in others. Overall, the model explains about 86.42% of the variations in income inequality in the short run (R^2=0.8642), indicating strong explanatory power.

Diagnostic and Stability Tests

To ensure the adequacy and robustness of the ARDL model, several post-estimation diagnostic and stability tests were conducted. These include the Serial Correlation LM test, Heteroskedasticity test (ARCH), Normality test (Jarque-Bera), Functional form test (Ramsey RESET), and Stability tests using CUSUM and CUSUM of Squares.

Below is a summary of the diagnostic test results

Table 7: Summary of Diagnostic Test Results

Test	Test Statistic	p-value	Conclusion
Breusch-Godfrey Serial Correlation LM Test	0.7349	0.4999	No serial correlation
ARCH Heteroskedasticity Test (Breusch-Pegan-Godfrey)	0.6309	0.8473	No heteroskedasticity
Jarque-Bera Normality Test	5.7309	0.0570	Residuals are normally distributed
Ramsey RESET Test (Functional Form)	1.0613	0.3217	Model is correctly specified
CUSUM Test	Stable	—	Parameters are stable
CUSUM of Squares Test	Stable	—	Parameters are stable

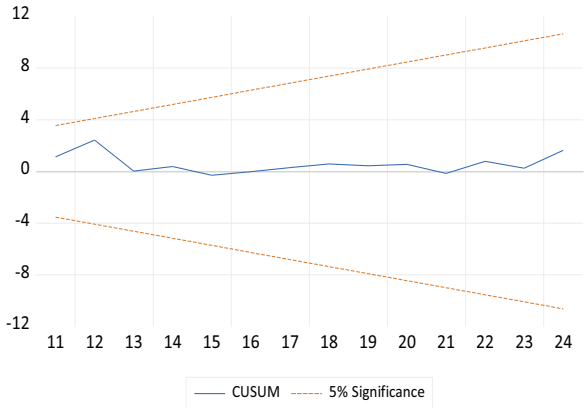

Figure 1.

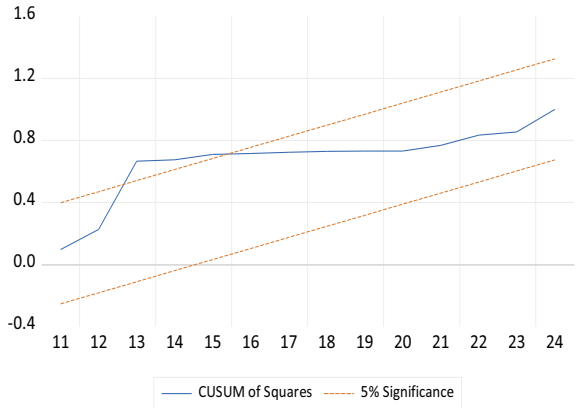

Figure 2.

The model passes all tests, suggesting that there are no issues with serial correlation, heteroskedasticity, normality of residuals, or model specification. The assumptions underlying the regression model appear to be satisfied.

The model's stability was checked using the Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) tests, following the method created by Brown, Durbin, and Evans (1975). The CUSUM test findings indicate that the model exhibited stability over the whole sample period, since the CUSUM statistic constantly remained within the 5% significant limits. The CUSUMSQ test revealed a little and transient departure over the critical boundaries between the 13th and 16th observations. This transient disruption likely signifies macroeconomic instability or structural changes in Nigeria during that time, especially the political transition and economic uncertainty subsequent to the annulment of the 1993 elections, as well as the execution of financial sector reforms associated with the Structural

Adjustment Programme (SAP) under military rule. The reversion of the CUSUMSQ line inside the limits post-1997 indicates that these shocks were ephemeral and did not cause enduring structural disruptions. Consequently, although this transient instability occurred, the model is regarded as fundamentally stable over the whole estimating time.

Discussion of Findings

The findings of this study offer compelling evidence on the dynamic and asymmetric nature of financial development's effect on income inequality in Nigeria, both in the short and long run. The results broadly support the Financial Kuznets Curve (FKC) hypothesis, while also aligning with recent empirical works in the Nigerian and African context.

Long-Run Dynamics

The long-run results indicate that income inequality remains persistent, as reflected by the positive coefficient of the lagged GINI index, supporting the findings of Nadabo et al. (2024) on the enduring nature of structural inequality in Nigeria. Initially, positive financial development (PFD) exacerbates inequality, with significant coefficients up to lag 2. This aligns with Okafor et al. (2024) and Akpa et al. (2024), who suggest that early stages of financial deepening benefit higher-income groups with better access to credit and information. However, by lag 4, PFD becomes negative and significant, demonstrating a delayed redistributive effect, consistent with the Financial Kuznets Curve, as noted by Nadabo et al. (2024).

Conversely, negative financial development (NFD) worsens inequality at lag 4, suggesting that financial setbacks disproportionately harm poorer households, reinforcing inequality over time. This is in line with Beck et al. (2010), who emphasize the detrimental effects of financial crises on vulnerable populations. Domestic credit to the private sector (CREDIT) consistently reduces inequality, supporting the view of Demirgüç-Kunt and Levine (2009) and Dupas and Robinson (2013), which highlights the role of credit in facilitating entrepreneurship and consumption smoothing among the poor. Financial access (ACCESS) shows a positive and delayed effect, significant only at lag 2, indicating that improved access initially benefits higher-income groups but gradually contributes to greater inclusion, echoing Okafor et al. (2024). The mixed effects of social welfare policies (SWP) in the long run—positive at lag 1 and negative at lag 2—suggest that poorly targeted welfare initiatives may initially worsen inequality but eventually have redistributive effects when properly implemented, as noted by Fengju and Wubishet (2024). Economic growth (GDPPC) shows a mixed pattern, with growth widening inequality at lags 1 and 3, but reducing it at lag 4, consistent with the Kuznets curve, where sustained growth eventually leads to inequality reduction, possibly through job creation or fiscal redistribution.

Short-Run Dynamics

In the short run, the error correction term (ECT) suggests a moderate speed of adjustment, confirming the presence of a stable long-run equilibrium. PFD remains inequality-widening in the short run, though the first lag turns negative, reflecting potential policy responses or shifts in market behavior, as suggested by Beck et al. (2010). NFD initially reduces inequality, likely

due to temporary reductions in elite capture of financial markets during financial contractions. This finding is consistent with Okoduwa et al. (2023) and Akpa et al. (2024), who observed that financial crises may momentarily level the playing field.

CREDIT continues to reduce inequality in the short run, reinforcing its long-term effect, though the positive sign at lag 1 suggests that initial credit expansions may benefit wealthier groups before broader benefits emerge. ACCESS shows weak and delayed short-run impacts, reinforcing the need for accompanying financial literacy, inclusion policies, and infrastructure improvements.

SWP's delayed positive impact in the short run indicates a policy lag, potentially due to implementation inefficiencies, as noted by Fengju and Wubishet (2024). GDPPC reflects mixed short-run effects, with lag 1 reducing inequality and lag 3 increasing it, aligning with Moses et al. (2023), who highlight the importance of assessing sectoral contributions to inclusive growth.

Conclusion

This study empirically examined the asymmetric effects of financial development on income inequality in Nigeria using the Nonlinear Autoregressive Distributed Lag (NARDL) approach. The results provide clear evidence that financial development exerts both positive and negative impacts on income inequality, depending on the direction of change and the time horizon. In the long run, positive financial development initially contributes to rising inequality, as the immediate benefits are often captured by wealthier segments of society with better access to financial markets. However, over time, a turning point is observed where the gains of financial deepening begin to trickle down, reducing inequality—a pattern consistent with the Financial Kuznets Curve (FKC) hypothesis. Negative shocks to financial development, on the other hand, exacerbate income inequality in the long run, highlighting the vulnerability of lower-income groups during financial contractions.

Moreover, credit to the private sector significantly reduces inequality both in the short and long run, affirming the importance of expanding inclusive credit facilities. The impact of financial access is more nuanced; suggesting that access alone is insufficient without equitable distribution mechanisms and supporting policies. Social welfare policies and economic growth also exhibit complex and lagged effects, reinforcing the need for sustained and well-targeted interventions.

The short-run dynamics further emphasize that inequality responds more immediately to financial regressions than to financial improvements. This asymmetry underscores the importance of financial stability and inclusive financial policies in mitigating short-term inequality spikes. Overall, the study concludes that financial development has the potential to serve as a tool for reducing income inequality in Nigeria, but only when accompanied by deliberate policy actions that broaden access, improve institutional quality, and strengthen redistributive mechanisms. Policymakers must prioritize equitable financial sector reforms, ensure inclusive credit access, and enhance the effectiveness of social protection systems to maximize the long-term poverty- and inequality-reducing benefits of financial development.

Policy Recommendations

Based on the empirical findings, the following policy recommendations are proposed to ensure that financial development contributes meaningfully to reducing income inequality in Nigeria:

1. Promoting inclusive financial access, particularly in rural areas, through policies supporting mobile banking, agent banking, and microfinance, can help reach unbanked and under banked segments.
2. Policymakers should expand targeted credit programs to support SMEs, women entrepreneurs, and youth-led businesses, as they often face financial barriers. Strong financial regulation and oversight are also necessary to minimize adverse distributional consequences.
3. To reduce inequality, social welfare policies should be targeted, monitored, and evaluated, while financial sector development should be integrated into broader economic goals for inclusive growth, rural development, and employment creation to ensure equitable benefits.
4. The government should invest in institutions supporting property rights, credit registries, and financial literacy to promote inclusive finance, thereby bridging the inequality gap.
5. Regularly assessing financial sector reforms' distributional impacts is crucial, and data systems and research platforms can help fine-tune policies and achieve desired outcomes.

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