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Microfinance and Income Inequality in Nigeria

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Abstract

The paper examines the effect of microfinance on income inequality in Nigeria. It employed the ARDL bounds test to investigate the relationship between microfinance banks' loans and advances and (the Gini index of) income inequality in Nigeria using annual time series data spanning the period from 1992 to 2022. The empirical evidence indicates that microfinance banks loans and advances, and improvement in (labour) employment significantly reduce income inequality in the short-and long-run. Inflation is found to exacerbate income inequality in both time horizons. Further evidence is that FDI worsens the income inequality problem in the short run but contributes significantly to lowering it in the long run. Based on the findings of the study, to reduce income inequality in the country, the paper recommends strengthening of the microfinance banking sector to position it to adequately play its roles of lending to the MSMEs; bringing inflation under control; generating employment through increased incentives to the private sector; and enhancing the attractiveness of key sectors of the economy to FDI.

Keyword: Income Inequality, Gini index/coefficient, Microfinance banks, Nigeria.

JEL Classification Codes: D63, G21, O15, P36

1. Introduction

Inequality is a major global problem. Reducing within-country and between/among-country inequality is a major goal of global and continental organisations. The tenth of the United Nations Sustainable Development Goals (SDGs) is to reduce inequalities within and among countries. This goal has strong linkages to other SDGs as achieving it would engender to a reasonable extent, zero poverty (Goal 1), zero hunger (Goal 2), good health and well-being (Goal 3), quality education (Goal 4) and a host of other goals. The first goal of the African Union Agenda 2063 which has been described as 'Africa's blueprint for transforming the continent into the global powerhouse of the future' (African Union, 2024, para. 1), has to do with achieving a high standard of living, quality of life and well-being for all citizens. The priority areas for achieving this goal include reduction of poverty, inequality, and hunger.

Inequality takes different forms including income inequality, wealth inequality, consumption inequality, gender inequality and so on (Mukhopadhyay, 2016; Garikipati et al., 2017; Zhang & Posso, 2017; Mannah-Blankson, 2018; Luo, et al. 2021; Kim & Lin, 2024). The focus of this paper is within-country income inequality which simply refers to unequal distribution of income within a country. This form of inequality, all things being equal, potentially correlates with other forms of inequality.

Development is not solely about an increase in the level of per capita income *per se*, but equality in the distribution of enhanced income coupled with structural changes (transition from primary production to secondary and tertiary production driven by technological advancement) in the economy. Gauging poverty reduction with an increase in per capita income or wealth may be misleading, as a nation's income may be concentrated in a few hands just as a few individuals in a nation may exercise control over the wealth of the nation. Thus, high income inequality is a major characteristic of a poor country irrespective of the level of the country's per capita income. Income inequality makes inclusive growth elusive.

The problem of income inequality in Nigeria is quite visible. Oxfam (2024) confirmed extreme inequality in the country when it noted that:

The combined wealth of Nigeria's five richest men - \$29.9 billion - could end extreme poverty at a national level yet 5 million face hunger. More than 112 million people are living in poverty in Nigeria, yet the country's richest man would have to spend \$1 million a day for 42 years to exhaust his fortune.

The amount of money that the richest Nigerian man can earn annually from his wealth is sufficient to lift 2 million people out of poverty for one year.

Given these facts and figures, it is indisputable that the country is faced with a serious development challenge that requires urgent attention in view of the economic and social woes associated with huge income gaps. Nigeria's government has at various times come up with policies and programmes such as the NEEDS, SEEDS, Vision 20, 2020, various economic agenda and blueprints for tackling unemployment, poverty, inequality and underdevelopment, yet the problem of income inequality persists.

One of Nigeria's government initiatives to tackle the problems of unemployment, poverty and inequality was the introduction of community banking in 1992, which later metamorphose into microfinance banking in 2005 by the Microfinance Policy, Regulatory and Supervisory Framework. An updated version of the framework in 2011 sought to strengthen the

microfinance banking sector by categorizing microfinance banks (MfBs) into three namely: unit banks which were to have a minimum paid up capital of ₦20 million, and allowed to operate from only one location without branches within a state; state MfBs which were to have a minimum paid-up capital of ₦100 million and allowed to operate multiple branches within a state; and the national MfBs expected to have a minimum paid-up capital of ₦2 billion naira and permitted to operate multiple branches within any state of the federation, including the Federal Capital Territory. This was done to boost their lending capacity and promote financial inclusion by extending banking services to the unserved and unbanked populace. It was expected to enhance access (of the poor) to credit to set up or expand existing micro, small and medium scale enterprises (MSMEs). The expectation was also that this would encourage employment and raise income levels, thereby reducing income inequality, lowering poverty and promoting economic development.

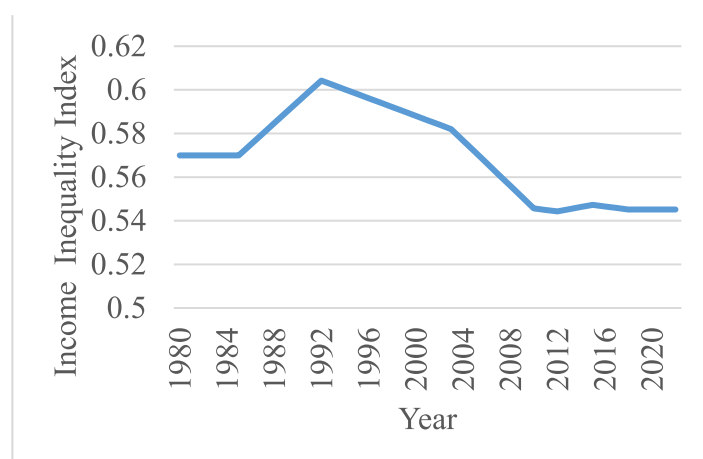
The Objective of this paper is to empirically investigate the effect of microfinance banks' loans and advances on income inequality in Nigeria. Most of the previous related studies adopted the panel data modeling approach. The current study is a country-specific or country-focused study. It differs from previous studies and contributes to extant knowledge by examining the effect of microfinance banks' loans and advances on income inequality in Nigeria using macrolevel data. To the best of our knowledge, based on a wide search of literature, no known previous studies have been conducted in this regard. The current study fills this gap.

2. Brief Stylised Facts

Figure 1 shows the trend in Nigeria's income inequality index (Gini coefficients) from 1980 to 2022. All through the period, the index was above 0.50, depicting inequality in the distribution of income in the country during the period. During the 1980-1992 period, the index rose from 0.570 to 0.604. This was the period the country experienced various economic turmoil which could be attributed partly to the neglect of agriculture and manufacturing sectors due to dependence on the oil sector, and implementation of various policies particularly the SAP policies introduced in June 1986 which was characterized by drastic cuts in government spending, liberalization of the financial sector, credit squeeze and increased taxation, influx of imported finished goods and the depreciation of the domestic currency amongst others. These adversely affected employment (as the agricultural and manufacturing sectors were badly affected), worsened inflation, raised poverty levels, and widened the income gap in the country (Omoruyi, 1987; Ahmed, 1987; Adeoye, 1991; Abah & Naankiel, 2016). However, during the period following 1992, the income inequality index began to decline.

Figure 1

Trend in Nigeria's Income Inequality Index (1980-2022)

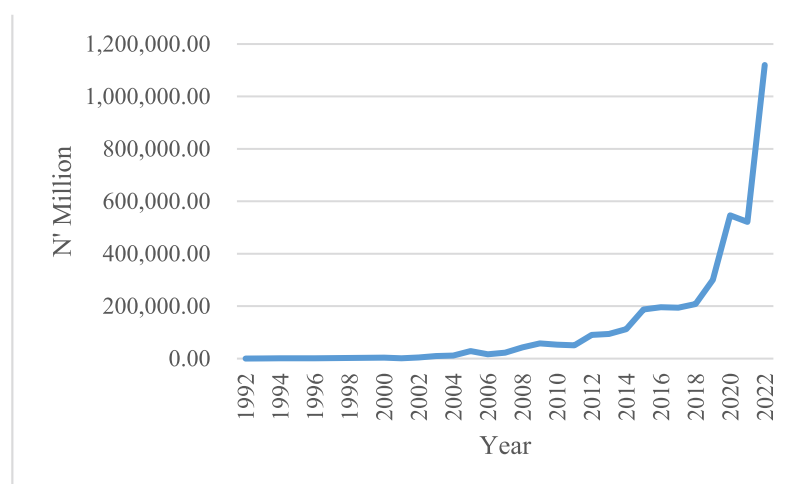


Source: Underlying data from World Inequality Database

The decline could be attributed to various factors including an increase in remittances. However, the period coincided with the period community banks (which later became microfinance banks) were introduced (in 1992). Figure 2 shows the trend in the amount of loans and advances extended by the community/microfinance banks during the period from 1992 to 2022. It is observed that microfinance banks loans and advances (MfBLA) generally trended upwards. Thus, the increase in MfBLA was associated with a decrease in income inequality during the period. These figures suggest an inverse relationship between MfBLA and income inequality. In this study, econometric tools are employed to investigate the relationship between the variables.

Figure 2

Trends in Community/Microfinance Banks Loans and Advances in Nigeria



Source: Underlying data from CBN Statistical Bulletin (*Various issues*)

3. Literature Review

Microfinance banks contribute to financial deepening or financial development through expansion of credits to the private sector, precisely the MSMEs. There is no theoretical consensus on the impact of financial development on income and its distribution. The impact has been described as ambiguous (Demirgüç-Kunt & Levine, 2009). Financial deepening depicted by monetary sector credit to the private sector (as a percentage of the GDP) would, all things being equal, engender improvement in incomes if loans and advances were not concentrated in a few hands or a few sectors of the economy, and if they were prudently and judiciously invested by the private sector in productive activities or viable projects. Where this causes an increase in demand for highly-skilled labour and a decrease in demand for low-skilled labour, this may further widen the income gap in the economy. Where increase in credit engenders increase in firms' demand for low-skilled labour, and if this class of labour is adequately rewarded or compensated, the result would be a lowering of (or reduction in) income inequality (Demirgüç-Kunt & Levine, 2009). Microfinance banks ease access to finance by the poor (who lack collaterals and credit history) for viable projects which potentially increases their incomes, and reduces income inequality (Galor & Moav, 2004).

Empowerment theory can be used to explain the relationship between microfinance and income inequality. The theory posits that microfinance empowers marginalized groups (particularly women) by providing them access to financial resources. This empowerment engenders improvement in economic status, return on human capital, sustainability, poverty alleviation and reduction in income inequality (Khursheed, 2022).

There exists a large body of evidence of negative effect of microfinance on income inequality (suggesting that microcredit and loans engender reduction in inequality), though quite a few studies found either no significant effect or, positive effect of microfinance on inequality. In what follows we review some of the empirical studies.

Hermes (2014) examined the effect of microfinance in developing countries during the period from 2000 to 2004 using panel data on 70 developing countries. The empirical evidence indicated that higher levels of participation in microfinance were associated with a reduction in income inequality, though the effects were relatively small.

Bangoura, et al. (2016) conducted a heterogeneous cross-section causality analysis to investigate the effect of microfinance on poverty and income inequality in a sample of 52 developing countries over the period from 1996 to 2011. Various analytical methodologies such as pooled OLS, instrumental variable and heterogeneous causality tests were employed for analysis of the data. The empirical evidence indicated that increase in microfinance loans to the poor engendered increase in their incomes, thereby causing reduction in income inequality.

Lacalle-Calderon et al. (2018) investigated the impact of microfinance on income inequality using macro-level data covering the 2001-2012 period on relevant variables for a sample of 85 countries. Various methodologies including instrumental variable random effect (IV-RE) modeling and system generalized methods of moments (SYS-GMM) were employed in the analysis. The study found that microfinance plays a significant role in reducing within-country income inequality over time. Further evidence from the study is that trade openness exacerbates income inequality.

Ali and Ghoneim (2019) examined the effect of microfinance on income equality in a sample of 30 developing countries from across Africa, Asia, Latin America and Europe during the

period from 2013 to 2015, while controlling for the effects of school enrolment, inflation, democracy, arable lands and population growth rate. The pooled least squares estimator was employed for the analysis. The study found no significant effect of microfinance on the Gini index of income inequality in the sample of countries.

Arif, et al. (2019) investigated the effect of microfinance on poverty and income inequality using panel data on 33 provinces in Indonesia during the 2011-2016 period. The study adopted panel least squares estimation technique. The empirical evidence indicates that while microfinance significantly reduced poverty, its effect on income inequality was not significant. The study also found that school enrolment significantly reduced inequality and poverty, while inflation was found to have contributed to widening the income gap in the country.

Wardhana et al. (2020) employed province-level panel data covering the period from 2012 to 2018 to investigate the effect of microloan from small-sized banks such as the Bank Perkreditan Rakyat (BPR), on income inequality in Indonesia. The analysis involved estimation of a fixed effect (panel) regression model. The results indicated that microloans from such banks had the effect of reducing income inequality in the country.

The effect of microfinance, financial development and foreign aid on income inequality in a sample of 43 sub-Saharan African (SSA) countries during the period 1995-2015 were examined in Lassoued (2021a). Various methodologies including fixed effect, pooled OLS and system generalized method of moments were adopted for data analysis in the study. The study found that foreign aid, microfinance and financial development played significant roles in reducing income inequality in the SSA. Lassoued (2021b) also examined the effects of microfinance and control of corruption on income inequality in the MENA region during the 1996-2018 period. The study employed system GMM, generalized least squares (GLS) and fixed effect modeling for the analysis. The evidence indicated that higher level of microcredit and lower level of corruption contributed significantly to reduction of income inequality in the region.

Subramaniam, et al. (2021) examined the role of microfinance in reducing poverty and income inequality in a panel data study involving a sample of 34 developing countries during the period from 2009 to 2016. The empirical evidence indicated that microfinance reduces poverty minimally as a result of limited access to microfinance by the hardcore poor. Similarly, Lee et al. (2021) investigated the impact of microfinance on poverty and income inequality in emerging market economies. The study found that microfinance significantly reduced income inequality.

Miled et al. (2022) investigated the effect of microfinance on income inequality in a panel of 57 developing countries during the periods 2000-2006 and 2007-2013 using macro-level data. Panel estimation techniques including the pooled ordinary least squares and instrumental variables techniques were employed in the study. The study found strong evidence that microfinance tended to reduce inequality in the countries, though the effect was slow in materializing.

Chatterjee and Patil (2022) assessed the impact of microfinance on income inequality in major SAARC nations during the 2000-2018 period. In the study, the effects of the number of borrowers and value of loans on income inequality were investigated. The methodology involved panel estimated generalised least squares and Granger causality test. Evidence from the study is that while the number of borrowers was associated with a decrease in income inequality, value of loans was associated with an increase in inequality. The latter observation was attributed to the likelihood of higher value of loans plunging the poor into debt-trap. The paper therefore recommended that focus should be on increasing the number of people accessing microloans.

Oteng-Abayie et al. (2023) did a spatial analysis of the effects of microfinance on poverty and income inequality in Ghana using national survey data for 2012/2013 and 2016/2017 on living standard. The analysis which involved spatial econometric techniques showed that microfinance negatively and significantly affects spatial income inequality and poverty in the country. This implies that microfinance contributes to the reduction of income inequality and poverty in the country.

Al-Azzam (2023) examined the relationship between income inequality and financial development using panel data covering the period 2000-2017 for 97 developing countries, while controlling for various macroeconomic and socioeconomic variables. The study comparatively examined the income inequality effects of microfinance loans and traditional finance measured by domestic credit as a percentage of the GDP and the International Monetary Fund financial development index. Gini index/coefficient of income inequality was used as dependent variable. Various specifications including random effects model with endogenous sample selection were employed in the analysis. The study found that microfinance consistently lowered or narrow income inequality in developing countries, while traditional finance had no impact. The findings underscore the relevance of microfinance in reducing income inequality in developing countries.

A recent study by Etudaiye-Murtah (2024) examined the effect of financial inclusion (promoted partly by microfinance institutions) on income inequality in Nigeria during the period from 1985 to 2019. The study was based on the special agent theory of financial inclusion. Using the ARDL modeling technique, the study found that income inequality was significantly reduced by financial inclusion in the country. It further found that education and economic growth also lowers income inequality, while population growth widens it.

Manoj (2024) investigated the effect of digitally-enabled microfinance on income inequality for the vulnerable in the expanded BRICS block during the pandemic. Data on key variables (such as human capital, alternative micro-finance, digitalization, governance, entrepreneurship, GDP, inflation, population and inequality (using the Standardized World Income Inequality Database(SWIID) Gini disposable and market income index) several other variables, covering the period from 2000 to 2022, were utilized for the study. Various methodologies including OLS, Dynamic Mixed Model, and Random Forest Tree (RFT) were employed to model digitally enabled microfinance. The study found that digitally enabled microfinance plays significant role in reducing income inequalities particularly during time of crisis.

Akpa et al. (2024) employed the system GMM technique to examine the effect of financial development on income inequality in sub-Sahara Africa during the period from 1995 to 2015. Using a panel dataset obtained from the SWIID and the World Development Indicators, on the relevant variables, the study found that financial development on its own widened the income gap, but when complemented with economic growth, the interaction significantly reduced income inequality.

The foregoing review of the literature reveals a dominant strand which is that microfinance contributes to reduction of inequality. Few of the studies found that the effect of microfinance on income inequality is non-significant, though it may help reduce poverty or smoothen consumption. Most of the previous research are cross-country panel data studies or within-country panel data studies using either household survey data, cross-sectional/units' data or primary data obtained using interview or other methods of collecting primary data. Based on a wide search of literature, quite a few have employed macro level data which are quite relevant for macroeconomic policy formulations. In particular, no known previous Nigeria-focused study has empirically investigated the relationship between microfinance and (Gini index of) income inequality using macro-level data. This leaves a gap in literature which is filled by the current study.

4. Methodology

4.1. Theoretical Framework and the Model

The empowerment theory which is woman-centric as it is more particular about empowerment of women, provides the theoretical framework for this study. However, this study extends its focus beyond women empowerment to the poor which includes all unserved and unbanked no- and low- income earners of both genders (male and female) who require empowerment to improve their incomes (and living standards), thus lowering income inequality in the economy (Ali & Ghoneim, 2019). The study builds on the theoretical models developed in Hermes (2014), and Ali and Ghoneim (2019), with some modifications. In doing this, income inequality index is regressed on microfinance banks' loans and advances, and a battery of relevant control variables selected based on theories and empiricisms. The model to investigate the effect of microfinance banks' loans and advances on the distribution of income in Nigeria is specified in its functional form as:

$$\text{INEQGINI} = f(\text{MFBLA}, \text{FDI}, \text{INF}, \text{EMPL}) \quad [1]$$

Where INEQGINI stands for Gini index of income inequality, MFBLA stands for microfinance banks loans and advances, FDI stands for FDI (as a percentage of GDP), INF stands for inflation (measured by annual change in consumer price index), EMPL stands for percentage of the population that is employed.

Equation 1 is represented in the form in which it is to be estimated econometrically as:

$$\text{INEQGINI}_t = \beta_0 + \beta_1 \text{LnMFBLA}_t + \beta_2 \text{FDI}_t + \beta_3 \text{INF}_t + \beta_4 \text{EMPL}_t + \varepsilon_{1t} \quad [2]$$

The variables are as defined previously. The β s are long run (static) parameters to be estimated. The a priori expectations are $\beta_1 < 0$, $\beta_2 < 0$, $\beta_3 > 0$, $\beta_4 < 0$. Microfinance banks' loans and advances are expected to reduce inequality since they are targeted at the poor (low-income earners) who are expected to use them to set up productive enterprises to enhance raise their income levels, thereby reducing income gaps in the economy. FDI inflows into key sectors of the economy is expected to raise the stock of capital as well as introduce new (advanced) technologies which MSMEs operators may take advantage of, by way of absorption, to enhance their productivity and incomes. High inflation reduces the purchasing power of money, adversely affecting investment, production and incomes of business owners especially those operating at micro and small levels. This will tend to further widen the income gap within an economy. Improvement in gainful employment is expected to engender a reduction in income inequality both directly (as a result of enhanced wages) and indirectly as a result of the increase in effective demand for goods and services offered by the MSME operators whose income may increase consequently.

4.2. Estimation Procedure

The variables were tested for stationarity using the Kwiatkowski Phillips Schmidt and Shin (KPSS) test which directly tests the stationarity of time series data. The autoregressive distributed lag model (ARDL) approach to analysis of short- and long-run relationships was adopted. This choice of this approach was informed by its flexibility in application as it can be applied in cases involving data series that are integrated of mixed orders $[I(0), I(1)]$ so long as none of the series used for the model estimation is $I(2)$; its suitability for small finite datasets; and its ability to yield consistent and efficient long run parameter estimates even in the presence of regressors' endogeneity which characterizes cointegrated regressors (Harris and Sollis, 2003).

The approach involves ordinary least squares (OLS) estimation of an unrestricted error correction model version of an ARDL model specified as:

$$\begin{aligned} \Delta \text{INEQGINI}_t = & \beta_0 + \sum_{j=1}^p (\delta_{1j} \Delta \text{INEQGINI}_{t-j}) + \sum_{j=0}^p (\delta_{2j} \Delta \text{LnMFBLA}_{t-j}) + \sum_{j=0}^p (\delta_{3j} \Delta \text{FDI}_{t-j}) + \\ & \sum_{j=0}^p (\delta_{4j} \Delta \text{INF}_{t-j}) + \sum_{j=0}^p (\delta_{5j} \Delta \text{EMPL}_{t-j}) + \psi_1 \text{LnMFBLA}_{t-1} + \psi_2 \text{FDI}_{t-1} + \psi_3 \text{INF}_{t-1} + \psi_4 \text{EMPL}_{t-1} + \\ & \xi_{3t} \end{aligned} \quad [3]$$

Parameters δ_{2j} to δ_{5j} in Equation 3 correspond to the short-run relationship, while the parameters ψ_1 to ψ_4 correspond to the long-run relationships. Δ is the first difference operator, ξ is the error term, j is the optimal lag order of the ARDL and it is to be empirically determined. Following the estimation of the model, the Wald's F test is employed to test the null hypothesis that no long run relationships exist ($\psi_1 = \psi_2 = \psi_3 = \psi_4 = 0$) against the alternative hypothesis of existence of long run relationships ($\psi_1 \neq \psi_2 \neq \psi_3 \neq \psi_4 \neq 0$).

Pesaran *et al.* (2001) computed two sets of asymptotic critical values for the F-statistic at different levels of statistical significance (1%-10%). One set comprises the lower bound critical values and assumes the variables are stationary at level $[I(0)]$; the other set comprises the upper bound critical values and assumes the variables are stationary at first differences $[I(1)]$. The decision rule is to reject the null hypothesis if the estimated F-statistic is greater than the upper bound critical value at the chosen level of statistical significance (usually 1% to 5%), drawing the inference that long run relationships exist among the variables, and could be estimated. The null hypothesis is not rejected if the estimated F-statistic is less than the lower bound critical value, implying existence of no long run relationships. This implies that only the short run relationships can be analysed using the base ARDL model. The test is inconclusive if the estimated F-statistic lies between the lower and upper bound critical values.

If the bounds test results indicate that long run relationship exists among the variables, the short run (error correction) model for the effects of MFBLA and the other (control) variables is derived from the unrestricted error correction versions of the ARDL model as:

$$\begin{aligned} \Delta \text{INEQGINI}_t = & \gamma_0 + \sum_{j=1}^p (\gamma_{1j} \Delta \text{INEQGINI}_{t-j}) + \sum_{j=0}^p (\gamma_{2j} \Delta \text{LnMFBLA}_{t-j}) + \sum_{j=0}^p (\gamma_{3j} \Delta \text{FDI}_{t-j}) + \\ & \sum_{j=0}^p (\gamma_{4j} \Delta \text{INF}_{t-j}) + \sum_{j=0}^p (\gamma_{5j} \Delta \text{EMPL}_{t-j}) + \alpha \text{ECT}_{t-1} + \varepsilon_{1t} \end{aligned} \quad [4]$$

The γ s are estimates of the respective short run effects of the explanatory variables on the dependent variable. ECT is the error correction term which *inter alia* measures the speed of adjustment to equilibrium in the event of short run deviation from the long run (equilibrium) relationship. To play the role of error correction, the coefficient (α) is expected to be negatively signed and statistically significant. The negative and significant coefficient is a further indication of co-integration of the variables. The ε is the error terms.

4.3. Data and their Sources

Annual time series data spanning the period from 1992 to 2022 on the variables were used for estimation of the model. The choice of this scope was informed by the fact that available data on community/microfinance banks' loan and advances (MFBLA) starts from 1992. The data were obtained from various authoritative sources. Data on MFBLA were obtained from the CBN Statistical Bulletin; data on (Gini index of) income inequality were obtained from the World Inequality Database (WID); Data on FDI (as a percentage of GDP), INF and EMPL were obtained from the World Bank's World Development Indicators.

5. Results and Discussion

The results of estimation of the specified model are presented in this section. The section begins with a presentation and discussion of the descriptive statistics on the variables used for the model estimations. This is followed by a presentation of the results of the tests for stationarity. Following this is the cointegration test and then a presentation and discussion of the model estimation results, diagnostic tests and the test for model stability.

5.1. Descriptive Statistics

The descriptive statistics on data series of each of the variables used in the study are presented in Table 1. Gini index of income inequality averaged 0.5675 and ranged between 0.5443 and 0.6042 during the period. This is an indication that the income gap existed in the country during the period under review. The p-value of the Jarque-Bera being greater than 0.05 indicates that the series followed a normal distribution. MFLA averaged ₦124, 318.8 million during the period, and ranged between ₦135.8 million and ₦1, 120, 000 million indicating that MFLA grew rapidly during the period under consideration. The series did not follow a normal distribution as indicated by the p-value of the Jarque-Bera statistic which is less than 0.05. FDI as a percentage of GDP averaged 1.33% and ranged between -0.04% and 2.99% during the period. These indicate that the amount of FDI that flowed into the economy had been very low, relative to the size of the economy. The series was, however, normally distributed as indicated by the p-value of the Jarque-Bera statistic which is greater than 0.05. Inflation was quite high during the period as it averaged 18.59% and ranged between 5.3% and 72.84%. The p-value of the associated Jarque-Bera statistic, being less than 0.05, indicates that the series was not normally distributed. Employment rate average 56.88% per annum and ranged between 53.23% and 58.28% during the period under consideration. The series was normally distributed as indicated by the p-value of the Jarque-Bera statistic, which is greater than 0.05.

Table 1

Descriptive Statistics on Variables

	INEQGINI	MFLA	FDI	INF	EMPL
Mean	0.567500	125318.8	1.330118	18.59428	56.88068
Maximum	0.604243	1120000.	2.900249	72.83550	58.27500
Minimum	0.544298	135.8000	-0.039522	5.388008	53.22500
Jarque-Bera	3.720933	154.6028	1.934672	37.59800	4.879391
Probability	0.155600	0.000000	0.380094	0.000000	0.087187
Observations	31	31	31	31	31

Source: Author's computations using EVIEWS 9.

5.2. Correlation Analysis

The Pearson's product moment (pairwise) correlation coefficients of the variables as used for the estimation of the specified models are presented in Table 2. The results show strong and significant negative correlation between microfinance bank's loans and advances and

income inequality (the dependent variable) in Nigeria. This suggests that microfinance banks' loans and advances may play significantly role in reduction of income inequality in the country. Positive, but non-significant correlation is observed between FDI and INEQGINI, while positive and significant correlation is observed between INF and INEQGINI. Positive and significant correlation is also observed between EMP and income inequality. This suggests that vulnerable employment characterized by low wages dominates decent employment in the country. However, it should be noted that correlation is not strongly suggestive of any impacts or causal effects (Schober et al., 2018). For these, appropriate econometric tools are required. The correlation between of pairs of the explanatory variables are not very strong as indicated by the absolute values of the coefficients which are less than 0.8 (Schober et al., 2018). Thus, the problem of serious multicollinearity is not envisaged in the models to be estimated using the variables.

Table 2*Correlation Coefficients with p-values*

Correlation Probability	INEQGINI	LMFBLA	FDI	INF	EMPL
INEQGINI	1.000000 -----				
MFBLA (log)	-0.951671 0.0000	1.000000 -----			
FDI	0.165366 0.3740	-0.277605 0.1305	1.000000 -----		
INF	0.559437 0.0011	-0.527233 0.0023	0.045154 0.8094	1.000000 -----	
EMPL	0.697059 0.0000	-0.734634 0.0000	0.521458 0.0026	0.291636 0.1114	1.000000 -----

Source: Author's computations using EVIEWS 9

5.3. Stationarity Test

The results of stationarity test for the variables used for the estimations are presented in Table 3. The results show that during the period covered by the study, INEQGINI (the dependent variable) and EMPL series were stationary at first difference (that is they were integrated of order 1), while Ln(MFBLA), FDI and INF were stationary at level (that is they were integrated of order 0). Thus, the variables are integrated of mixed order. Consequently, the ARDL bound test was employed to test for existence of long run relationships among them.

Table 3*Stationarity Tests*

KPSS Stationarity Test							
Variables	Levels			1st Difference			I(d)
	test Stat	Critical Value (5%)	Inference	test Stat	Critical Value (5%)	Inference	
INEQGINI	0.6777	0.4630	NS	0.2589	0.4630	S	1
Ln(MFBLA)	0.1320	0.1460	S	-	-	-	0
FDI	0.2238	0.4630	S	-	-	-	0
INF	0.3572	0.4630	S	-	-	-	0
EMPL	0.5323	0.4630	NS	0.0729	0.4630	S	1

I(d) stands for order of integration

Source: Author's computations using EViews 9.

5.4. Cointegration Test Result

The result of the bound's test for long run relationships among the variables is presented in Table 4. The result shows that the estimated F-statistic is greater than the upper bounds critical value even at the 1% level of statistical significance. The null hypothesis that no long run relationships is therefore rejected at the 1% significance level, and it is inferred that the variables are cointegrated. Given this, the long run estimates can be derived, while the short run relationships can be modeled with an error correction representation.

Table 4*ARDL Bounds Test*

Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	k
F-statistic	12.85882	4
Critical Value Bounds		
	Lower	
Significance	Bound	Upper Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's Estimation using EViews 9

5.5. Model Estimation Results

The model estimation results are presented in Table 5. The results show that loans and advances extended by the microfinance banks have the effect of reducing income inequality in the short- and long run, though the effect is only significant in the long run (at the 1% level). This conforms to *a priori* expectation, and underscores the relevance of the microfinance bank sector to reduction of income inequality in the country. This evidence corroborates findings of previous studies such as Hermes (2014), Bangoura, et al. (2016), Lacalle-Calderon et al. (2018), Lassoued (2021a), Lassoued (2021b), Subramaniam, et al. (2021), Miled et al. (2022), Al-Azzam

(2023), and Oteng-Abayie et al. (2023), all of which found microfinance to contribute significantly to reduction of income inequality. The non-significant short-run negative effect is not unexpected as loans and advances extended to MSMEs may not instantaneously, significantly translate into improved incomes for the entrepreneurs in the MSME sector of the economy.

The short-run contemporaneous effect of FDI on income inequality is negative, but non-significant, while the lagged effect is positive, but significant at the 10% level. This suggests that FDI may worsen (though not extremely) the income inequality problem in the short run. However, this effect is only transient as the long run effect of FDI is negative and significant at the 1% level. Thus, increased FDI inflows into key sectors of the economy such as manufacturing, agriculture and so on, can engender reduction of income inequality in the country in the long run. While the observed short run lagged effect of FDI on income inequality is in sync with evidence from Zakari and Shuaibu (2024), the observed long run income inequality-reduction effect of FDI corroborates evidence from previous studies such as Ogede et al. (2022), Yuldashev (2023) and Wang et al. (2023).

The effect of inflation on income inequality is positive and significant at the 5% level in the short- and long-run. The implication is that inflation worsens the income inequality problem. This conforms to a *priori* expectation. The observation is not unexpected considering that persistent and appreciable increase in prices adversely affects the productivity, competitiveness and income of enterprises, especially the MSMEs, thereby widening the income inequality within the country. Moreover, it can erode the purchasing power of low-income earners/households thereby exacerbating income inequality in the country. This observation is in sync with evidence from Nantob (2015), Arif, et al. (2019), Lassoued (2021), Ali and Asfaw (2023), Glawe and Wagner (2024) and several others, all of which found that inflation exacerbates income inequality.

Improvement in employment is observed to have the effect of reducing income inequality in the country. The effect is significant in the short- and long-run at the 5% and 10% level respectively. This underscores the need for policies and programmes that are germane to employment generation (or job creation) in the country in the government's bid to reduce income inequality therein.

The coefficient of the error correction term [CointEq(-1)] is negatively signed as expected, and significant at the 5% level. This further confirms that the variables are cointegrated; that is long run (equilibrium) relationships exist among them. However, the speed of adjustment to equilibrium in the event of short run deviations therefrom is quite low as indicated by the coefficient of the error correction term (-0.1349) which implies that 13.49% of short-run deviation from equilibrium is adjusted or corrected annually to restore equilibrium position.

The base ARDL model has a good fit as indicated by the coefficient of determination of 0.9983, which indicates that over 99.83% of the systematic variation in the dependent variable is explained by the model. The explanatory power of the model is upheld by the F-statistic which is significant at the 1% level, implying that the regressors are jointly significant in explaining income inequality in the country. The Durbin-Watson statistic gives no indication of the problem of autocorrelation.

Table 5

ARDL Cointegrating (Error Correction) and Long Run Form

Dependent Variable: INEQGINI				
Sample: 1992 2022				
Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dln(MFBLA)	-0.000431	0.000499	-0.864279	0.3977
D(FDI)	-0.000212	0.000379	-0.560330	0.5815
D(FDI(-1))	0.000677	0.000385	1.760115	0.0937
D(INF)	0.000047	0.000020	2.338857	0.0298
D(EMPL)	-0.000745	0.000234	-3.189983	0.0046
CointEq(-1)	-0.134857	0.048235	-2.795827	0.0112
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Ln(MFBLA)	-0.010640	0.001363	-7.804461	0.0000
FDI	-0.012406	0.003318	-3.739228	0.0013
INF	0.000346	0.000139	2.482358	0.0220
EMPL	-0.005524	0.003166	-1.744834	0.0964
C	0.984253	0.187194	5.257927	0.0000

R2 = 0.9983, Adj. R2 = 0.9976; F-stat. = 1430.417, p(F-stat.) = 0.0000; Durbin-Watson stat. = 1.5222

Source: Author's Estimation using EViews 9.

5.6. Diagnostic Tests

The results of the diagnostic test performed on the model are presented in Table 6. The tests involve the Jarque-Bea (J-B) test for residual normality; the Breusch-Godfrey (B-J) test for serial correlation; the Breusch-Pagan-Godfrey (B-P-G) test for heteroskedasticity; and the Ramsey's Regression Equation Specification Error Test (RESET). The 5% level of statistical significance was adopted for all the test statistics. The results show that the residuals are normally distributed as the p-value of the test statistic is greater than 0.05. In the same vein, the serial correlation test indicates that there is no problem of serial correlation in the model. The heteroskedasticity test indicates that the residuals of the model have constant variance (that is the residuals are homoskedastic, not heteroskedastic). The Ramsey RESET indicates that the specification of the model is error-free. Thus, it is appropriately specified.

Table 6

Diagnostic Tests

Tests	Test Stat	p-value	Inference
Residual Normality (J-B test)	3.5958	0.1656 > 0.05	Residuals are normally distributed
Serial correlation (B-G LM)	0.6121	0.5531 > 0.05	No serial correlation
Heteroskedasticity (B-P-G)	0.9908	0.4721 > 0.05	Residuals are homoskedastic
Ramsey's RESET	2.1231	0.1614 > 0.05	Model is appropriately specified

Source: Authors' estimation using EViews 9

5.7. Model Stability Test

The stability of the model was tested using the method prescribed by Brown et al. (1975) for testing the constancy of regression parameters overtime. The test involves plots of cumulative sum of recursive residuals (CUSUM) and cumulative sum of squared recursive residuals (CUSUMSQ). The plots are presented in Figure 3 and Figure 4 respectively. Both plots lie between the 5% significance bounds. This implies that the model is structurally stable and can be deployed for policy purposes.

Figure 3
CUSUM

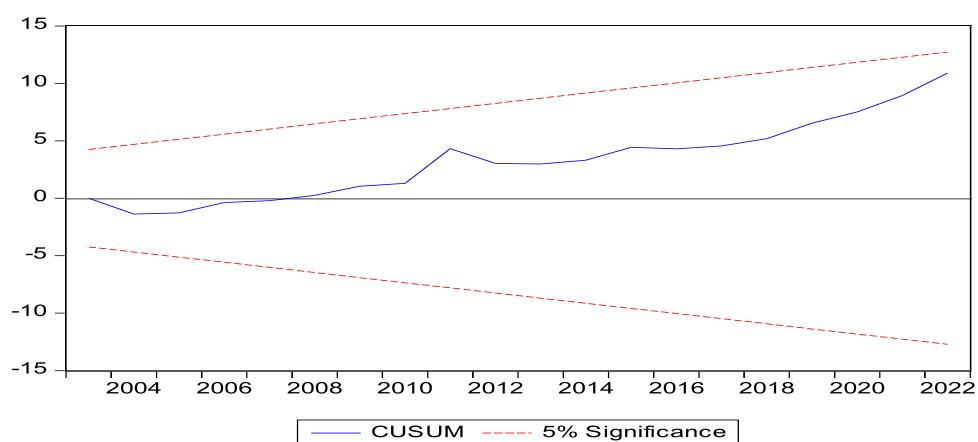
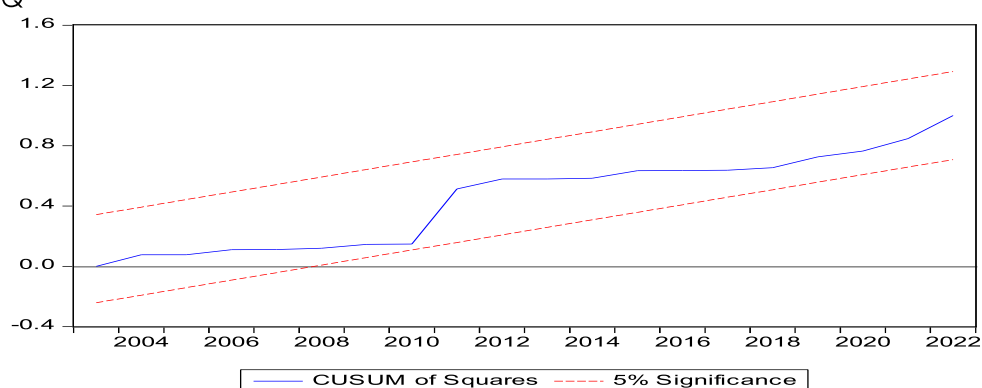


Figure 4
CUSUMSQ



6. Conclusion and Recommendations

6.1. Conclusion

The study examined the effect of microfinance banks' loans and advances on income inequality in Nigeria during the 1992-2022 period, while controlling for the effects of other microeconomic variables including FDI, inflation and employment. The ARDL approach to modeling short-run and long run relationships was employed in the analysis. The empirical evidence indicated that the lending operations of microfinance banks contributed significantly to reduction of income inequality in the country as the banks provide access to credits and loans to MSMEs including the unbanked and unserved populace, to fund productive and entrepreneurial activities thereby raising their income levels and reducing income gaps within the economy. The study further found that FDI inflows and employment generation are germane to reducing income inequality in the country. Inflation was found to have contributed significantly to inequality in the distribution of income in the country.

6.2. Policy Recommendations

Based on the empirical evidence, the following are recommended for policy considerations:

- i. Considering that microfinance banks loans and advances contributed to reduction of income inequality significantly in the country, there is need for policies, programmes, initiative and incentives to strengthen the microfinance banking sector to position it to lend more to the MSME sector. This may involve an upward review of the capital requirements of various categories of the MfBs, and encourage as many as possible (paticulaly the national MfB) to get listed on the stock exchange to enable them raise capital therefrom. The latter suggestion calls for lowering the listing requirements for the MfBs. There is also the need for the MfBs to develop new and attractive financial products to attract savings from the people. These will largely enhance their lending capacities.
- ii. The observation that FDI inflows reduced income inequality in the long run calls for efforts by the government to enhance the attractiveness of key sectors of the economy including manufacturing and agriculture to foreign direct investment.
- iii. There is need to appropriately deploy fiscal and monetary policy tools to bring inflation under control as it contributes to inequality in the country.
- iv. The observation that employment generation contributed to reduction of income inequality in the country calls for government's policies and programmes to boost job creation or gainful employment in the country. This involves *inter alia*, improvement in the ease of doing business, infrastructural development (including energy, transportation, etc.), and other investment-friendly and pro-employment policies and initiatives such as favourable tax regimes, favourable interest rates, improved security and so on.

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