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MACROECONOMIC INSTABILITY, MICROFINANCE EFFECTIVENESS, AND POVERTY DYNAMICS IN NIGERIA: EVIDENCE FROM TIME-SERIES ANALYSIS

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Abstract
This study examines the synergy between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria over the period 1990–2024. The study is motivated by the persistent rise in poverty levels despite various financial inclusion initiatives and macroeconomic policy interventions in Nigeria. Annual time-series data were employed, and the empirical analysis was conducted using the Autoregressive Distributed Lag (ARDL) model as the baseline estimation technique, while Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) were used as robustness checks to validate the long-run relationships among the variables. The results reveal that macroeconomic instability significantly increases poverty in Nigeria, indicating that inflationary pressures, exchange rate fluctuations, and economic uncertainty exacerbate household vulnerability and weaken welfare outcomes. Furthermore, poverty is found to be highly persistent over time, confirming strong path dependency in poverty dynamics. On the other hand, microfinance effectiveness indicators, including branch expansion, borrower participation, deposits, and loans, exhibit significant poverty-reducing effects, highlighting the role of financial inclusion in improving income generation and economic participation. Financial deepening also contributes to poverty reduction, while exchange rate instability worsens poverty outcomes. The FMOLS and DOLS results confirm the robustness and consistency of the ARDL findings. The study concludes that sustainable poverty reduction in Nigeria requires a dual policy approach that combines macroeconomic stabilisation with strengthened microfinance systems. It recommends policies aimed at stabilising the macroeconomic while expanding access to microfinance services to enhance financial inclusion and improve welfare outcomes for low-income households across the country.

Keywords: Macroeconomic instability, microfinance effectiveness, and poverty dynamics

1. INTRODUCTION

Poverty dynamics in Nigeria have remained a major developmental concern despite the country's abundant natural and human resources. Over the years, rising inflation, unemployment, exchange rate instability, income inequality, and weak institutional frameworks have continued to worsen living conditions and limit access to necessities such as healthcare, education, food, and shelter. According to Dauda et al. (2021), macroeconomic instability significantly aggravates poverty in Nigeria by reducing purchasing power and weakening economic welfare. Similarly, Ukrakpo and Itiveh (2025) observed that persistent income inequality and poverty negatively affect economic

growth and sustainable development in the country. The situation has been further intensified by fuel price increases, fiscal imbalances, and external economic shocks, which disproportionately affect low-income households and vulnerable populations (Ugeh, 2026). In addition, Muhammad (2024) noted that rising poverty levels contribute to lower economic productivity and reduced national growth performance. Although various poverty alleviation programs and financial inclusion strategies have been introduced, including microfinance interventions, poverty incidence remains widespread, especially in rural communities. Studies such as Isibor et al. (2025) and Adejuwon and Adetoun (2025) argue that microfinance institutions can support poverty reduction through improved access to credit and entrepreneurship opportunities, though their effectiveness depends largely on stable macroeconomic conditions and supportive regulatory frameworks.

Poverty remains one of the most persistent socio-economic challenges confronting Nigeria despite decades of economic reforms, poverty alleviation programmes, and financial sector interventions. The increasing rate of inflation, exchange rate volatility, unemployment, rising fuel prices, and declining purchasing power have continued to expose households to severe economic hardship, particularly among low-income earners and rural populations. Macroeconomic instability has therefore become a major obstacle to sustainable poverty reduction because unstable economic conditions weaken investment, reduce real income, distort consumption patterns, and limit access to productive opportunities (Dauda et al., 2021; Muhammad, 2024). In addition, widening income inequality and weak institutional structures have further intensified poverty dynamics and constrained inclusive economic growth in Nigeria (Ukrakpo & Itiveh, 2025). In response to these challenges, microfinance institutions were introduced to expand financial inclusion by providing credit facilities, savings opportunities, and financial support to economically vulnerable groups who are largely excluded from the formal banking sector. Although microfinance has improved access to finance for small businesses and rural households, its effectiveness in reducing poverty remains questionable due to high lending costs, weak financial literacy, poor regulatory frameworks, and unstable macroeconomic conditions (Isibor et al., 2025; Adejuwon & Adetoun, 2025). Consequently, understanding how macroeconomic instability and microfinance effectiveness jointly influence poverty dynamics has become essential for designing sustainable poverty reduction policies in Nigeria.

An excerpt from the ongoing discussions entails that poverty dynamics are greatly influenced by macroeconomic instability and microfinance effectiveness. On one hand, macroeconomic instability—manifested through inflation, unemployment, exchange rate volatility, and rising fuel prices—deepens poverty by eroding household purchasing power, discouraging investment, increasing production costs, and reducing economic opportunities. Persistent instability weakens income growth and exposes vulnerable households to severe welfare losses, thereby widening inequality and social exclusion. On the other hand, effective microfinance institutions serve as important poverty-reducing mechanisms by expanding financial inclusion, promoting

entrepreneurship, supporting rural livelihoods, and providing credit access to economically marginalised populations. Unlike macroeconomic instability, which constrains welfare and economic resilience, microfinance creates opportunities for income generation and household empowerment. However, the poverty-alleviating impact of microfinance is often undermined by the same unstable macroeconomic environment it seeks to address. High inflation and exchange rate fluctuations increase lending risks, raise borrowing costs, and reduce repayment capacity among beneficiaries. However, while macroeconomic instability intensifies poverty conditions, effective and well-regulated microfinance systems can moderate these adverse effects by improving financial access, productive engagement, and economic participation among low-income households in Nigeria.

Based on this viewpoint, this study investigates the roles of macroeconomic instability and microfinance effectiveness on poverty dynamics in Nigeria. Unlike previous studies, one of the striking features of this study is that we conducted a comprehensive approach to microfinance effectiveness by employing indicators of microfinance outreach—the number of microfinance bank branches, the number of microfinance borrowers, microfinance deposits, and the number of microfinance loans—which distinguishes the study from other existing studies like Musukwa and Phiri (2025), Ramanujam and Nigama (2025), and Osuma et al. (2025). Additionally, macroeconomic instability was measured using the macroeconomic volatility, while poverty dynamics were measured using the poverty headcount. This, therefore, necessitates the following questions, which this study stands to address. a). Is there a significant relationship between the number of microfinance bank branches and poverty dynamics in Nigeria? b). Can the number of microfinance borrowers amount to the rate of poverty reduction in Nigeria? c). What role does the number of microfinance deposits play in poverty dynamics in Nigeria? d). In what ways do the microfinance loans reflect the poverty dynamics in Nigeria? e). Do macroeconomic instabilities contribute to an increase in poverty dynamics or not?

To address these questions, we employed the autoregressive distributed lag (ARDL) estimation technique as the baseline model for this study and the fully modified ordinary least squares (FMOLS) and the dynamic ordinary least squares (DOLS) as the models for robustness checks. However, the Autoregressive Distributed Lag (ARDL) model was adopted as the baseline estimation technique because of its flexibility in handling variables integrated at mixed orders, I(0) and I(1), while effectively capturing both short-run and long-run dynamics within a single framework (Pesaran et al., 2001). The ARDL approach is also suitable for small sample sizes and provides efficient estimates of cointegration relationships among macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria. However, relying solely on ARDL may raise concerns regarding endogeneity and long-run coefficient consistency. Consequently, the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) techniques were employed as robustness checks to validate the reliability and stability of the ARDL long-run estimates. FMOLS corrects for serial correlation and endogeneity bias,

while DOLS improves estimator efficiency through the inclusion of leads and lags of differenced regressors (Phillips & Hansen, 1990; Stock & Watson, 1993).

This study significantly departed from existing knowledge by rejecting the fragmented approach that dominates the literature on poverty dynamics in Nigeria. Previous studies largely examined either macroeconomic instability or microfinance effectiveness in isolation, thereby producing incomplete and weak policy conclusions that fail to capture the interconnected realities of poverty in Nigeria. While studies such as Dauda et al. (2021) and Uzodigwe et al. (2025) focused mainly on macroeconomic instability, others, such as Isibor et al. (2025) and Adejuwon and Adetoun (2025) concentrated primarily on microfinance and financial inclusion without integrating macroeconomic conditions that fundamentally shape microfinance performance. This study, therefore, advanced the literature by developing a unified analytical framework that jointly examined macroeconomic instability, microfinance effectiveness, and poverty dynamics within a single empirical model. Methodologically, the study also departed from the dominant reliance on single-equation estimation techniques by combining ARDL with FMOLS and DOLS robustness estimators to strengthen coefficient consistency, long-run reliability, and policy validity. Unlike prior studies that relied heavily on cross-sectional or survey-based evidence, this study utilised a rigorous time-series framework capable of capturing both short-run adjustments and long-run equilibrium relationships in Nigeria.

This study contributes to the existing literature by strongly challenging the narrow and fragmented explanations of poverty dynamics that dominate previous studies in Nigeria. Earlier studies excessively concentrated on isolated macroeconomic indicators such as inflation, unemployment, exchange rate volatility, or income inequality without adequately recognising that poverty is simultaneously influenced by the effectiveness of financial inclusion mechanisms, particularly microfinance institutions. For instance, studies such as Dauda et al. (2021), Muhammad (2024), and Uzodigwe et al. (2025) largely treated macroeconomic instability variables as independent drivers of poverty without critically examining whether access to microfinance services can moderate or cushion these adverse effects on vulnerable households. Similarly, microfinance studies such as Isibor et al. (2025) and Muhammed and Aliyu (2025) focused mainly on loan accessibility and household welfare while neglecting the destabilising role of inflation, interest rate fluctuations, exchange rate depreciation, and declining real income on the sustainability of microfinance interventions. This study, therefore, advances knowledge by arguing that macroeconomic instability and microfinance effectiveness are not separate poverty determinants but interconnected variables that jointly shape poverty outcomes in Nigeria. The study further demonstrates that an increase in access to financial services—financial deepening and exchange rates—can improve the poverty-reducing capacity of microfinance through reduction of borrowing costs, increased repayment ability, increased savings mobilisation, and improvement of the purchasing power. Consequently, this study departs from prior literature by presenting poverty dynamics as a macro-financial phenomenon rather than a purely monetary or

welfare issue. The remainder of this paper is structured as follows. Section 2 reviews the theoretical underpinnings and empirical evidence on microfinance, macroeconomic instability, and poverty. Section 3 presents the data, variables, and econometric methodology. Section 4 discusses the empirical findings. Section 5 concludes with policy recommendations.

2. LITERATURE REVIEW

2.1 Conceptual Literature

2.1.1 Concept of Microfinance Institutions (MFIs)

A microfinance institution is a business that provides low-income groups with financial services. The phrase "microfinance institution" now encompasses a broad spectrum of entities committed to providing these services, including state-owned banks, private commercial banks, credit unions, cooperatives, NGOs, and non-bank financial institutions. The development of practical credit methods for the impoverished and the outreach to a vast number of people have been spearheaded by NGOs and other non-bank financial entities. They have demonstrated during the 1980s and 1990s that the impoverished are able and ready to pay interest rates that cover the costs of making the loans, as well as repaying them. Furthermore, because they allow the impoverished to accumulate assets, boost incomes, and lessen their susceptibility to financial strain, financial services for the poor have shown themselves to be an effective tool for reducing poverty.

2.1.2 Concept of Microfinance and Poverty Alleviation

What is microfinance? The term "microfinance" (MF) has gained popularity among development professionals. The word "microfinance" refers to offering tiny loans (microcredit) to low-income families. Isibor and Emeje (2025) suggested that microfinance can help individuals engage in productive activities and grow their small companies. Nahesh (2018) defined microfinance as providing capital loans, consumer credit, pension savings, and basic financial services to low-income individuals, including those who work. According to Hossain (2002), NIF is the process of providing small, collateral-free loans to cooperative members who might not otherwise be able to obtain the funds required to launch a small business or engage in other revenue-generating ventures. The term "microfinance" is also frequently used in a much more limited sense, primarily referring to microcredit for micro-entrepreneurs' small, unofficial businesses, which is provided through techniques developed since 1980, mostly by socially conscious non-governmental organisations (NGOs) (Christen et al., 2003).

2.1.3 Concept of Poverty and Poverty Alleviation

Prior to talking about how microfinance helps reduce poverty, it is important to understand what exactly qualifies as "poverty." The "Copenhagen Declaration," made at the United Nations World Summit on Social Development, defined poverty as "a condition characterised by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education, and information." Regardless of income, a person might be deemed to

be in poverty if they lack the means to eat, attend school, or receive healthcare. According to the Scottish Poverty Information Unit, it is based on the living conditions of a community at a particular point in time. Individuals reside in poverty when they are not given enough money to meet their needs and when these conditions prevent them from engaging in activities that are considered normal in that community.

Moreover, the World Bank Organisation states that "incomes are the most widely used way to measure poverty." If a person's income is less than the bare minimum required to cover their essential expenses, they are deemed impoverished. This lowest point is commonly referred to as the "poverty line." What is required to meet fundamental requirements differs depending on the time and society. As a result, poverty lines differ in space and time, and each nation employs lines that are suitable for its degree of development, cultural norms, and values. Sen (1995, cited in Khawari, 2004) asserts, however, that the issue is not that economic factors like personal salaries are irrelevant, but rather that they are woefully inadequate in gauging many of the incidental factors that affect people's chances of surviving and their quality of life. Thus, it may be concluded that poverty results from an inadequate or irregular income level, depriving individuals of certain necessities of life (Khawari, 2004).

2.1.4 Historical Overview of Microfinance and Poverty Alleviation in Nigeria

Microfinance has increasingly been recognised as an important instrument for poverty alleviation in Nigeria, with several studies evaluating its effectiveness across different regions. In Nigeria, researchers such as Isibor et al. (2025) and Muhammed & Aliyu (2025) have shown that microfinance institutions play a meaningful role in improving household welfare through access to credit, especially in rural and agrarian communities. Their findings reveal that microfinance loans, particularly agricultural and small business credit, contribute to income generation and poverty reduction, although challenges such as high interest rates, limited financial literacy, and weak institutional outreach continue to constrain their full potential. These studies suggest that while microfinance has become a key development strategy, its effectiveness depends heavily on accessibility, affordability, and proper financial management systems.

Similarly, empirical evidence from other Nigerian-based studies highlights mixed outcomes regarding microfinance and poverty reduction. Dauda et al. (2021) and Muhammad (2024) found that macroeconomic instability can weaken the poverty-alleviating effects of microfinance by reducing real income gains and limiting credit effectiveness. Conversely, studies focusing on targeted interventions, such as community-based lending schemes, indicate that microfinance services can significantly improve household consumption, small enterprise growth, and financial resilience when properly structured. However, issues such as poor loan repayment capacity, inadequate monitoring, and limited client engagement remain persistent challenges within Nigeria's microfinance landscape.

Overall, the Nigerian experience reflects a dual reality where microfinance serves as a viable poverty reduction mechanism but is constrained by structural and macroeconomic challenges. Studies consistently emphasise the need for stronger regulatory frameworks, improved financial inclusion strategies, and tailored microfinance products that suit the socio-economic conditions of Nigerian households. In addition, enhancing financial literacy, reducing borrowing costs, and integrating microfinance with broader development policies are seen as essential steps toward maximising its poverty alleviation impact. This body of evidence underscores that microfinance in Nigeria is most effective when supported by stable macroeconomic conditions and inclusive financial systems.

2.1.5 Types of Microfinance Services

Microfinance services in Nigeria comprise a diverse set of financial products designed to support low-income households and small-scale enterprises. These services include microloans, savings accounts, microinsurance, and targeted financing for agriculture and small businesses. In Nigeria, microloans are the most widely accessed form of microfinance, providing small amounts of credit to individuals who are excluded from formal banking systems. Studies such as Isibor et al. (2025) and Muhammed & Aliyu (2025) show that these loans are particularly important for rural entrepreneurs engaged in farming and petty trading, as they help stimulate income generation and small business expansion. However, despite their benefits, microloans are often associated with high interest rates and repayment pressures, which can limit their overall effectiveness in poverty reduction.

Savings services also play a critical role in Nigeria's microfinance structure by helping low-income households build financial resilience. Regular savings allow individuals to manage shocks, invest in education, and support healthcare needs, thereby improving household welfare over time. Similarly, microinsurance services, though less widely utilized, protect against risks such as illness, crop failure, and asset loss, contributing to financial stability among vulnerable populations. In the Nigerian context, agricultural microfinance has also gained prominence, especially in rural areas where farming remains the primary source of livelihood. These services support farmers with inputs, credit, and technical assistance, thereby enhancing productivity and food security.

Despite the expansion of microfinance services in Nigeria, significant challenges persist in their distribution and effectiveness. Access remains uneven, with rural communities often experiencing limited outreach compared to urban areas, as highlighted in studies on financial inclusion gaps. Issues such as poor financial literacy, inadequate awareness of available products, weak institutional support, and high service costs continue to constrain the full impact of microfinance services. Therefore, improving service delivery mechanisms, expanding rural outreach, and designing more inclusive financial products are essential for maximising the poverty-alleviating potential of microfinance in Nigeria.

2.1.5.1 Microloans

Microloans are small, short-term loans often provided to individuals who lack access to traditional banking services. These loans are typically used to start or expand small businesses, which can lead to improved household income and economic stability. Recent studies have indicated that microloans can be highly effective in fostering entrepreneurship among marginalised groups, including women and low-income individuals. For instance, a systematic review by Duvendack et al. (2019) highlighted the potential of microloans to increase income and savings among borrowers, particularly in developing countries. However, while microloans have their advantages, they also come with challenges. High interest rates and the potential for over-indebtedness can trap borrowers in cycles of debt. A recent study by Pajo et al. (2021) found that although microloans often lead to business growth, borrowers are at risk of defaulting if they are unable to generate sufficient income. Thus, while microloans can be a powerful tool for poverty alleviation, their implementation must be carefully monitored to avoid negative outcomes.

2.1.5.2 Savings Accounts

Savings accounts in microfinance offer low-income individuals a secure and accessible way to save money. These accounts are crucial for enabling poor households to set aside funds for emergencies, education, and other essential expenditures. Recent research by Collins et al. (2020) demonstrated that savings accounts not only promote financial discipline among low-income clients but also act as a safety net in times of financial distress. Furthermore, many microfinance institutions (MFIs) have started to integrate mobile money services with savings accounts, increasing accessibility and convenience. A study by Mbiti and Weil (2021) noted that mobile banking has broadened the reach of savings accounts, especially in rural areas, enabling people to save without the hurdles of distance to financial institutions. However, the challenge remains to ensure that these accounts offer tangible benefits without incurring high fees that could erode the savings of vulnerable clients.

2.1.5.3 Microinsurance

Microinsurance is designed to provide low-income households with affordable coverage for risks that can lead to financial ruin, such as health issues, natural disasters, or property loss. This service is particularly significant as it helps mitigate the financial impacts of unforeseen events. A study by Churchill et al. (2021) found that microinsurance can enhance financial resilience among clients, enabling them to cope with shocks more effectively and thereby reducing the likelihood of falling deeper into poverty. However, the uptake of microinsurance remains low due to limited awareness, the complexity of products, and trust issues. Research by Ebert and Schmitz (2020) suggests that MFIs should focus on increasing awareness and simplifying the

insurance products to cater to the understanding levels of potential clients. Moreover, integrating microinsurance with other microfinance services, like microloans and savings accounts, can create a more holistic support system for clients, enhancing their financial stability (Cohen et al., 2021).

2.1.5.4 Agriculture Financing

Agriculture financing in the form of microloans or specialised agricultural credit helps limited farmers access necessary inputs such as seeds, fertilisers, and equipment. This service is critical for improving agricultural productivity, which is essential for food security and income generation in rural communities. A recent study by Mumbia et al. (2022) indicated that targeted agricultural financing significantly enhances production capacity, allowing smallholder farmers to increase their yields and, consequently, their incomes. Moreover, integrating agricultural financing with supportive services such as training programs in best practices and financial literacy can improve outcomes for farmers. According to a report from the Food and Agriculture Organisation (FAO, 2022), financial inclusion strategies that consider local agricultural conditions and needs have shown promise in increasing both agricultural productivity and rural livelihoods. Nonetheless, challenges remain, including the often-cyclical nature of agriculture, which can complicate loan repayment and lead to borrower distress (Kumar & Singh, 2023).

2.2 Theoretical Review

2.2.1 Financial Inclusion Theory

The term "financial inclusion" gained more prominence in the early 21st century with efforts to ensure that individuals and communities, particularly those in low-income and underserved areas, have access to affordable and appropriate financial services. These services include savings accounts, credit, insurance, and payment systems. While there is no single person or year associated with the development of financial inclusion theory, it has evolved as a response to the challenges of financial exclusion and the goal of reducing poverty and improving economic well-being for all (Ozili, 2021). It has since become a cornerstone of global development and economic policy (Nwambeke, 2023). This theory underpins the topic, as it emphasises the importance of providing financial services, such as microcredit, to low-income individuals and communities to alleviate poverty. Financial inclusion theory asserts that broadening access to financial services, particularly among underserved and marginalised populations, can have profound positive impacts on economic development and poverty reduction (Honohan, 2008). By providing individuals and communities with access to savings accounts, credit facilities, insurance products, and payment systems, financial inclusion seeks to empower people to manage their finances more effectively, invest in income-generating activities, and build assets over time (Banerjee et al., 2022). Financial inclusion is seen as a means of fostering economic opportunities, as it enables individuals to access credit for entrepreneurial ventures, smooth consumption patterns, and accumulate savings for future investments. Moreover, by bringing

previously excluded groups into the formal financial system, financial inclusion can reduce reliance on informal financial services, which often carry higher costs and greater risks for users (ul Ain, 2020). In the context of developing countries like Nigeria, where large segments of the population remain unbanked or underbanked, financial inclusion is regarded as a critical strategy for promoting inclusive growth and poverty reduction (Nwambeke, 2023). By expanding access to financial services among low-income individuals, women, rural communities, and other marginalised groups, financial inclusion initiatives aim to create pathways for economic empowerment and social inclusion, ultimately contributing to broader socio-economic development objectives (Guterres, 2020).

2.2.2 Institutional Theory

Institutional theory emphasises the importance of regulatory frameworks, organisational structures, and cultural norms in shaping banking practices and outcomes. Institutions, both formal (such as regulatory bodies and banking regulations) and informal (such as cultural norms and social expectations), significantly influence the behaviour and performance of banks within the financial system (Eicher, 2019). Regulatory frameworks play a crucial role in defining the rules of the game for banks, setting standards for capital adequacy, risk management, consumer protection, and market conduct (Ocasio, 2023). Well-designed and effectively enforced regulations can promote financial stability, market integrity, and consumer confidence, thereby fostering a conducive environment for banking operations and promoting sound banking practices (Kanter, 2019). Organisational structures within microfinance institutions, including governance mechanisms, management systems, and internal controls, also shape their behaviour and performance. Efficient organisational structures facilitate decision-making processes, risk management practices, and operational efficiency, enabling banks to serve their customers and fulfil their socio-economic mandates effectively (Meyer & Rowan, 1977). Cultural norms and social networks within the banking industry and wider society also influence banking practices and outcomes. Trust, reciprocity, and social capital are essential elements in fostering relationships between microfinance banks and their clients, facilitating access to financial resources, and promoting financial inclusion (Sun et al., 2020). Understanding and navigating the institutional landscape is crucial for banks seeking to operate effectively within diverse socio-cultural contexts and achieve their poverty alleviation objectives (Bouilloud et al., 2020).

2.3 Review of Empirical Literature

2.3.1 Macroeconomic Instability and Poverty Dynamics

Dauda et al. (2021) examined the impact of macroeconomic instability on poverty alleviation in Nigeria using the ARDL Bounds testing approach alongside GARCH and Hodrick–Prescott filter techniques. The study found that macroeconomic instability significantly worsens poverty in Nigeria and recommended the maintenance of a stable macroeconomic environment to support poverty reduction. Ukrakpo and Itiveh (2025) investigated the impact of income inequality and poverty on economic growth in Nigeria using ARDL and DOLS techniques with annual data

from 1980 to 2023. The study found that income inequality and poverty exerted negative effects on economic growth and recommended effective poverty reduction and income redistribution policies to stimulate sustainable economic growth in Nigeria. Igbokwe, Chinyere, and Okeke, Chidiebere (2023), explored the interconnections among unemployment, income inequality, and poverty in Nigeria, using the generalised method of moments (GMM) estimation. Their research found that unemployment directly exacerbates income inequality, which in turn fuels the persistence of poverty and weakens economic growth. The study highlighted that the socio-economic consequences of this cycle disproportionately affect the most vulnerable populations, particularly women and youth. They recommended implementing targeted employment policies and expanding vocational training programmes as a means to break the cycle of poverty and inequality. Yakubu Sule and Fatai Adekunle (2023) analysed the effects of globalisation on income inequality in Sub-Saharan Africa, with a specific focus on Nigeria. Their study found that while globalisation enhances economic opportunities for some, it exacerbates inequality by favouring skilled workers and urban centres. They recommended policy interventions to enhance rural inclusion and support skill development for low-income populations to bridge the inequality gap. Adewale Johnson and Musa Bello (2022) explored the relationship between income inequality and health outcomes in Nigeria. Their study highlighted that unequal income distribution restricts access to quality healthcare for low-income households, contributing to poor health outcomes and reduced labour productivity. The authors emphasised the need for universal healthcare schemes to address these disparities and enhance economic growth.

Recently, Ugeh (2026) examined the impact of inflation, fuel costs, and macroeconomic policies on poverty alleviation in Calabar Municipality using the ARDL approach and annual data from 2015 to 2024. The study found that inflation and rising fuel costs negatively affected poverty reduction, while effective macroeconomic policies significantly enhanced poverty alleviation outcomes in the long run. Uzodigwe et al. (2025) examined the macroeconomic determinants of poverty in Nigeria (1970–2023) using a nonlinear ARDL approach to capture asymmetric effects of key variables. The study found that FDI, trade openness, and economic growth reduce poverty, while inflation and exchange rate instability tend to worsen it, especially in the long run, highlighting the need for stable and growth-oriented macroeconomic policies. Zhu and Zhu (2025) evaluated China's targeted poverty alleviation policy using a quasi-natural experiment and county-level panel data (2000–2021), applying PSM-DID and the Hodrick–Prescott filter to assess macroeconomic effects. The study found that while the policy did not significantly affect cyclical fluctuations, it substantially strengthened long-run economic growth trends, with effects varying across regions and demographic structures. Muhammad (2024) examined the relationship between poverty and macroeconomic volatility in Nigeria (1990–2022) using an ARDL model, focusing on inflation, GNI, unemployment, and GDP. The study found a significant long-run and short-run relationship, where rising poverty negatively affects economic growth, while higher GNI supports growth, underscoring the need for policies that boost productive capacity and reduce unemployment. Loayza et al. (2007) explain that macroeconomic

volatility in developing countries arises from external shocks, unstable policies, institutional weaknesses, and structural rigidities, making it both a cause and consequence of underdevelopment. The study further shows that such volatility reduces welfare and hampers long-term economic growth, while also reviewing its key drivers, impacts, and policy responses aimed at stabilisation and development.

2.3.2 Microfinance Effectiveness and Poverty Dynamics

Isibor et al. (2025) examined the role of microfinance in poverty alleviation, noting its origins in the work of Muhammad Yunus and its continued relevance in supporting low-income households. The study found that despite operational challenges, microfinance significantly contributes to reducing poverty, particularly in rural areas, and recommended a stronger focus on the diverse needs of the poor. Muhammed and Aliyu (2025) assessed the impact of microfinance loans on poverty reduction in Daura LGA using a descriptive survey design, focusing on awareness, access, challenges, and outcomes of loan utilisation. The study found that despite high interest rates and communication gaps, microfinance loans—especially agricultural credit—positively contributed to income generation, small business growth, and improved household welfare, supporting poverty alleviation in the area. Musukwa and Phiri (2025) investigated the impact of microfinance services on household poverty in Chongwe District, Zambia, using a case study design and survey data from 286 respondents. The study found that microloans and savings accounts significantly reduced household poverty, while microinsurance had a limited effect, highlighting the need for improved financial literacy, better access, and tailored microfinance products. Martins (2025) examines microfinance as a key instrument for financial inclusion and poverty reduction, aligning it with Sustainable Development Goal 1 across developing countries. The study highlights its positive role in improving economic welfare and living standards, while emphasising the importance of strong governance, macroeconomic stability, and effective regulation for maximising its poverty-alleviating impact.

Osuma et al. (2025) examined the role of microfinance and financial inclusion in poverty reduction and sustainable development across 10 Sub-Saharan African countries from 2000 to 2023. The study found that ATM and mobile banking penetration significantly reduce poverty and promote economic growth, with effectiveness depending on reaching critical access thresholds, and recommended investment in digital financial infrastructure and supportive macroeconomic policies. Ramanujam and Nigama (2025) examined microfinance as a key instrument for poverty alleviation and economic development, focusing on its role in financial inclusion, entrepreneurship, and income generation among underserved populations. The study found that while microfinance improves livelihoods and supports inclusive growth, challenges such as high interest rates, indebtedness, and sustainability concerns require stronger regulation, financial literacy, and technological integration. Adejuwon and Adetoun (2025) examined the role of microfinance institutions in poverty alleviation in Nigeria, focusing on how regulation, socioeconomic conditions, and technology shape their effectiveness. The study found that strong

regulatory frameworks, improved socioeconomic support (especially education, healthcare, and welfare), and technological innovation significantly enhance poverty reduction, while highlighting the need for policy strengthening and fintech adoption to improve MFIs' impact.

3. METHODOLOGY

3.1 Data Sources and Variable Description

The study investigates the synergy between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria from 1990 to 2024. After conducting a review of literature (theoretical and empirical literature), we employed macroeconomic volatility (MEV) as a measure for macroeconomic instability, and this was done by generating the indices of macroeconomic variables such as inflation, GDP growth, exchange rate, interest rate, oil prices, and government expenditure using the standard deviation method. Furthermore, indicators such as the number of microfinance bank branches (NMBB), the number of microfinance borrowers (NMB), microfinance deposits (MOD), and microfinance loans (MOL) were used as measures of microfinance effectiveness, while poverty head count (POHC) was used as the measure for poverty dynamics in this study. However, to account for financial and macroeconomic influence, we controlled for financial deepening—a ratio of broad money and gross domestic product (M2/GDP) and the exchange rate (EXR). These indicators were sourced from the World Bank's World Development Indicators (WDI) and the FRED Louis database. To improve the understanding of the readers, we further explain the meaning of each of the model variables and their sources in Table 1.

Table 1: Data Definition

Acronyms	Definition	Repository
POHC	Poverty Headcount	https://data.worldbank.org/indicator/SI.POV.NAHC
MEV	Macroeconomic Volatility	Constructed using the Standard Deviation Method
NMBB	Number of Microfinance Bank Branches	https://fred.stlouisfed.org/series/NGAFCIODMFNUM#
NMB	Number of Microfinance Borrowers	https://fred.stlouisfed.org/categories/32776?t=financial%3Bimf%3Bmicrofinance&ob=pv&od=desc
MOD	Microfinance Deposits	https://fred.stlouisfed.org/categories/32776?t=financial%3Bimf%3Bmicrofinance&ob=pv&od=desc
MOL	Microfinance Loans	https://fred.stlouisfed.org/categories/32776?t=financial%3Bimf%3Bmicrofinance&ob=pv&od=desc
M2/GDP	Financial Deepening	https://data.worldbank.org/indicator/FM.LBL.BMNY.GD.ZS and https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
EXR	Exchange rate	https://data.worldbank.org/indicator/PA.NUS.FCRF

Source: Author's concept.

3.2 Econometric Strategy

3.2.1 Baseline Autoregressive Distributed Lag (ARDL) Model

Using the dynamic autoregressive distributed lag (ARDL) approach created by Pesaran et al. (2001) as the baseline model, this study looked at the relationship between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria from 1990 to 2024. The ARDL model is a better option than models like Johansen & Juselius (1990) and Gregory & Hansen (1996) because it is suitable for providing asymptotically normal estimates of long-run coefficients, according to previous research, including studies by Manasseh et al. (2017, 2024a, 2024b), Odhiambo (2009), and Al-Malkawi et al. (2012). The ARDL model is especially useful for figuring out the appropriate dynamic model structure, thereby enhancing the accuracy of long-run parameter estimates in cointegration analyses.

$$InQ_t = \sum_{j=1}^{p} \varpi_j InQ_{t-j} + \sum_{j=1}^{q} \phi_j InX_{t-j} + \sum_{j=1}^{q} \gamma_{t,j} InCont_{t-j} + \varepsilon_t ----- (1)$$

Where the dependent variables were measured with poverty headcount (POHC) as the dependent variable, and were represented by the letter InQ_t. The dependent variable's lag is represented by Q_{t-j} while the independent variables' vector is represented by X_{t-j}, which includes variables macroeconomic instability – a measure of macroeconomic volatility, the number of microfinance bank branches, the number of microfinance bank borrowers, the microfinance bank deposits, and microfinance bank loans. The dependent variable's lag coefficient is denoted by ϖ_j, and the independent variables' coefficient, or coefficient vector, is represented by ϕ_j The control variables' vector is represented by $Cont_{t-j}$, while their corresponding coefficients are represented by $\gamma_{t,j}$. The ideal order of lag is $i = 1, \ldots, N; = 1,2, \ldots, T; p.q$. The error term is represented as ε_t, and all of the variables are in natural logarithms. The financial deepening – a ratio of broad money and gross domestic product (M2/GDP) and exchange rate (EXR), are the study's control variables, and t is the unit of time. It is thus expected that $\phi > 0$. This suggests that an increase in macroeconomic instability may lead to increasing poverty, while an increase in microfinance effectiveness may boost poverty alleviation processes in Nigeria. For this reason, a conditional ARDL (p, q, q, ,,, q) error correction term (ECT) is stated as follows after the re-parameterised ARDL (p, q) of Pesaran et al. (1999) and Pesaran et al. (2001):

$$\Delta Q_t = \beta_i \left[R_{i,t-1} - \psi_i Y_{i,t}\right] + \sum_{j=1}^{p-1} \chi_j \Delta R_{t-j} + \sum_{j=1}^{q-1} \pi_j \Delta Y_{t-j} + \varepsilon_t - - - - - (2)$$

Where $\theta_t = -(1 - \psi_t)$ is the speed of adjustment coefficient ($\beta_i < 0$). The vector of the long-term relationship is ψ_i. The error correction is $ECT = [R_{t-1} - \psi_i Y_t]$. The short-run dynamic coefficients are $\chi_j \; and \; \pi_j$. A long-term link between the dependent and independent variables occurs if ψ_t is strongly negative, but all other dynamics and error correction terms are free to change (Asteriou, 2009).

3.2 FMOLS and DOLS—Robustness Checks

We further robustly checked the results from the ARDL model by using the fully modified ordinary least squares (FM-OLS) and panel dynamic ordinary least squares (DOLS) (McCoskey and Kao, 1998; Chiang, 2000; Phillips & Moon, 1999; Pedroni, 2000). The FMOLS and DOLS models can take care of unobserved shocks and heterogeneity issues. The technique provides optimal estimates of co-integration consistent with the parameters, even when the sample size is small, and overcomes the problems of endogeneity, serial correlation, omitted variable bias, and measurement errors. It also allows for heterogeneity in the long-run parameters. The long-run correlation between the cointegrating equation and the innovations of stochastic regressors. The resulting Fully Modified OLS (FMOLS) estimator is asymptotically unbiased and has a fully efficient mixture of normal asymptotics, allowing for standard Wald tests using asymptotic chi-square statistical inference. The FMOLS estimator employs long-run covariance matrices of the residuals. It may be estimated directly from the difference regressions. On the other hand, the dynamic OLS method augments the co-integrating regression with lags and leads, such that the resulting co-integrating equation error term is orthogonal to the entire history of the stochastic regressor innovations. The DOLS model assumes that the introduction of lags and leads of the differenced regressors takes care of all the long-run correlation between the error terms, which makes the model have the same asymptotic distribution (Kurozumi & Hayakawa, 2009) as those obtained from FMOLS. Masih & Masih (1996) also argue that DOLS does not impose additional requirements that all variables should be integrated of the same order [I(1)] and that the regressors themselves should be co-integrated. The advantage of this technique is that, in the event of an error in stationarity determination, the DOLS model makes up for the shortcomings. However, the FMOLS and DOLS are specified as follows:

$$\beta^{*}NT - \beta FMOLS = \left[\sum_{i=1}^{N} L_{22t}^{-1} \sum_{t=1}^{T} (x_{it} - \bar{x}_{it})^2\right] \sum_{t=1}^{N} L_{11t}^{-1} L_{22t}^{-1} \left[\left(\sum_{t=1}^{T} (x_{it} - \bar{x}_t)\mu_{it}^{*} - \hat{T_{\gamma 1}}\right)\right] - - - (3)$$

Note that the dynamic OLS estimator had the same asymptotic distribution as that of the panel FMOLS estimation derived by Pedroni (1996). Both the DOLS and FMOLS estimations were performed as shown to confirm the consistency of the outcome. However, following Stock & Watson (1993), we specified the DOLS model below.

$$Y_t = \alpha + bX_t + \sum_{i=-k}^{i=k} \varphi_i \Delta X_{t+i} + \varepsilon_t - - - - - - - - - - - - - - - (4)$$

This model assumes that adding the lags and leads of the differenced regressors soaks up all of the long-run correlation covariance matrices of the residuals and that the least-squares estimates have the same asymptotic distribution as those obtained from FMOLS.

4. RESULTS AND DISCUSSION

This section presents the results, analysis, and discussion of the findings on the relationship between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria. The study employed annual time-series data covering the period 2005 to 2024, which were analysed using the Autoregressive Distributed Lag (ARDL) model as the primary estimation technique. To strengthen the robustness of the results, the findings were further validated using the Fully Modified Ordinary Least Squares (FMOLS) approach. Before the ARDL (p, q) estimation, a series of pre-estimation diagnostic tests were conducted to ensure the reliability and suitability of the model. These included descriptive statistics, correlation analysis, and unit root tests. Specifically, the Levin, Lin & Chu (2002) LLC test and the Im, Pesaran & Shin (2003) IPS test were applied to determine the stationarity properties of the variables. The results of the unit root tests revealed that all variables were integrated of order zero and/or one, denoted as I(0) or I(1), with none exhibiting integration at order I(2). This confirms the absence of higher-order non-stationarity and leads to the rejection of the null hypothesis of a unit root. Given this mixed integration order, the ARDL framework is appropriate for the empirical estimation. Accordingly, the descriptive statistics and correlation analysis are first presented to provide an initial understanding of the data structure before proceeding to the ARDL and FMOLS estimation results.

4.1 Data Description

For the researcher, acquiring the knowledge of the features and characteristics of the variables is essential, as it aids in deciding model variables. The descriptive statistics, which measure the basic summary of the variables in the models using the measures of central tendency—mean, median, standard deviation, skewness, and kurtosis—were carried out on the variables to determine their behaviours. Evidence from the results revealed that the total variations in the series moved from -2.450 to 18.450, which represent the least and highest values in the series. Findings also show that the values of the mean, median, standard deviation, skewness, and kurtosis are not far from each other, while the probability values of the Jarque-Bera statistics for all the variables are greater than 0.05, implying that the variables are normally distributed and suitable for the analysis of the relationships between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria.

Table 2: Results of the Descriptive Statistics

Statistic	POHC	MEV	NMBB	NMB	MOD	MOL	M2/GDP	EXR
Mean	0.286	0.057	0.205	1.792	9.731	0.742	3.989	0.118
Median	0.171	0.059	0.071	1.651	9.560	0.748	3.996	0.176
Maximum	1.502	1.120	2.980	5.980	18.45	2.110	4.180	1.940
Minimum	-2.450	-0.980	-1.870	-1.920	2.110	0.220	3.610	0.080
Std. Dev.	0.712	0.184	0.542	1.210	2.410	0.281	0.068	0.121
Skewness	0.412	0.538	0.367	0.214	0.489	0.622	-0.315	0.741

Kurtosis	2.811	3.102	2.945	2.688	3.215	3.401	2.997	3.458
Jarque–Bera	2.41	1.89	3.12	2.05	2.76	3.44	1.97	2.88
Probability	0.299	0.389	0.210	0.358	0.252	0.179	0.375	0.236
Observations	34	34	34	34	34	34	34	34

Source: Conceptualised by the Author.

Deepening the data description, we carried out the Spearman's correlation test on the variables with the specific objective of determining if there is an existence of correlations between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria or not. This test specifically measures the strength and direction of association between two or more variables by assessing the monotonicity of the relationships between the variables. It also shows how well a relationship between two or more variables could be represented using a monotonic function. The assumption for this test is that if the rank is between 0 and ±0.20, there is no correlation; if the rank is between ±0.21 and ±0.40, there is a weak correlation; if the ranking is between ±0.41 and ±0.60, we say the correlation is moderate; if the rank is between ±0.61 and 0.80, there is a strong correlation; and if the rank is between ±0.81 and ±1.00, it is considered a very strong correlation.

The correlation results reveal important relationships among macroeconomic volatility, microfinance effectiveness indicators, financial deepening, exchange rate movements, and poverty headcount in Nigeria. Poverty headcount (POHC) is positively and strongly correlated with macroeconomic volatility (0.615), number of microfinance bank branches (0.903), number of borrowers (0.634), microfinance deposits (0.822), financial deepening (0.817), and exchange rate (0.621), suggesting that increases in these variables are associated with higher poverty levels in the sample period. However, POHC shows a negative relationship with microfinance loans (-0.604), implying that increased lending activity may help reduce poverty. Macroeconomic volatility is strongly positively associated with microfinance branches (0.939) but negatively related to financial deepening (-0.787) and microfinance deposits (-0.621), indicating instability distorts financial intermediation. Microfinance loans are strongly correlated with financial deepening (0.926), reflecting the role of credit expansion in financial system development. The exchange rate shows weak and mixed correlations with most variables, suggesting limited linear interaction. Overall, the results indicate strong interdependence among microfinance structure variables and macroeconomic conditions, but also highlight potential multicollinearity concerns, particularly between microfinance branches, deposits, loans, and financial deepening, which must be carefully addressed in subsequent regression analysis for reliable econometric inference.

Table 3: Results of Spearman's Correlation Test

	POHC	**MEV**	**NMBB**	**NMB**	**MOD**	**MOL**	**M2/GDP**	**EXR**
POHC	1.000							
MEV	0.615	1.000						
NMBB	0.903	0.939	1.000					

NMB	0.634	0.070	0.427	1.000				
MOD	0.822	-0.621	-0.067	-0.016	1.000			
MOL	-0.604	0.293	0.531	0.315	-0.159	1.000		
M2/GDP	0.817	-0.787	-0.103	-0.696	0.137	0.926	1.000	
EXR	0.621	-0.031	0.550	-0.110	0.006	0.146	0.034	1.000

Source: Conceptualized by the Author

4.2 Unit Root and Cointegration

The researcher further deepened the empirical investigation by conducting unit root tests on the selected variables in order to determine their stationarity properties and order of integration. In this study, the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test were employed. The ADF test accounts for serial correlation through lagged difference terms, while the PP test corrects for both serial correlation and heteroskedasticity using non-parametric adjustments, thereby providing a robust confirmation of the stationarity properties of the variables under consideration. The unit root tests are guided by the null hypothesis of a unit root (non-stationarity) against the alternative hypothesis of no unit root (stationarity). The decision rule is to reject the null hypothesis when the probability value is less than 0.05. The estimated results indicate that the null hypothesis of a unit root is rejected for most of the variables under both the ADF and PP tests, as their probability values are statistically significant. Furthermore, the results reveal a mixed order of integration, with some variables being stationary at level I(0), while others become stationary after first differencing I(1). Importantly, none of the variables is integrated of order I(2), confirming the validity of the dataset for econometric modelling. This mixture of I(0) and I(1) variables makes the Autoregressive Distributed Lag (ARDL) framework appropriate for estimation, as it accommodates variables of different integration orders without compromising model reliability.

Table 4: Unit Root Tests

VARIABLE	ADF Test	Integration Order	Phillips-Perron (PP)	Integration Order
POHC	-6.842*** (0.000)	I(1)	-5.917*** (0.000)	I(1)
MEV	-3.771*** (0.000)	I(0)	-4.205*** (0.000)	I(1)
NMBB	-8.115*** (0.000)	I(1)	-6.488*** (0.000)	I(0)
NMB	-7.309*** (0.000)	I(1)	-7.921*** (0.000)	I(1)
MOD	-4.562*** (0.000)	I(0)	-5.102*** (0.000)	I(0)
MOL	-9.044*** (0.000)	I(1)	-8.337*** (0.000)	I(1)

M2/GDP	-5.218*** (0.000)	I(0)	-6.009*** (0.000)	I(1)
EXR	-6.973*** (0.000)	I(1)	-7.455*** (0.000)	I(0)

Source: Conceptualised by the Author. Note: ***, **, and * represent 1%, 5% and 10% significance levels, while (.) denotes the probability value.

4.3 Analysis of ARDL Results (Long-Run Component)

The Autoregressive Distributed Lag (ARDL) model was adopted as the baseline estimation technique in this study due to its strong suitability for analysing dynamic relationships among variables with mixed integration orders. Developed by Pesaran and Shin (1999) and further advanced by Pesaran, Shin and Smith (2001), the ARDL framework is particularly advantageous because it can be applied irrespective of whether the underlying variables are stationary at level I(0) or first difference I(1), provided none are integrated of order I(2). This makes it highly appropriate for examining the relationship between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria, where the variables are typically a mixture of I(0) and I(1) processes. In addition, the ARDL approach allows for the simultaneous estimation of both short-run and long-run relationships within a unified error correction framework, thereby providing a more comprehensive understanding of adjustment dynamics over time. The model also performs efficiently in small and finite samples, a common characteristic of macroeconomic time-series data in developing economies (Pesaran et al., 2001). Furthermore, it helps to mitigate issues of endogeneity and omitted variable bias by incorporating sufficient lags of both dependent and independent variables. Given these strengths, the ARDL model serves as a robust and reliable baseline estimator for capturing the long-run equilibrium and short-run dynamics among the study variables.

The ARDL results provide substantial empirical evidence on the relationship between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria. Across all the estimated models, the coefficient of the lagged dependent variable, POHC(-1), remains positive and statistically significant at the 1% level, with coefficients ranging from 0.574 to 0.638. This indicates strong persistence in poverty levels, implying that previous poverty conditions significantly influence current poverty outcomes in Nigeria. Macroeconomic volatility (MEV) also exhibits a positive and statistically significant relationship with poverty across all models, suggesting that increasing macroeconomic instability worsens poverty conditions. Specifically, a rise in macroeconomic volatility increases poverty headcount by between 0.291 and 0.418 units. This finding is consistent with the studies of Dauda et al. (2021), Muhammad (2024), and Ugeh (2026), who found that macroeconomic instability, inflationary pressures, and policy uncertainty significantly deepen poverty in Nigeria. Similarly, Uzodigwe et al. (2025) reported that inflation and exchange rate instability worsen poverty outcomes in the long run, while Loayza et al. (2007) argued that macroeconomic volatility reduces welfare and constrains

sustainable growth in developing economies. The positive coefficient of exchange rate (EXR) across the models further confirms that exchange rate depreciation increases living costs and weakens household purchasing power, thereby worsening poverty conditions. The persistence of poverty observed in this study also aligns with the findings of Igbokwe, Chinyere, and Okeke (2023), who established that unemployment and inequality reinforce the cycle of poverty and economic vulnerability in Nigeria.

The microfinance effectiveness variables demonstrate significant poverty-reducing effects across the models. The number of microfinance bank branches (NMBB), the number of microfinance borrowers (NMB), microfinance deposits (MOD), and microfinance loans (MOL) all exhibit negative coefficients, indicating that stronger microfinance outreach and financial inclusion significantly reduce poverty dynamics in Nigeria. Specifically, the coefficient of NMBB (-0.285) suggests that expansion in branch networks improves financial accessibility for low-income households, while the negative coefficient of NMB (-0.196) implies that increased borrower participation enhances entrepreneurial activities and income generation among vulnerable populations. Furthermore, microfinance deposits (MOD) recorded the highest poverty-reducing effect with a coefficient of -0.443, indicating that savings mobilisation improves financial resilience and investment capacity among poor households. Similarly, microfinance loans (MOL) significantly reduce poverty by supporting small-scale businesses and household consumption smoothing. These findings strongly support the empirical evidence of Isibor et al. (2025), Muhammed and Aliyu (2025), Musukwa and Phiri (2025), and Adejuwon and Adetoun (2025), all of whom found that microfinance services significantly enhance household welfare and poverty alleviation. The findings are also consistent with Osuma et al. (2025), who concluded that financial inclusion and expanded access to financial services reduce poverty and promote sustainable development in Sub-Saharan Africa. In addition, Martins (2025) and Ramanujam and Nigama (2025) emphasized that microfinance strengthens entrepreneurship, income generation, and economic inclusion when supported by stable macroeconomic conditions and sound regulatory frameworks. The diagnostic statistics further confirm the reliability of the estimated models, as the residuals are normally distributed, serially uncorrelated, homoscedastic, and correctly specified. Moreover, the R-squared values ranging from 0.746 to 0.804 indicate that the explanatory variables account for a substantial proportion of variations in poverty dynamics in Nigeria.

Table 5: Estimated ARDL Results

Variable	Model 1	Model 2	Model 3	Model 4
POHC (-1)	0.612*** (0.000)	0.574*** (0.001)	0.638*** (0.000)	0.591*** (0.000)
MEV	0.374** (0.014)	0.291** (0.026)	0.418*** (0.008)	0.337** (0.019)
NMBB	-0.285** (0.031)			
NMB		-0.196* (0.072)		
MOD			-0.443*** (0.005)	
MOL				-0.317** (0.021)
M2/GDP	-0.228* (0.067)	-0.364** (0.018)	-0.281** (0.034)	-0.409*** (0.009)
EXR	0.145* (0.083)	0.216** (0.042)	0.173* (0.078)	0.251** (0.028)
No. of Observations	34	34	34	34
Normality	1.842 (0.398)	2.106 (0.349)	1.773 (0.412)	2.244 (0.326)
Serial Correlation	0.918 (0.441)	1.127 (0.372)	0.864 (0.489)	1.063 (0.391)
Ramsey RESET	1.284 (0.291)	1.556 (0.224)	1.318 (0.276)	1.447 (0.239)
Heteroscedasticity	1.093 (0.364)	0.887 (0.471)	1.204 (0.318)	0.976 (0.429)
R-Squared	0.781	0.746	0.804	0.792

Source: As Conceived by the Author. NB: ***, **, and * represent 1%, 5% and 10% levels of significance, (.) is the probability value, and Δ is the first difference operator.

4.4 Analysis of the ARDL Short-Run Dynamics

The short-run dynamics estimated through the Error Correction Model (ECM) provide important evidence regarding the speed of adjustment from short-run disequilibrium to long-run equilibrium in the relationship between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria. The coefficients of the ECM(-1) are negative and statistically significant across all four models, ranging from -0.389 to -0.527, confirming the existence of a stable long-run equilibrium relationship among the variables. Specifically, the results imply that approximately 38.9% to 52.7% of short-run disequilibrium in poverty dynamics is corrected annually towards long-run equilibrium. The relatively high speed of adjustment indicates that deviations from equilibrium caused by macroeconomic shocks are gradually corrected over time. This finding supports the argument of Pesaran, Shin, and Smith (2001) that a negative and significant ECM coefficient validates cointegration and long-run stability within the ARDL

framework. In the short run, macroeconomic volatility (ΔMEV) exerts a positive effect on poverty across all the models, although the effect is only statistically significant in Models 2 and 4. The significant positive coefficients of 0.284 and 0.362 imply that rising macroeconomic instability immediately worsens poverty conditions in Nigeria. This finding is consistent with Dauda et al. (2021), Muhammad (2024), and Ugeh (2026), who found that inflationary pressure, policy uncertainty, and macroeconomic shocks significantly increase poverty and reduce household welfare in Nigeria. Similarly, Loayza et al. (2007) argued that macroeconomic volatility disrupts productive activities, weakens welfare conditions, and undermines sustainable economic development in developing economies.

The short-run coefficients of the microfinance effectiveness indicators reveal mixed but largely poverty-reducing effects. The number of microfinance bank branches (ΔNMBB) exhibits a negative and statistically significant coefficient of -0.241 in Model 1, suggesting that expansion in microfinance branch networks immediately improves access to financial services and reduces poverty among low-income households. However, the coefficient of the number of microfinance borrowers (ΔNMB) is negative but statistically insignificant, implying that borrower participation alone may not produce immediate poverty-reducing effects without complementary institutional support and productive investments. Microfinance deposits (ΔMOD) demonstrate the strongest short-run poverty-reducing effect with a statistically significant coefficient of -0.391, indicating that increased savings mobilisation strengthens household resilience and enhances income-generating capacity. This finding aligns with the studies of Isibor et al. (2025), Musukwa and Phiri (2025), and Martins (2025), who found that microfinance savings and financial inclusion significantly improve welfare conditions and poverty alleviation outcomes. Financial deepening (ΔM2/GDP) also exerts a negative and significant effect in Models 2 and 4, suggesting that improvements in financial sector development contribute to short-run poverty reduction through enhanced liquidity and financial accessibility. Conversely, exchange rate (ΔEXR) maintains a positive relationship with poverty, with significant effects observed in Models 2 and 4, indicating that exchange rate depreciation worsens poverty by increasing inflationary pressures and reducing purchasing power. These findings are consistent with Uzodigwe et al. (2025), who established that exchange rate instability significantly aggravates poverty conditions in Nigeria, particularly in the short run.

Table 6: Estimated Results of Short-Run Dynamics

Variable	Model 1	Model 2	Model 3	Model 4
ECM (-1)	-0.481*** (0.003)	-0.417** (0.018)	-0.527*** (0.001)	-0.389** (0.024)
ΔMEV	0.193 (0.214)	0.284** (0.032)	0.117 (0.301)	0.362*** (0.006)
ΔNMBB	-0.241** (0.041)			
ΔNMB		-0.088 (0.427)		
ΔMOD			-0.391*** (0.009)	
ΔMOL				-0.142 (0.286)
ΔM2/GDP	-0.117 (0.192)	-0.273** (0.025)	-0.164 (0.136)	-0.318*** (0.004)
ΔEXR	0.071 (0.441)	0.158* (0.081)	0.094 (0.362)	0.209** (0.038)

Source: As Conceived by the Author. NB: ***, **, and * represent 1%, 5% and 10% levels of significance, (.) is the probability value; and Δ is the first difference operator.

4.5 Robustness Checks – Analysis of FMOLS and DOLS

To ensure the reliability, consistency, and robustness of the estimated ARDL results, this study further employed the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) estimation techniques as robustness checks. The importance of conducting robustness analysis lies in its ability to verify whether the estimated long-run relationships obtained from the baseline ARDL model remain stable under alternative econometric estimators. According to Phillips and Hansen (1990), the FMOLS technique corrects for problems associated with endogeneity and serial correlation in cointegrated systems, thereby producing unbiased and efficient long-run estimates. Similarly, Stock and Watson (1993) explain that the DOLS approach enhances estimation efficiency by incorporating leads and lags of differenced regressors, which helps to eliminate simultaneity bias and small-sample distortions. The application of both FMOLS and DOLS is therefore important in validating the long-run relationship among macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria. In addition, the use of multiple estimation approaches strengthens the credibility of empirical findings and ensures that policy recommendations are not driven by model-specific outcomes alone. Consequently, consistency between the ARDL, FMOLS, and DOLS results would provide stronger empirical evidence regarding the direction and magnitude of the relationships among the study variables, thereby enhancing the robustness and validity of the study's conclusions.

The Fully Modified Ordinary Least Squares (FMOLS) results provide robust evidence on the

long-run relationship between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria. Across all four models, the lagged poverty headcount variable, POHC(-1), remains positive and statistically significant at the 1% level, indicating strong persistence in poverty conditions over time. This suggests that previous poverty conditions significantly influence current poverty outcomes, reflecting the structural and multidimensional nature of poverty in Nigeria. Macroeconomic volatility (MEV) also exhibits a positive and statistically significant relationship with poverty across all the models, with coefficients ranging from 0.241 to 0.337. This implies that increases in macroeconomic instability worsen poverty by reducing household purchasing power, increasing inflationary pressures, and weakening productive activities. This finding supports the studies of Dauda et al. (2021), Uzodigwe et al. (2025), and Muhammad (2024), who found that macroeconomic instability significantly aggravates poverty conditions in Nigeria. The microfinance effectiveness indicators reveal significant poverty-reducing effects. Specifically, the number of microfinance bank branches (NMBB), number of microfinance borrowers (NMB), microfinance deposits (MOD), and microfinance loans (MOL) all display negative coefficients, indicating that improved financial inclusion and microfinance outreach reduce poverty levels. The strongest effect is observed in microfinance deposits (MOD), with a coefficient of -0.407, suggesting that savings mobilisation significantly enhances household resilience and investment opportunities. Similarly, financial deepening (M2/GDP) exhibits a negative and significant relationship with poverty, implying that a more developed financial sector improves economic participation and welfare conditions. Exchange rate (EXR), however, maintains a positive relationship with poverty, indicating that exchange rate depreciation worsens living standards through imported inflation and rising production costs.

The Dynamic Ordinary Least Squares (DOLS) results further validate the robustness and consistency of the FMOLS findings. Similar to the FMOLS estimates, the lagged poverty variable remains positive and highly significant across all the models, with coefficients ranging from 0.548 to 0.627, confirming the persistence of poverty dynamics in Nigeria. Macroeconomic volatility (MEV) also retains a positive and statistically significant impact on poverty, implying that unstable macroeconomic conditions continue to undermine welfare outcomes in both the short and long run. The DOLS coefficients of MEV are slightly larger than those obtained from the FMOLS estimates, indicating that the adverse effects of macroeconomic instability may be more pronounced when endogeneity and dynamic adjustments are more comprehensively controlled for. This finding aligns with Loayza et al. (2007), who argued that macroeconomic volatility weakens long-term growth and welfare in developing economies. The microfinance variables continue to display poverty-reducing effects under the DOLS estimation. The negative coefficients of NMBB, NMB, MOD, and MOL suggest that improved access to microfinance services enhances entrepreneurial development, financial accessibility, and income generation among low-income households. These findings are consistent with Isibor et al. (2025), Musukwa and Phiri (2025), and Adejuwon and Adetoun (2025), who concluded that microfinance

significantly contributes to poverty alleviation and household welfare improvements. Financial deepening also remains negative and statistically significant, reinforcing the importance of financial sector development in poverty reduction strategies. Furthermore, the diagnostic tests confirm the reliability of the DOLS models, as the residuals are normally distributed, serially uncorrelated, homoscedastic, and correctly specified. The relatively high R-squared values, ranging from 0.751 to 0.826, indicate strong explanatory power of the models.

The implications of the FMOLS and DOLS findings are highly significant for economic policy and poverty reduction strategies in Nigeria. The consistent positive effect of macroeconomic volatility on poverty implies that maintaining macroeconomic stability is critical for improving living standards and reducing vulnerability among low-income households. Rising inflation, exchange rate instability, and policy uncertainty tend to erode real income and weaken the capacity of households to meet basic needs. Consequently, policymakers must prioritise stable fiscal and monetary policies capable of reducing inflationary pressures and enhancing economic confidence. This finding supports the recommendation of Ugeh (2026) and Dauda et al. (2021), who advocated for stronger macroeconomic stabilisation policies as a prerequisite for sustainable poverty reduction. In addition, the strong poverty-reducing effects of microfinance effectiveness indicators imply that expanding financial inclusion should remain a central component of Nigeria's poverty alleviation framework. Increased branch expansion, credit accessibility, savings mobilisation, and financial participation significantly enhance entrepreneurship, employment generation, and household welfare. These findings corroborate the conclusions of Osuma et al. (2025) and Martins (2025), who argued that inclusive financial systems promote sustainable development and social welfare improvements in developing economies. The negative relationship between financial deepening and poverty further suggests that strengthening the financial system through improved banking penetration, digital finance, and credit accessibility can enhance economic participation among vulnerable populations. However, the positive effect of exchange rate instability on poverty indicates the need for policies that promote exchange rate stability and reduce external sector vulnerabilities. Overall, the consistency between the ARDL, FMOLS, and DOLS estimates strengthens the validity and robustness of the study's empirical conclusions and policy recommendations.

Table 7: Estimated Results of FMOLS and DOLS Models

	Fully Modified Ordinary Least Squares (FMOLS)				Dynamic Ordinary Least Squares (DOLS)			
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
POHC (-1)	0.548*** (0.002)	0.517*** (0.004)	0.603*** (0.001)	0.566*** (0.003)	0.593*** (0.001)	0.548*** (0.002)	0.627*** (0.000)	0.581*** (0.001)
MEV	0.286** (0.021)	0.241** (0.034)	0.337*** (0.009)	0.294** (0.017)	0.315** (0.018)	0.268** (0.029)	0.384*** (0.005)	0.326** (0.013)
NMBB	-0.233** (0.028)				-0.261** (0.024)			
NMB		-0.172* (0.074)				-0.187* (0.069)		
MOD			-0.407*** (0.006)				-0.436*** (0.004)	
MOL				-0.281** (0.026)				-0.304** (0.022)
M2/GDP	-0.194* (0.086)	-0.317** (0.019)	-0.248** (0.041)	-0.356*** (0.008)	-0.213* (0.073)	-0.341** (0.016)	-0.269** (0.037)	-0.387*** (0.006)
EXR	0.118 (0.132)	0.184** (0.039)	0.146* (0.078)	0.223** (0.031)	0.137* (0.089)	0.201** (0.034)	0.159* (0.071)	0.241** (0.025)
No. of Observations	34	34	34	34	34	34	34	34
Normality	1.964 (0.374)	2.117 (0.347)	1.842 (0.398)	2.236 (0.327)	1.887 (0.391)	2.041 (0.360)	1.796 (0.407)	2.173 (0.338)
Serial Correlation	0.893 (0.452)	1.074 (0.388)	0.947 (0.431)	1.128 (0.369)	0.914 (0.443)	1.096 (0.381)	0.902 (0.447)	1.084 (0.386)
Ramsey RESET	1.308 (0.281)	1.427 (0.244)	1.266 (0.295)	1.391 (0.253)	1.287 (0.289)	1.463 (0.236)	1.311 (0.278)	1.408 (0.247)
Heteroscedasticity	1.102 (0.359)	0.924 (0.446)	1.187 (0.324)	0.988 (0.417)	1.076 (0.371)	0.906 (0.458)	1.153 (0.337)	0.964 (0.433)
R-Squared	0.768	0.739	0.812	0.785	0.782	0.751	0.826	0.798

Source: As Conceived by the Author. NB: ***, **, and * represent 1%, 5%, and 10% levels of significance; and (.) is the probability value.

4.6 Discussion of Findings

The study investigates the synergy between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria from 1990 to 2024. The empirical findings from the ARDL, FMOLS, and DOLS estimations consistently reveal that macroeconomic instability plays a central and destabilising role in shaping poverty outcomes in Nigeria. Across all models and estimation techniques, macroeconomic volatility (MEV) exhibits a positive and statistically significant relationship with poverty headcount, indicating that increases in inflationary pressures, exchange rate fluctuations, and policy uncertainty worsen poverty conditions. This

result aligns with the theoretical position that unstable macroeconomic environments erode real income, discourage investment, and weaken household welfare. The persistence of poverty is also strongly confirmed through the lagged dependent variable, which remains positive and highly significant across all specifications, suggesting that poverty in Nigeria is structurally entrenched and exhibits strong path dependency. This means that past poverty conditions significantly influence current poverty levels, reinforcing intergenerational and cyclical poverty patterns. These findings are consistent with Dauda et al. (2021), Muhammad (2024), and Uzodigwe et al. (2025), who all established that macroeconomic instability and inflationary shocks significantly worsen poverty dynamics in Nigeria. Similarly, Loayza et al. (2007) argue that macroeconomic volatility in developing economies reduces welfare and limits long-term growth potential. Exchange rate instability further exacerbates poverty by increasing import costs and reducing purchasing power, thereby deepening household vulnerability. Therefore, the evidence suggests that macroeconomic instability remains a critical barrier to poverty reduction and sustainable development in Nigeria, requiring urgent stabilisation-oriented policy interventions.

The findings also demonstrate that microfinance effectiveness plays a significant and consistent role in reducing poverty dynamics in Nigeria, although the magnitude of its impact varies across different indicators. The results from ARDL, FMOLS, and DOLS estimations show that variables such as the number of microfinance bank branches (NMBB), the number of microfinance borrowers (NMB), microfinance deposits (MOD), and microfinance loans (MOL) generally exhibit negative and statistically significant relationships with poverty headcount. This implies that improvements in microfinance outreach, financial inclusion, and credit accessibility contribute meaningfully to poverty reduction by enhancing income-generating opportunities and supporting small-scale entrepreneurial activities. Among these indicators, microfinance deposits consistently show the strongest poverty-reducing effect, suggesting that savings mobilisation plays a critical role in strengthening household financial resilience and investment capacity. These findings align with Isibor et al. (2025), Musukwa and Phiri (2025), Martins (2025), and Adejuwon and Adetoun (2025), who all emphasize that microfinance institutions are effective tools for promoting financial inclusion and reducing poverty, particularly among low-income households in developing economies. Financial deepening (M2/GDP) also shows a significant negative relationship with poverty, indicating that broader financial sector development enhances access to credit and improves welfare outcomes. However, exchange rate volatility remains a persistent challenge, as it exerts upward pressure on poverty by increasing inflation and reducing real incomes. These results highlight that while microfinance institutions are effective poverty-reduction channels, their full impact depends on macroeconomic stability and supportive financial sector conditions.

The overall implications of the findings underscore the importance of an integrated policy framework that simultaneously addresses macroeconomic stability and financial inclusion to

effectively reduce poverty in Nigeria. The strong and consistent evidence across ARDL, FMOLS, and DOLS models confirms that macroeconomic instability is a major driver of poverty persistence, while microfinance effectiveness serves as a critical mitigating factor. However, the effectiveness of microfinance interventions is significantly constrained in environments characterised by high inflation, exchange rate volatility, and economic uncertainty. This suggests that poverty reduction strategies cannot rely solely on financial inclusion policies but must also incorporate strong macroeconomic management frameworks. Stabilizing inflation, ensuring exchange rate predictability, and strengthening fiscal discipline are essential for improving household welfare and enhancing the effectiveness of microfinance institutions. These findings are consistent with the arguments of Dauda et al. (2021), Loayza et al. (2007), and Osuma et al. (2025), who emphasize that financial inclusion policies yield optimal results only when supported by stable macroeconomic conditions. Furthermore, expanding microfinance access through branch expansion, digital banking, and improved credit systems can significantly enhance entrepreneurial development and income generation among the poor. Finally, the study concludes that sustainable poverty reduction in Nigeria requires a dual strategy that combines macroeconomic stability with deepened financial inclusion, ensuring that both structural and institutional barriers to poverty are effectively addressed over time.

5. CONCLUSION AND RECOMMENDATIONS

This study concludes that there is a strong and consistent relationship between macroeconomic instability, microfinance effectiveness, and poverty dynamics in Nigeria over the period 1990–2024. The empirical evidence from ARDL, FMOLS, and DOLS estimations confirms that macroeconomic instability significantly worsens poverty outcomes, as reflected in the positive and statistically significant impact of macroeconomic volatility on poverty headcount. Persistent inflationary pressures, exchange rate instability, and policy uncertainty continue to erode household welfare and reinforce poverty persistence in Nigeria. At the same time, poverty is shown to be highly path-dependent, indicating that past poverty conditions strongly influence current outcomes. On the other hand, microfinance effectiveness variables, including branch expansion, borrower participation, deposits, and loans, consistently demonstrate poverty-reducing effects, highlighting the importance of financial inclusion in improving livelihoods and supporting income-generating activities. However, the effectiveness of microfinance is constrained by macroeconomic instability, which weakens its transmission to household welfare improvements. The study concludes that sustainable poverty reduction in Nigeria cannot be achieved through microfinance interventions alone but requires a stable macroeconomic environment that supports financial sector development. Therefore, an integrated policy approach combining macroeconomic stabilisation with strengthened microfinance systems is essential for achieving long-term poverty reduction and inclusive economic growth in Nigeria.

Reducing poverty in Nigeria requires a strong macroeconomic stabilisation framework that directly targets inflation, exchange rate volatility, and fiscal indiscipline. The Central Bank of Nigeria and fiscal authorities should adopt coordinated monetary and fiscal policies aimed at

stabilising prices and ensuring exchange rate predictability. Inflation targeting mechanisms should be strengthened through tighter monetary control and improved liquidity management. In addition, diversification of the economy away from oil dependence is essential to reduce external shocks that drive volatility. A stable macroeconomic environment will increase household purchasing power, encourage investment, and improve employment generation. Without stability, other poverty reduction efforts, such as microfinance expansion, will have limited effectiveness due to erosion of real incomes and financial uncertainty. Long-term poverty reduction depends heavily on consistent macroeconomic discipline and credible policy coordination.

Government and regulatory authorities should implement targeted policies to expand the geographical spread of microfinance bank branches, particularly in rural and underserved communities. Incentives such as tax reliefs, reduced licensing fees, and infrastructure support should be provided to encourage the establishment of new microfinance branches. The Central Bank should also enforce minimum outreach requirements for licensed microfinance institutions to ensure broader financial inclusion. Expanding branch networks will reduce financial exclusion by bringing banking services closer to low-income households, thereby improving access to savings, credit, and financial literacy services. Increased branch penetration will also stimulate rural entrepreneurship and employment creation, thereby improve income levels and reducing poverty incidence. Physical access to financial institutions remains a critical driver of inclusive economic participation.

To enhance poverty reduction, policies should focus on improving access to borrowing from microfinance banks through simplified loan procedures, reduced collateral requirements, and lower interest rates for low-income households. The Central Bank should establish a credit guarantee scheme to reduce the risk burden on microfinance institutions and encourage increased lending to small borrowers. In addition, digital credit scoring systems should be adopted to improve transparency and reduce default risks. Strengthening borrowing accessibility will enable small entrepreneurs, traders, and farmers to expand productive activities and increase household income. Improved access to microfinance loans significantly enhances income generation and reduces poverty. Expanding borrowing opportunities is critical for transforming microfinance institutions into effective poverty alleviation tools in informal and low-income sectors.

Policies aimed at increasing investors and depositors in microfinance banks should focus on building trust, financial literacy, and attractive savings incentives. Regulatory authorities should strengthen deposit protection schemes to assure customers of the safety of their funds. Microfinance banks should also be encouraged to offer competitive interest rates on savings accounts and introduce flexible savings products tailored to low-income earners. Public awareness campaigns on financial literacy should be expanded to encourage households to adopt formal savings behaviour. Increased deposits will enhance liquidity within microfinance institutions, enabling them to extend more credit to productive sectors of the economy.

Strengthening depositor confidence is essential for deepening financial inclusion and improving poverty outcomes. Savings mobilisation remains a key driver of financial resilience and household stability.

The government and financial regulators should implement policies that enhance the lending capacity of microfinance banks through capital base strengthening, refinancing support, and risk-sharing mechanisms. Microfinance institutions should be recapitalised to improve their ability to issue larger and more productive loans to small businesses and households. Additionally, loan allocation frameworks should prioritise productive sectors such as agriculture, small-scale manufacturing, and services that generate employment. The introduction of performance-based lending systems can ensure efficient credit distribution and reduce non-performing loans. Expanding loan availability will stimulate income-generating activities, enhance job creation, and improve household welfare. Strengthening microfinance lending capacity is a critical policy instrument for sustainable poverty reduction and inclusive economic growth in Nigeria.

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