INCOME INEQUALITY, ACCESS TO CREDIT AND FINANCIAL INCLUSION

BY

Miracle Tamara-Enemiyayefa GBONWEI

MGS2104743

DEPARTMENT OF FINANCE

FACULTY OF MANAGEMENT SCIENCES

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A RESEARCH PROJECT WRITTEN AND SUBMITTED TO THE DEPARTMENT OF FINANCE, FACULTY OF MANAGEMENT SCIENCES, UNIVERSITY OF BENIN, BENIN CITY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELORS OF SCIENCE (B.Sc) DEGREE IN FINANCE OF THE UNIVERSITY OF BENIN, BENIN CITY

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DECLARATION

I, **Miracle Tamara-Enemiyayefa GBONWEI**, hereby declare that this project is completely my own composition under the supervision of Dr. S.U. Eboigbe. This work has not been submitted in part or whole by anyone else and all references made from the work of other persons have duly acknowledged.

_____ _____

Signature **Date**

CERTIFICATION

We certify that this project has been carried out by **Miracle Tamara-Enemiyayefa GBONWEI** with matriculation number **MGS2104743** in the Department of Finance, Faculty of Management Sciences, University of Benin. It is adequate in scope and in quality in partial fulfilment of the requirement for the award of Bachelor of Science (B.Sc) degree in Finance.

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DR. S.U. EBOIGBE **DATE**
(Project Supervisor)

_____ _____

DR. O. AIGBOVO **DATE**
(Project Coordinator)

_____ _____

DR. O.A. IZEKOR **DATE**
(Head of Department)

DEDICATION

This project is dedicated to God Almighty for giving me the grace to complete this project work and my academic pursuit at large.

ACKNOWLEDGEMENTS

I wish to express my heartfelt gratitude to Almighty God, who has been my constant source of strength, guidance, and help throughout my academic journey and during the completion of this research project.

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My dear beloved grandmother (Late Mrs. Happy Mary Kpesu) may her soul rest in peace I thank her for all the support she gave to me growing up I wouldn't be here without here

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Finally, to my dear friends, roommate, and gist partner — Susan, Sharon and loveth — thank you for your love, friendship, constant support and for your companionship throughout my years here. I love you all dearly.

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ABSTRACT

The study examined income inequality, access to credit, and financial inclusion spanning periods from 1995 to 2023 based on the accessibility of data. Four hypotheses were raised and evaluated using the fully modified ordinary least squares estimator. Based on the analysis conducted, the following findings were made that: the number of ATMs per 100,000 adults (ATM) has a negative but statistically insignificant coefficient (-0.0877, p = 0.6695); the number of registered mobile money accounts (MMA) also showed a negative but statistically insignificant relationship with income inequality (-0.0051, p = 0.4920); outstanding loans from commercial banks (LCB) have a positive but statistically insignificant coefficient (15.7753, p = 0.3713); and the private credit to GDP ratio (PRC) is the only variable with a statistically significant positive relationship with income inequality (0.1417, p = 0.0235). As a result of these findings, it was recommended that: policymakers should implement measures to ensure equitable access to credit, including prioritizing loans to underserved groups, such as small and medium-sized enterprises (SMEs), women, and low-income individuals, while creating incentives for financial institutions to extend credit to marginalized communities; should be made to increase mobile money accounts usage, particularly in rural and underserved areas; financial literacy programs should be introduced to educate borrowers on managing loans effectively and using them for productive ventures; and financial institutions should integrate ATMs with more advanced features, such as bill payment, mobile money transfers, and account opening, to make them more impactful for low-income users.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Income inequality in Nigeria remains a critical barrier to sustainable development, reflecting entrenched structural and regional disparities in wealth and opportunity. According to the World Bank (2023), Nigeria's Gini coefficient is estimated at 0.48, placing it among the countries with the highest income inequality in sub-Saharan Africa. This inequality is particularly stark between urban and rural areas, with northern regions consistently experiencing higher poverty rates, lower educational attainment, and weaker access to public services than their southern counterparts (National Bureau of Statistics [NBS], 2022). Additionally, the top 10 percent of Nigerians control approximately 47.7 percent of total income, leaving the bottom 50 percent with less than 15 percent, thus limiting upward mobility and deepening socio-economic exclusion (Akpan & Ikoh, 2022; Oxfam, 2023).

The implications of this income disparity are multifaceted. High levels of inequality hinders economic growth by weakening aggregate demand, eroding trust in institutions, and fuelling political instability (Galor, 2019). Furthermore, persistent poverty cycles are exacerbated in areas with limited access to economic resources and infrastructure. Quantitative tools such as the Gini coefficient and Lorenz curve illustrate the magnitude of these inequalities, but they also underscore the deeper issue of unequal access to capital and financial services (Atkinson, 2015). In many rural and informal settings, limited access to credit impairs household

investment in education, health, and enterprise, thereby reinforcing intergenerational poverty and social marginalization (Aterido, Beck & Iacovone, 2013).

Access to credit plays a pivotal role in mitigating income inequality by enabling individuals to engage in productive economic activities. However, access remains highly constrained in Nigeria due to structural barriers such as lack of formal identification, insufficient collateral, high interest rates, and low levels of financial literacy (Central Bank of Nigeria [CBN], 2022). Although outstanding loans from deposit money banks as a share of GDP increased from 15.4 percent in 2015 to 23.8 percent in 2023 (World Bank, 2024), credit distribution remains disproportionately skewed towards large corporations and urban borrowers. Similarly, Nigeria's private credit to GDP ratio reached 18.2 percent in 2023, still below the average of 27 percent for lower-middle-income countries (International Monetary Fund [IMF], 2024). These figures highlight the limited penetration of credit into underserved sectors, especially the informal economy, which accounts for over 65 percent of employment in Nigeria (ILO, 2023).

To address these disparities, financial inclusion has emerged as a key strategy aimed at expanding access to financial services such as savings, credit, insurance, and digital payment platforms (Demirguc-Kunt, Klapper & Singer, 2017). Nigeria’s National Financial Inclusion Strategy (NFIS), launched in 2012 and revised in 2018, targeted a 95 percent inclusion rate by 2024. While the country has made significant strides, progress has been uneven. By 2023, the financial inclusion rate stood at 64.8 percent, still below the revised target (EFInA, 2023). Several financial inclusion indicators reflect this gradual progress: the number of ATMs per 100,000 adults increased from 17.20 in 2020 to 18.60 in 2023; the number of registered mobile

money accounts per 1,000 adults reached 432.5 in 2023, up from 278.0 in 2020 (Global Findex, 2024). These technological innovations, particularly mobile money and agency banking, have expanded access to credit and transactional services in rural and previously excluded communities (Sahay et al., 2020).

Despite these gains, considerable challenges persist. Many Nigerians still face barriers in translating financial access into effective usage, particularly in accessing formal credit. The gap between financial inclusion and inclusive credit access remains a major obstacle to poverty alleviation and income redistribution. Weak institutional capacity, inadequate risk assessment tools, and insufficient policy support for inclusive lending continue to undermine the transformative potential of financial inclusion (Ogunleye, Abiodun & Adekunle, 2021). Accordingly, an understanding of the nexus between income inequality, access to credit, and financial inclusion is crucial for designing effective policy interventions. This study therefore aims to examine how financial inclusion and credit access can jointly serve as mechanisms for reducing income inequality in Nigeria's evolving financial landscape.

1.2 Statement of the Research Problem

The persistent challenge of income inequality in Nigeria, despite sustained efforts to enhance financial inclusion, raises critical concerns about the effectiveness and equity of current financial strategies. Financial inclusion is widely acknowledged as a mechanism for income redistribution and poverty alleviation (World Bank, 2020). However, the precise impact of financial inclusion on income inequality in Nigeria remains inconclusive. While the theoretical foundation posits a positive link (Adu et al., 2019), the presence of structural barriers such as

unequal access to digital infrastructure, regional disparities, and low financial literacy continues to hinder uniform access to financial services (Demirgüç-Kunt et al., 2018). These factors complicate the actual outcomes of financial inclusion, especially for rural and underserved populations.

Previous empirical studies have produced mixed findings on the relationship between financial inclusion and income inequality in Nigeria. Some argue that financial inclusion reduces income inequality by expanding access to credit, insurance, and savings for the poor, thereby promoting entrepreneurship and enhancing household welfare (Adu et al., 2019; Oruo et al., 2020; Nwosu & Ogunleye, 2021). This perspective aligns with the observed increase in mobile money accounts and wider ATM coverage, which have improved access in certain regions. On the other hand, other studies contend that financial inclusion disproportionately benefits wealthier individuals who are more financially literate and reside in urban centers, potentially worsening income inequality (Aye et al., 2019; Duru et al., 2020; Ibe et al., 2021). This negative outcome is particularly plausible in contexts where credit access is skewed towards formal employees and large firms, as seen in the current credit-to-GDP trends. A third stream of literature finds no statistically significant effect of financial inclusion on income inequality, suggesting that inclusion efforts in Nigeria may still be too limited in scale or depth to influence broader economic inequality (Umar et al., 2021; Nduka et al., 2022; Adeola & Evans, 2020).

Additionally, much of the existing literature focuses on data periods ending 2021, thereby omitting more recent developments in Nigeria's financial inclusion landscape. Nwosu and Ogunleye (2021), Aye et al. (2019); Adeola and Evans (2020) largely analyze trends only up

to 2020 or 2021, which excludes the recent rise in financial inclusion. These newer indicators reflect significant changes in the structure and accessibility of financial services from 1995 to 2023, a period that has seen the expansion of digital finance and regulatory reforms in Nigeria's financial sector.

Furthermore, there are notable methodological limitations in previous studies. A majority of the analyses rely heavily on the Ordinary Least Squares (OLS) estimation technique (e.g., Aye et al., 2019; Ibe et al., 2021; Umar et al., 2021), which, although useful for establishing baseline associations, does not adequately account for long-term relationships among cointegrated variables. Given the evolving and dynamic nature of financial inclusion, more robust econometric methods are necessary to capture these long-run interactions. This study addresses this methodological gap by adopting the Fully Modified Ordinary Least Squares (FMOLS) technique, which is particularly suited for handling cointegration and correcting for endogeneity and serial correlation (Phillips & Hansen, 1990). The application of FMOLS allows for more reliable estimation of the long-term effects of financial inclusion on income inequality.

In light of the temporal and methodological shortcomings of previous research, this study makes a dual contribution. First, it extends the scope of analysis to cover the period from 1995 to 2023, thereby capturing more recent changes in Nigeria's financial inclusion environment. Second, by employing the FMOLS approach, it offers a more precise understanding of the long-term impact of financial inclusion on income inequality. This comprehensive analysis seeks to clarify whether recent advancements in financial access including digital finance,

credit expansion, and broader service coverage have translated into meaningful reductions in income inequality in Nigeria.

1.3 Research Questions

The study will provide answers to the following research questions:

i. How does the number of ATMs per 100,000 adults influence income inequality in Nigeria?

ii. What is the impact of the number of registered mobile money accounts per 1,000 adults on income inequality in Nigeria?

iii. To what extent do outstanding loans from deposit money banks (% of GDP) affect income inequality in Nigeria?

iv. How does the private credit to GDP ratio relate to income inequality in Nigeria?

1.4 Research Objectives

The major objective of this study is to examine income inequality, access to credit, and financial inclusion in Nigeria. Specifically, the study sought to:

i. examine the relationship between the number of ATMs per 100,000 adults and income inequality in Nigeria;

ii. analyze the impact of the number of registered mobile money accounts per 1,000 adults on income inequality in Nigeria;

iii. assess the effect of outstanding loans from deposit money banks (% of GDP) on income inequality in Nigeria; and

iv. investigate the influence of the private credit to GDP ratio on income inequality in Nigeria.

1.5 Research Hypotheses

The null hypotheses below are raised to be tested:

i. There is no significant relationship between the number of ATMs per 100,000 adults and income inequality in Nigeria.

ii. The number of registered mobile money accounts per 1,000 adults has no significant impact on income inequality in Nigeria.

iii. Outstanding loans from deposit money banks (% of GDP) do not significantly affect income inequality in Nigeria.

iv. There is no significant relationship between the private credit to GDP ratio and income inequality in Nigeria.

1.6 Scope of the Study

The focus of this study is to investigate income inequality, access to credit, and financial inclusion in Nigeria. This study employs four explanatory variables (number of ATMs per 100,000 adults, number of registered mobile money accounts per 1,000 adults, outstanding loans from deposit money banks (% of GDP), and private credit to GDP ratio) to examine

income inequality, access to credit, and financial inclusion in Nigeria. This longitudinal research will span the 29 years between 1995 and 2023. This time frame is deemed sufficient to cover the long-term changes in the relationship between financial inclusion and income inequality in Nigeria, as well as the period after various financial inclusion reforms in Nigeria, such as the launch of the National Financial Inclusion Strategy (NFIS) in 2012, the introduction of the Mobile Money Guidelines in 2009, and the Cashless Policy in 2012.

1.7 Significance of the Study

This research study holds significant value for various stakeholders, each benefiting from its insights in distinct ways.

Methodological Significance: The study contributes methodologically by adopting the Fully Modified Ordinary Least Squares (FMOLS) estimation technique to explore the long-term relationship between financial inclusion and income inequality. Unlike traditional econometric models such as the Ordinary Least Squares (OLS), FMOLS effectively addresses issues of endogeneity and serial correlation in cointegrated variables (Phillips & Hansen, 1990). This allows for more robust and reliable estimation, offering a robust understanding of the structural relationships that evolve over time. Consequently, the study advances the empirical literature by providing methodological rigor that can serve as a benchmark for future econometric research in development economics.

Policymakers: They stand to gain critical insights into the relationship between income inequality, access to credit, and financial inclusion in Nigeria, allowing them to craft more

effective and targeted policies. The findings can help guide the allocation of resources to expand access to financial services, particularly in underserved areas, and reduce the economic disparity that hampers national development. Moreover, understanding how various financial inclusion indices (such as the number of ATMs, mobile money accounts, and access to credit) affect income inequality would enable the government to implement policies that foster inclusive economic growth.

Financial Institutions: Financial institutions such as banks and fintech companies can use the study to better understand market gaps and design products and services that cater to previously excluded populations. By identifying the regions or demographics most affected by financial exclusion, these institutions can expand their reach and tailor financial products like savings accounts, microloans, and mobile banking services to meet the needs of low-income groups. This not only promotes financial inclusion but also opens new revenue streams for the institutions.

International Organizations and Development Agencies: These agencies focused on poverty alleviation and economic development can utilize the research findings to assess the effectiveness of financial inclusion initiatives. The study can serve as a benchmark for evaluating ongoing projects and designing future interventions that address income inequality. By examining Nigeria as a case study, these organizations can also draw parallels to other developing nations facing similar challenges, thus broadening the impact of their development programs.

The General Public: The general public, particularly marginalized and low-income groups, would benefit indirectly as the study may lead to increased access to financial services. Improved financial inclusion would allow individuals to save, invest, and manage risks more effectively, thus improving their economic standing and contributing to reducing income inequality across the country.

Academics and Researchers: They can benefit from the study by gaining a deeper understanding of the intricate link between financial inclusion and income inequality. The study can contribute to the existing body of knowledge on economic development and provide a foundation for further research on the effectiveness of financial inclusion initiatives in reducing income inequality. It can also open new areas of inquiry, such as the role of gender, rural-urban disparities, or technology in financial inclusion efforts.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter consist of critical examination of the literatures that are pertinent and related to the subject of this research. Review encompasses all the concepts, empirical results, and theoretical explanations needed for an in-depth analysis and comprehension of the research. It gives an explanation of how income inequality and financial inclusion are comprehended by other researchers.

2.2 Conceptual Review

2.2.1 Income Inequality

Income inequality refers to the unequal distribution of income between individuals or families in society and has been largely discussed in literature. It is, according to World Bank (2019), best described by commonly used measures such as the Gini coefficient, which illustrates the disparity in the distribution of income on a scale of 0 (equality) to 1 (inequality). Alternatively, Atkinson (2019) explains income inequality as the difference in levels of income that prevents equal opportunity access and therefore social mobility. Lustig (2018) notes that income inequality is not just a measure of economic imbalances but of imbalances in society, including access to health, education, and other fundamental services. Milanovic (2019) suggests an international perspective, suggesting that income inequality be analyzed intra-country and inter-country to understand its overall importance. Piketty (2020) also suggests that income

inequality is brought about by complex interactions between economies, policies, and history, underlining the importance of capital accumulation. Finally, Stiglitz (2021) points out that income inequality arises due to systemic issues, for example, policy distortions and market failure, which tend to favor capital over labor. Collectively, these definitions point out that income inequality is a multifaceted issue that involves both economic and social dimensions. Although they differ in extent—from quantitative measures to broad societal applicability—they concurred with the notion that income inequality is a reflection of disparities in economic success, access, and social opportunity.

One of the dominant elements of income inequality is wage inequality, which is a measure of inequality in compensation between different workers, often on grounds such as education, experience, and field of work (Autor, 2019). In addition, inequality of wealth is a critical component because it reflects the difference of the accumulation of wealth in the form of property, stocks, and other financial assets (Zucman, 2019). Wealth inequality has been shown to perpetuate income inequality in most societies, including Nigeria, as wealth makes more money through investment dividends (Oxfam, 2020). Another is labor market segmentation, where the division of the labor market into a formal and informal segment leads to variations in wages, employment security, and working conditions (Okoye, 2020). Regional disparity is also a contributing factor, particularly in countries like Nigeria, where business operations are concentrated in certain areas, with others lagging behind (Akinyemi, 2021). Gender inequality is a crucial component of income inequality because women also find it hard to get good-paying jobs and are, in general, underrepresented in senior positions, generally overall

contributing to the pay gap (Folayan, 2021). Finally, policy drivers such as tax policies, social welfare policies, and labor legislation can both compensate or exacerbate income inequality (Saez, 2019). For example, progressive taxation and social protection programs can reduce inequality, while regressive taxation and inadequate social protection can widen the gap between the wealthy and the poor.

Severe income disparity can depress economic growth because it inhibits the lower-income groups' ability to invest in human capital accumulation and education, thereby reducing productivity as a whole (Dabla-Norris, 2020). In addition, income inequality can exacerbate social conflict and political instability by fuelling perceptions of injustice and eroding institutional confidence (Piketty, 2020). Widely expanded income inequality in Nigeria has been linked to increased poverty and social tensions, which are likely to intensify conflict and undermine efforts towards sustainable development (Akinyemi, 2021). In addition, income inequality also has adverse effects on health outcomes, where the poorer segments of society are denied access to quality healthcare and suffer from health disparity and differences in life expectancy (Oxfam, 2020). Income inequality has also been said to discourage human capital accumulation by denying access to quality education to the marginalized segment of society (Stiglitz, 2021). Apart from economic disparities, the importance of income inequality also lies in its potential to create a cycle of intergenerational poverty, whereby children who are raised in poor households have less opportunity to attain the resources needed for mobility and therefore perpetuate the poverty and inequality cycle (Folayan, 2021). As such, the relevance

of income inequality goes beyond economic disparities and can affect social cohesion, political stability, health, and human development.

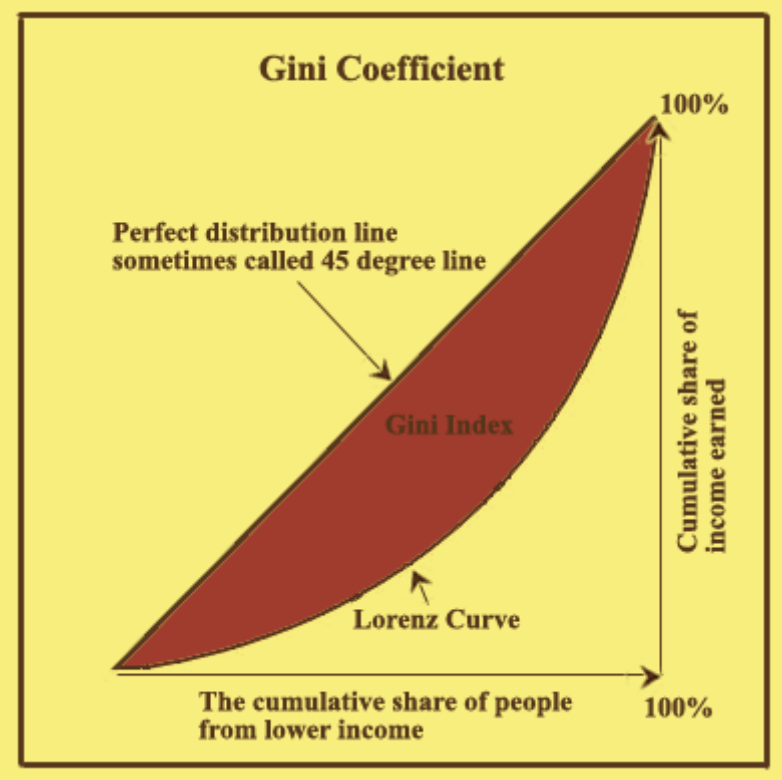
2.2.2 Measures of Income Inequality

Income inequality is a significant and new topic of concern in economic policy and debates on social welfare. It affects social cohesion, economic performance, and the health of individuals. In order to understand and address income inequality, economists and policymakers utilize a range of measures, each of which depicts a different picture of the extent and nature of inequality. The five main measures of which are discussed in contemporary literature are the Gini coefficient, the Lorenz curve, the Theil index, the Atkinson index, and the Palma ratio.

2.2.2.1 The Gini Coefficient

The Gini coefficient is the most commonly used measure of income inequality. Developed by Italian statistician Corrado Gini in 1912, it is a ratio that equals the area between the line of perfect equality and the Lorenz curve divided by the area under the line of perfect equality (Clementi et al., 2020). The Gini coefficient ranges from 0 (perfect equality) to 1 (perfect inequality), and it provides just a single number that can be utilized to define the distribution of income (Figure 2.1). A higher Gini coefficient indicates that a society has greater income inequality. High Gini coefficients generally imply a requirement for redistributive policies, e.g., social welfare programs and progressive taxation, to curb inequality and spur inclusive growth (OECD, 2019).

Figure 2.1 Gini Coefficient



(Clementi et al., 2020)

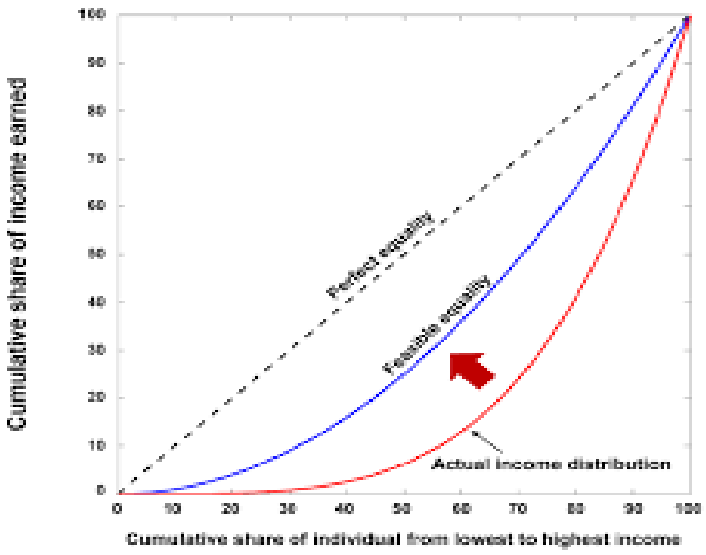
Previous literature has pointed to the strengths and weaknesses of the Gini coefficient. It is honoured with its simplicity and ease of interpretation and hence has become a common instrument for cross-country comparisons (Lustig et al., 2018). Notwithstanding this, the Gini coefficient has been attacked on grounds that it is not sensitive to changes among different parts of the income distribution. It is responsive to change in the center of the distribution and not the ends, and this can result in a misleading assessment of inequality in countries with concentrated wealth at the top (Palomino et al., 2021). In addition, It does not provide

information about the shape of the income distribution or sources of inequality, limiting its use in explaining the structural drivers of inequality (Milanovic, 2018). Despite all these criticisms, the Gini coefficient remains a good measure of the impact of economic policy and social programs on income distribution (World Bank, 2020).

2.2.2.2 The Lorenz Curve

The Lorenz curve is the graphical representation of income distribution on a chart in which the cumulative percentage of total earnings of the bottom x% is indicated on the graph (Alvaredo et al., 2018).The Lorenz curve comprises the cumulative proportion of population and the cumulative proportion of income. The Lorenz curve is capable of examining the impact of policies on the distribution of income by examining the change in the shape of the curve over time (Checchi & García-Peñalosa, 2018). The curve starts at the origin (0,0) and ends at the point (1,1), which represents the entire population and total income. The farther the curve deviates from the line of absolute equality (a 45-degree line), the more unequal it is (Figure 2.2). Graphically representing income distribution, it can enable policymakers to decide on the segments of individuals who require special interventions, such as social safety nets and education, in order to fight inequality (Blanchet et al., 2022).

Figure 2.2 The Lorenz Curve



(Checchi & García-Peñalosa, 2018)

While the Lorenz curve is useful for graphically displaying inequality, it lacks a specific numerical value, which renders it less effective when used for quantitative purposes (Piketty & Saez, 2014). Intersecting Lorenz curves may also lead to confusion when directly comparing the level of incomes between countries or over time (Jenkins & Van Kerm, 2017). Nevertheless, even with these limitations, the Lorenz curve is a valuable addition to numerical data like the Gini coefficient as it offers a more nuanced description of income distribution.

2.2.2.3 The Theil Index

The Theil index, which is an entropy-based measure of income inequality, allows for the decomposition of total inequality into 'within-group' and 'between-group' forms (Conceição &

Ferreira, 2021). Income shares and population proportions of groups in society are the building blocks of the Theil index. By the analysis of these factors, the index may provide an insight into the composition of inequality and the degree to which it is explained by within-group or between-group differences (Lerman & Yitzhaki, 2020). The index may be expressed in two forms: Theil's T (mean logarithmic deviation) and Theil's L (logarithmic variance). By this index, one obtains a robust measure of inequality which explains dispersion within as well as between groups of population. By identifying targeted reasons for inequality, policymakers are better able to plan policies to account for disparities, such as regional development programs, education policy, and labor market reform (UNDP, 2020). One advantage of Theil index over other measures is that it is capable of decomposing inequality to several causes, such as regional, sectoral, or demographic disparities (Dabla-Norris et al., 2015). This renders Theil index highly useful for policymakers who would like to identify and address the root causes of inequality. Its shortcoming, however, with regard to its intricateness and lower intuitiveness compared to the Gini coefficient limits its application to public discourse and policy debates (Bourguignon, 2017).

2.2.2.4 The Atkinson Index

The Atkinson index, created by Anthony Atkinson in 1970, measures inequality of income and incorporates social preferences regarding equity. The Atkinson index is made up of the distribution of incomes and the parameter of aversion to inequality. One can study the impact of different redistributive policies on social welfare by changing this parameter (Decancq & Lugo, 2017). It is distinguished from other measures in that it can accept varying levels of

inequality aversion, and places more importance on change at different points in the distribution of income (Atkinson, 2015). It ranges between 0 (complete equality) and 1 (complete inequality), with higher values reflecting greater inequality. This index suggests that policymakers must address societal tastes when designing measures to reduce inequality, so that policies align with public notions of fairness and equity (Madden, 2020).

The Atkinson index has been praised for its versatility and ability to reflect society's attitudes towards inequality. It has, nonetheless, been condemned for subjectivity inasmuch as it requires the selection of a parameter that represents society's inequality aversion. Other values of this parameter will generate other conclusions on the level of inequality (Fleurbaey & Peragine, 2019). However, the Atkinson index is a framework for understanding the equilibrium between equity and efficiency in policy decisions.

2.2.2.5 The Palma Ratio

The Palma ratio, as defined by Gabriel Palma in 2011, is calculated by using the income share of the top 10% divided by the income share of the bottom 40% of the population (Cobham et al., 2018). By drawing attention to the difference between the poor and the wealthy, the Palma ratio highlights the need for policies that thwart income concentration among the wealthy, such as wealth redistribution and progressive taxation (Alvaredo et al., 2020). This is grounded in the fact that the middle 50% of incomes in the income distribution generally enjoy a proportionately stable share of national income, with the implication being that inequality is largely due to the extremes. Its focus on income polarization necessitates specially formulated

policies aimed at the extremes of the distribution of income so that greater equity is realized through policies that reduce the share of income of the top 10% but improve the economic welfare of the bottom 40% (Cobham et al., 2021).

The Palma ratio has been complimented for its simplicity and the fact that it places its attention on the polar points of the extremes of income distribution, which are typically the subject matter in inequality discussions (Cobham & Sumner, 2016). However, it is condemned for concentrating on the extremes while not considering changes in the middle-income sections and possibly overlooking the complexity of income distribution (Palma, 2019).

2.2.2.3 Financial Inclusion

Financial inclusion has been discussed differently in the literature so far and implies a composite concept involving access and utilization of financial services by various segments of the society. Financial inclusion, in the words of Sarma and Pais (2018), is a process to make financial services accessible and decent credit wherever it is needed by low-income and weaker sections at affordable cost. Ozili (2020) further builds on this perspective by explaining financial inclusion as the provision and equity of chances to access financial services. Similarly, Camara and Tuesta (2018) suggest that financial inclusion is not only access but equally effective utilization of financial products and services by the entire population. These definitions converge in the point that financial inclusion is not access alone; there must be effective use of financial services to promote economic participation. A comprehensive definition by Demirgüç-Kunt et al. (2018) requires that financial inclusion is the mechanism

through which people and businesses have access to meaningful and affordable financial products and services appropriate to their needs—transactions, payments, savings, credit, and insurance—delivered in a responsible and sustainable way. Also, Kumar (2021) emphasizes the importance of formal financial services with the further observation that financial inclusion also needs to safeguard consumers as well as promote financial literacy. These various perspectives support a shared consensus that financial inclusion is not only about access but also financial service quality, usage, and sustainability. The World Bank (2018) further stresses that financial inclusion is a key accelerator in alleviating poverty and boosting mutual prosperity, particularly in emerging economies like Nigeria.

Empirically, financial inclusion has significant implications on income inequality, particularly in developing countries. Akinlo and Oni (2020) argue that by providing marginalized groups with access to financial services, financial inclusion can enhance economic opportunities, thereby reducing income inequality. Specifically, in the Nigerian case, financial inclusion can empower individuals to invest in business, health, and education, which are fundamental conduits for earning income (Adeleye et al., 2019). Secondly, financial inclusion encourages savings and investment, leading to economic growth that is more balanced (Babajide et al., 2021). For instance, digital financial services and mobile banking have been utilized to indicate a revolutionary effect in accessing the unbanked population in Nigeria and thus facilitating a larger portion of society to participate within the economy (Ozili, 2021). However, financial inclusion may not necessarily eliminate income inequality entirely. As contended by Oduh (2022), while increased financial inclusion can reduce the income gap by providing more

financial products to the poor, the quality and efficiency of services are key to closing lasting impacts. Further, Afolabi and Olagunju (2022) contend that the presence of structural issues, i.e., low financial knowledge and low infrastructure development, can hinder the appropriateness of financial inclusion interventions in curbing income inequality. Thus, financial inclusion, though it can provide a sustainable pathway in the fight against Nigeria's income inequality, hinges on its efficacy based on a multi-faceted approach that incorporates the encouragement of financial literacy, financial infrastructure development, and the delivery of good quality financial services.

2.2.3 Metrics of Financial Inclusion

There are a number of financial inclusion indicators but in this study, number of ATMs per 100,000 adults, number of registered mobile money accounts per 1,000 adults, commercial bank outstanding loans (% of GDP), and private credit to GDP ratio is used.

2.2.3.1 Number of ATMs per 100,000 Adults

The "number of ATMs per 100,000 adults" is one of the widely accepted measures for financial infrastructure expansion and availability in a given economy. According to Adekoya (2021), this variable measures the intensity of Automated Teller Machines (ATMs) in relation to the population of adults, employed as a proxy for the availability of financial services. Similarly, Olayinka (2020) contends that the greater the number of ATMs, the more convenient it is to access banking services, particularly in geographically isolated areas where access to traditional bank branches is poor. In another perspective, Alabi and Nwosu (2019) refer to this

act as a component of the broad financial inclusion landscape, pointing out its role in extending basic bank services such as cash disbursement and balance inquiry to poor communities. Ehimare (2022) further asserts that ATMs make financial operations more efficient and thus the cost of utilizing financial services is lower for low-income individuals. In addition, Azeez (2019) argues that a measure of the number of ATMs per 100,000 adults is an indicator of the penetration of financial markets, in the sense that an increase in ATM density has the ability to reduce effort and time for individuals to access formal financial systems. Olaoye and Salami (2021) approach the issue somewhat differently by observing that the indicator not only reflects access but also reflects utilization of digital financial services since ATMs act like portals for most banking products, including fund transfer and bill payment. Although differing in the manner in which they are defined, all these definitions lead to the argument that an increasing number of ATMs for every 100,000 adults generally results in more financially available environments, especially within an environment where digital banking penetration remains limited.

Empirical evidence for the relationship between the number of ATMs per 100,000 adults and income inequality in Nigeria reflects a less than straightforward but positive effect on less inequality. Adegboye and Fakunmoju (2020) found that there is a greater concentration of ATM in regions in Nigeria with lower income inequality. Their research suggests that ATMs increase the poor's inclusion in the financial system by providing easy access to banking services, which assist low-income earners to save, invest, and manage their finances better. Similarly, Bello and Adeola (2019) argue that improved ATM accessibility has a tendency to

democratize access to financial services, reducing the reliance on informal financial channels, which are more expensive and risky for low-income groups. In a rural-urban disparity research study, Okoro and Ekeocha (2021) depicted that access to ATMs in the rural areas plays an important role in reducing income disparity by empowering marginalized communities with essential financial instruments. They added that while ATMs are increased in rural places, local residents are more likely to engage in formal financial activities such as opening savings accounts and joining microcredit programs. Moreover, Akinlo and Onifade (2022) add that the widespread proliferation of ATMs can lead to the better use of financial resources in the economy, leading to the growth of the economy among different socioeconomic groups. However, they recommend that increasing the number of ATMs alone is not a panacea; it must also be joined by other measures such as financial education schemes and mobile banking services in order to optimize its impact on income inequality. Collectively, all these studies evidence that while ATM density per 100,000 adults is a crucial factor in financial inclusion, its efficacy in bridging income inequality in Nigeria is most robust when integrated in a broader, multi-dimensional approach to financial sector development.

2.2.3.2 Mobile Money Accounts Registered per 1,000 Adults

Number of registered mobile money accounts per 1,000 adults" is a metric often applied in measuring the penetration and adoption of mobile financial services across a population. Many scholars have approached this definition with varying levels of attention. According to Demirguc-Kunt, Klapper, Singer, Ansar, and Hess (2018), the measure indicates the extent to which mobile money has been adopted, an indicator of access and convenience of financial

services in society. The definition here implies that the greater the number, the more financially inclusive, which can drive economic growth. Similarly, Suri and Jack (2018) refer to this measure as a proxy for the ability of the population to access and utilize formal financial services, which is accountable for reducing financial transaction barriers. A study by World Bank (2019) extends this perspective even further, claiming that it is not only about how many accounts but also the frequency and quality of usage, thus relating it to increased economic activity and financial literacy. Correspondingly, Ozili (2020) draws attention to the fact that such an action would entail consideration of active and inactive accounts, arguing that any rise in registered accounts is not representative of enhanced financial inclusion. Further, Andrianaivo and Kpodar (2019) argue that this measure should be considered from the perspective of the building of digital infrastructure and regulatory frameworks because these characteristics significantly affect the effectiveness of mobile money services. Finally, Asongu and Nwachukwu (2021) suggest that the "number of registered mobile money accounts per 1,000 adults" can serve as a proxy for financial system inclusiveness, particularly in developing economies with lesser access to conventional banking service. Despite having different opinions, there is a common element among these definitions in that they recognize that this measurement is a fundamental determinant of how broad financial inclusion is and the corresponding effects on economic growth, poverty reduction, and social equality.

Evidence indicates that the higher the number of registered mobile money accounts per 1,000 adults, the lower the level of income inequality. Agyekum, Addo, and Atta (2020) research in a Nigerian setting confirmed that mobile money services improved financial inclusion

significantly, particularly for excluded groups like low-income earners and rural residents who are not integrated into mainstream banking systems. Greater access to finance can lead to greater economic engagement, and thus reduced income inequalities. Equally, studies conducted by Ouma, Odongo, and Were (2018) show that mobile money services support the smoothing of incomes and enable micro-saving and credit services, which can aid low-income earners in addressing financial shocks and investing in income-generating activities. For Nigeria, Nwokoro and Ukoha (2019) determined that an increase in mobile money accounts has been related to improved access to financial services, where poor segments of society are empowered to engage in entrepreneurial ventures and access basic necessities including healthcare and education, thereby narrowing the income gap. In addition, Ejiogu (2019) argues that mobile money services in Nigeria democratize financial services, restricting the use of cash transactions as well as the networks of informal finance that tend to be less efficient and more costly to poorer individuals. But let us also recall the findings of Ozili (2021), who is cautioning that while mobile money accounts can help deepen financial inclusion, their ability to minimize income inequality may be constrained where complementary factors such as financial literacy, digital infrastructure, and supportive regulatory environments are absent.

2.2.4.3 Outstanding Loans from Commercial Banks (% of GDP)

Outstanding loans from commercial banks (% of GDP) are the total of all loans given by commercial banks to various sectors of the economy, expressed as a percentage of the Gross Domestic Product (GDP). It is a very significant indicator to understand the financial depth and access of a nation. According to the views of different scholars, the ratio shows the role of the

banking sector in inducing economic activity. For instance, Demirgüç-Kunt (2018) takes it as a metric that estimates the level of credit provision provided by commercial banks to the economy as a ratio of its GDP, with the banking sector's role in financial intermediation being its contribution. Similarly, Sahay (2018) takes the provided percentage as an implication of the efficiency and reach of the overall financial institutions in terms of providing loans that can potentially initiate economic growth. Conversely, Beck (2019) argues that while the ratio between outstanding loans and GDP can be utilized to explain the penetration of the banking system, it can also reflect the dangers of over-lending when not regulated. Ahmed (2020) extends this view, noting that this ratio, when excessively high, can create financial stability risks and the threat of a banking crisis, particularly in developing markets. Onyeiwu (2021) espouses the developmental perspective, asserting that a higher percentage has a tendency to be linked with more opportunities for investment, fostering income generation and poverty alleviation. Ojo (2022) also contends that while the ratio of outstanding loans to GDP is a sign of an active banking sector, it must be strictly controlled so as not to generate systemic risk. Despite these disparities in definition, the running theme is that the ratio is an indicator of the contribution of the financial sector to economic advancement, with implications for both growth and stability. To this end, while higher outstanding loans as a percentage of GDP can reflect robust financial inclusion, they must be managed in a way that does not exacerbate economic vulnerabilities.

The impact of outstanding loans from commercial banks (% of GDP) on income inequality in Nigeria is not straightforward. On the one hand, an increase in this ratio generally implies

improved financial inclusion, as more individuals and businesses obtain access to credit, thus the potential for reduced income inequality. Ogbuabor (2019) finds that if commercial banks give more loans, small and medium enterprises (SMEs) would be in a position to thrive, thereby creating employment and income distribution. However, this positive impact is largely dependent on the accessibility of these loans to the less-income segments of the population. If the majority of the loans are advanced to already rich individuals or large corporations, it may have the contrary effect of increasing income inequality. For instance, Adedoyin (2020) notes that bank credit in Nigeria is biased towards urban and richer clients, limiting the access of the poorer rural population to such financial services. Similarly, Adegbite (2021) contends that exorbitant borrowing rates and stringent loan conditions by commercial banks can discourage the poorer segment of society from taking credit, thus reinforcing the existing economic disparities. Correspondingly, while outstanding loans by commercial banks as a percentage of GDP can portray the financial sector's contribution to economic activity, their distributional implications must be closely examined. The allocation of the loans and the financer terms they entail can either mitigate or exacerbate income inequality. Policy initiatives to improve equal access to credit are, therefore, crucial in ensuring that excellent loan growth assists in reducing income inequality rather than increasing it.

2.2.3.4 Private Credit to GDP ratio

The ratio of private credit to GDP is a significant gauge in the financial development of an economy that signifies the extent to which private sector borrowing is intermediated relative to the size of the economy. Various authors define the ratio differently. For instance, Kang and

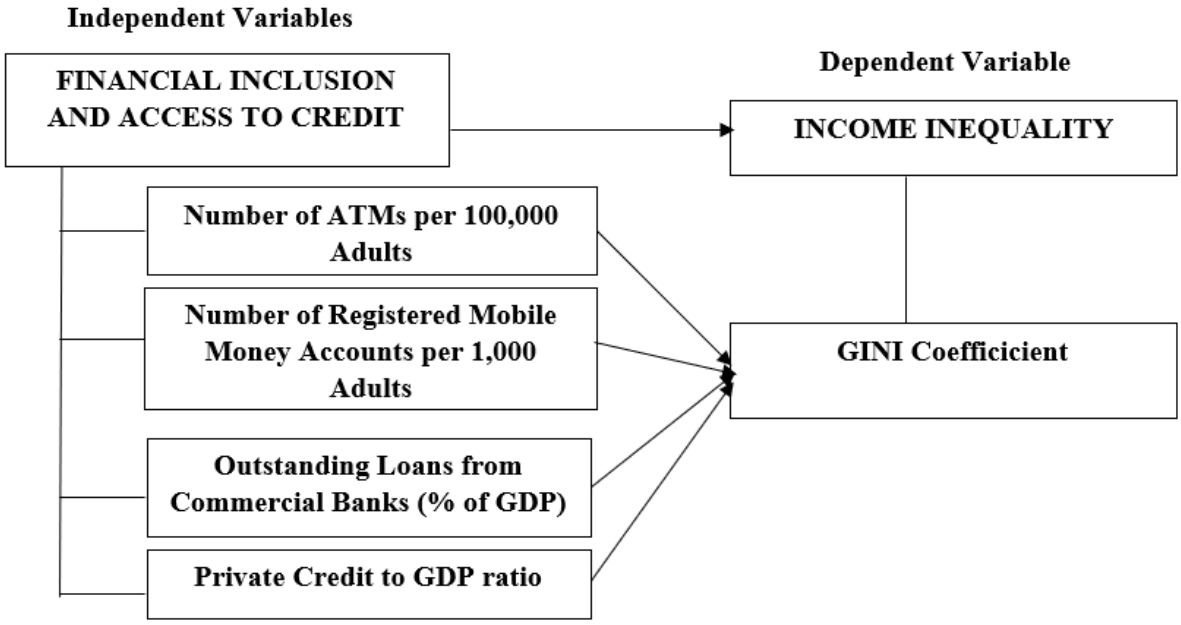
Sawada (2018) have defined it as a ratio of the financial resources provided to the private sector by financial institutions to the GDP of the country, indicating the level of access to private sector credit as compared to economic size. Similarly, Beck and Levine (2019) point it out as a proxy for financial development, which reflects the availability and accessibility of financial services to the private sector that, in turn, can induce economic growth. Ashraf and Zheng (2020) add to this by arguing that a higher proportion of private credit to GDP suggests a more developed financial system in which banks and financial institutions effectively channel resources towards profitable private sector investments. Further, Adusei (2021) observes that the ratio reflects the depth of financial intermediation, and a higher ratio represents greater financial integration and mobilization of resources within the economy. Barajas and Chami (2022) go a step further to observe the ratio as an indicator of how well the credit market can finance business ventures and consumption by individuals, which matters for economic dynamism. Lastly, Umar and Raza (2023) use it as an indicator of financial inclusion, arguing that a high ratio is suggestive of extensive access to credit, mainly by households and small businesses. Putting together these definitions, the private credit to GDP ratio is a wide-ranging indicator of financial sector health that measures not just the volume of credit in the economy but also the efficiency with which financial intermediation is occurring and the inclusiveness of credit allocation to the private sector.

Empirical studies have examined the implications of the ratio of private credit to GDP. Some results are inconclusive. An increase in this ratio can have dual effects on income distribution. On one hand, Adegboye and Akinsola (2019) find that a rise in the proportion of private credit

to GDP has the potential to reduce income inequality through greater access to finance by previously marginalized individuals and businesses, entrepreneurial ventures, and job creation. Similarly, Ogunrinola and Osabuohien (2020) argue that when financial institutions offer credit to a broader segment of society, including SMEs, it can help raise income-generating opportunities, which can lead to a more equitable distribution of wealth. On the other hand, Akinlo and Akinpelu (2021) also caution that a higher private credit to GDP ratio can increase income inequality if credit is largely accessible to wealthier individuals or bigger corporations, which can lead to concentration of capital in the hands of the wealthy while the poor segments of society have fewer opportunities for finance. In addition, Asongu and Odhiambo (2022) contend that the effect of private credit on income inequality is conditional upon the quality of the regulatory environment; under the condition of a poorly regulated financial system, increased credit can create financial crises that disproportionately affect the poor. For the Nigerian situation, Salami and Adebayo (2023) indicate that the relationship between private credit and income inequality is country-specific and complex and requires proper financial inclusion policies for credit expansion to translate into inclusive economic benefits.

2.3 Conceptual Framework

The conceptual framework which links the independent variables of the study to the dependent variable is presented in figure 2.1.



Source: Researcher's conceptual framework (2025).

2.4 Theoretical Review

2.4.1 Financial Intermediation Theory

The Theory of Financial Intermediation, primarily developed by scholars such as Gurley and Shaw (1960) and later by Diamond (1984) and others, holds that financial intermediaries, i.e., banks and other financial institutions, play a significant role in the economy by transmitting funds from savers to borrowers. This theory addresses the position of financial intermediaries in covering market failures, reducing transaction costs, and reducing lending and borrowing activity risks. For developing economies like Nigeria, the theory serves as a significant explanation of how the financial system can be utilized to end financial exclusion. Through improving efficient resource allocation and promoting access to financial products,

intermediaries can potentially reduce income inequality by allowing more levels of the population to participate in economic activities (Beck et al., 2015). The applicability of this theory is higher in Nigeria since most of the population remains unbanked or underbanked, thus limiting their ability to save, invest, and smooth consumption over the life cycle.

Critically examining Financial Intermediation Theory highlights its underlying assumption that intermediaries reduce information asymmetry and transaction costs in financial markets (Allen & Santomero, 1997; Diamond, 1984). Financial intermediaries, according to this theory, are best designed to estimate the creditworthiness of lenders, monitor their activities, and present diversified investment choices to savers (Freixas & Rochet, 2008). Moreover, Levine (2005) argues that efficient financial intermediation can lead to more inclusive financial systems if it helps decrease the access constraints to credit and other financial services so that disadvantaged groups can engage in economic activities. Finally, empirical evidence has established that financial intermediation is associated with poverty reduction and economic growth (Beck, Demirguc-Kunt, & Levine, 2007; Levine, 2005). However, the view that financial intermediation can enhance financial inclusion but lead to financial instability and inequality if not with proper regulation is shared by critics like Stiglitz (2015), as financial institutions would concentrate more on maximising their profits than on welfare. Besides, Demirguc-Kunt and Klapper (2018) clarify that it is not necessarily the case that an increase in the number of financial institutions or channels of access leads to effective financial inclusion if the determinants such as financial literacy and economic opportunities have not been treated.

In comparison to the research question "the impact of financial inclusion on income inequality in Nigeria," the Financial Intermediation Theory is an appropriate framework for understanding the mechanics through which financial systems can be constructed to achieve equitable growth. Keeping in view that Nigeria is comparatively income-inequitable and a significant portion of the population falls out of formal financial services (World Bank, 2018), the role played by financial intermediaries becomes even more important. By facilitating savings, credit, and insurance, financial intermediaries can allow low-income households to invest in productive uses, consumption smoothening, and protection from economic shocks (Ayyagari, Beck & Hoseini, 2013). Moreover, the theory also places importance on an efficient and fair financial system to ensure higher economic participation, whose fruits would lead to higher income equality (Beck, Levine & Levkov, 2010). However, success of financial intermediation for income inequality reduction in Nigeria depends on the following among many others: the regulatory environment, financial education, as well as the nature of the products in the financial market. The Nigerian context illustrates that while financial inclusion could be enhanced using innovative intermediation, i.e., mobile banking and microfinance (Ozili, 2018), these have to be complemented by policies addressing the structural imbalances and promoting financial literacy so that benefits from financial inclusion are evenly distributed throughout society.

2.4.2 Theory of Financial Deepening

The theory of financial deepening was first conceived by Edward S. Shaw (1973) in his seminal book "Financial Deepening in Economic Development." Shaw argued that it is crucial for

economic development to establish a sound financial system, and financial markets, institutions, and instruments play a core role in mobilizing and efficiently allocating resources. Financial deepening refers to an increase in financial services provision, which means an expansion of the range of financial products and services available to different segments in society. Shaw maintained that a sophisticated financial system reduces information asymmetry, lowers transaction costs, and improves access to finance, which subsequently fosters investment as well as economic growth. Financial deepening in the case of emerging markets like Nigeria is generally considered to be a tool for enhancing financial inclusion, which has significant implications for income inequality reduction (Beck, 2015). By expanding access to financial services, weaker segments of society can participate more intensively in economic activity, with potential implications for reducing income disparities (Greenwood et al., 2016).

The theory of financial deepening contends that a deep financial system boosts economic growth through the expansion of access to credit and financial services, thus enabling firms and individuals to invest in productive activities (King & Levine, 1993; Levine, 2005). Growth leads to greater accumulation of capital, technological advancements, as well as economic development. Demirgüç-Kunt and Levine (2009) assert that financial deepening will contain income inequality because it will allow the poor and small enterprises to get access to credit, save securely, and invest in healthcare and education. However, the theory has also been examined critically in some recent works by some authors, who believe that financial deepening per se will not guarantee any reduction in income inequality (Mookerjee & Kalipioni, 2010). For instance, if financial deepening is disproportionately beneficial to the

wealthy, it may increase income inequality (Jauch & Watzka, 2016). Other studies have highlighted the institution environment and the quality of institutions as factors influencing the impact of financial deepening (Beck et al., 2014; Sahay et al., 2015). Where the financial sector is poorly regulated, financial deepening can enhance risk-taking and financial instability, which in turn enhance inequality (Stiglitz, 2015). Therefore, even as financial deepening can enhance financial inclusion and reduce income inequality, its effectiveness will hinge on various matters such as the spread of finance services, regulatory systems, and general economic environment.

In relation to the effect of financial inclusion on income inequality in Nigeria, financial deepening theory gives a multidimensional framework. As a consequence of financial deepening, financial inclusion implies that more individuals and businesses have access to financial services, leading to equitable distribution of resources and opportunities (Ayyagari et al., 2016). Empirical studies in the context of Nigeria have shown that financial deepening has mixed impacts on income inequality. On the one hand, access to finance has enabled low-income households and small enterprises to improve their economic status (Akinlo & Egbetune, 2010). Conversely, the imbalance in the provision of financial services, which is mainly in urban regions, has hindered the contribution of financial inclusion towards lessening rural poverty (Mehrotra & Yetman, 2015). Additionally, the vulnerabilities of the Nigerian financial market to corruption as well as poor regulatory systems undermine the fair allocation of financial resources (Imoughele & Ismaila, 2014). Therefore, while the financial deepening theory has held that increased financial inclusion will reduce income inequality, the Nigerian experience illustrates that mere financial service expansion is not sufficient. Policy measures

that remove the structural and institutional barriers to access to finance must be implemented to realize the extent to which financial deepening has an effect on income inequality in Nigeria.

2.4.3 Endogenous Growth Theory

Endogenous growth theory, spearheaded by economists such as Paul Romer (1986) and Robert Lucas (1988) in its initial development, is a cornerstone of modern economic theory in that it addresses internal impulses in an economy that drive long-term growth. Whereas the neoclassical model of growth as has accounted for growth mainly as a product of exogenous technological advances, the endogenous growth theory postulates economic growth to be a result of endogenous determinants such as human capital, innovation, and accumulation of knowledge (Romer, 1990). They are of the view that investment in human capital, innovation, and knowledge will have positive externalities and spillover effects and lead to sustainable growth. This theory also highlights the role of policy intervention, market institutions, and architecture in shaping conditions for growth. The relevance of this theory in the case of developing economies like Nigeria is that it points out how money instruments and inclusiveness can work towards the growth pattern by affecting the development of human capital and technological change (Lucas, 1988; Aghion & Howitt, 1992).

Examining endogenous growth theory critically, scholars have raised several critical issues. Aghion and Howitt (1998) further developed the theory with the introduction of the principle that innovation and research and development (R&D) are key growth factors, emphasizing that more financially integrated economies can invest more resources in these areas. Grossman and Helpman (1991) also noted that the financial systems play an important role in facilitating

investment in R&D and thus growth. King and Levine (1993) also gave credence to the hypothesis of the theory, showing a positive relationship between economic development and growth. More recent literature, that of Levine (2005), has provided evidence of the support of growth by financial inclusion through increasing the effectiveness of allocation of capital and reducing income inequality. Conversely, other critics like Durlauf et al. (2005) comment that the theory might overstate the role of technological change and human capital and underplay structural constraints such as political instability and inequality of income distribution. Similarly, Arestis and Demetriades (1997) have identified financial liberalization traps, which, if left unregulated, can increase income inequality rather than reduce it. This criticism concurs with Stiglitz's (2015) opinion that unregulated financial inclusion will lead to the financial sector's excesses, thereby resulting in increasing inequality. As such, while the theory offers a robust framework for explaining the mechanism for growth, it should be employed with finesse in various economic contexts.

On the impact of Nigeria's financial inclusion on income inequality, endogenous growth theory offers a valuable framework. Nigerian financial inclusion, as access to credit, savings, and insurance, in theory can fuel human capital investment and innovation and therefore fuel inclusive growth (Nwaoba, 2019). However, empirical evidence is ambiguous; e.g., Babajide et al. (2015) found that financial inclusion significantly reduces poverty and inequality in Nigeria by enabling more effective allocation of resources and greater economic opportunity. Conversely, Okafor et al. (2020) argue that while financial inclusion has expanded, Nigeria's lack of adequate infrastructure and regulatory frameworks negates its effectiveness in

alleviating inequality. Endogenous growth theory emphasizes that for financial inclusion to have a meaningful impact on income inequality, facilitating policies such as greater financial literacy, technology adoption, and infrastructural development must exist (Beck et al., 2007). Further, it states that mere deepening of financial services without addressing the quality of the services or the overall economic environment can lead to second-best outcomes that even exacerbate inequality (Aghion, 2019). Therefore, the theory can be applied but also highlights the necessity of a multi-dimensional strategy that addresses both supply and demand sides of financial services to avoid making sure that financial inclusion translates to reduced income inequality in Nigeria.

2.4.4 Social Exclusion Theory

Social exclusion theory, which was first formulated by French sociologist René Lenoir in the 1970s, describes a process through which individuals or groups are prevented systematically from gaining rights, opportunities, and resources that are otherwise available to members of society and are central to social integration (Silver, 1994). The theory's fundamental premise is that society exclusion goes beyond just poverty and is also about multi-faceted deprivation that results from the exclusion of individuals from society on a variety of grounds such as economic status, race, gender, etc. (Sen, 2000). The theory has extended to address a wide range of dimensions, of which one is financial exclusion, whose level in Nigeria is specifically very high. In this country, financial inclusion or exclusion plays a deciding role in reducing or aggravating income inequality. Social exclusion theory provides a critical framework from which to examine how the availability and use of financial services can impact the distribution

of income, particularly in developing nations where structural inequalities run so deeply (Atkinson & Hills, 1998).

Social exclusion theory argues that not only is deprivation due to lack of income but also due to the systemic failure to gain full access to the economic, social, and political life of society (Levitas et al., 2007; Pantazis et al., 2006). Researchers like Saunders (2015) have suggested that financial exclusion is a component of social exclusion, creating fewer opportunities for savings, credit, and investment, thereby enhancing income inequality. Empirical analysis has pointed out that restricted access to financial services can create a poverty cycle, limiting individuals from enhancing their financial condition (Beck, Demirgüç-Kunt & Levine, 2007). A study by Cull, Ehrbeck, and Holle (2014) has also highlighted that access to banking services, microfinance, and insurance under financial inclusion has the potential to significantly reduce inequality by enabling individuals to invest in education, health, and entrepreneurship. Conversely, when population groups are excluded economically, they become vulnerable to economic shocks and are less inclined to escape the poverty trap, affirming the theory's argument that exclusion is not solely one-dimensional (Chakravarty & Pal, 2010). Also, social exclusion theory has been criticized for tending to exaggerate the role of individual agency at the expense of limiting structural barriers, although it remains a central framework for analyzing the dynamics between financial inclusion and income inequality (Room, 1995; Silver & Miller, 2003).

Social exclusion theory is especially applicable in the Nigerian context for understanding the dynamics between financial inclusion and income inequality. Nigeria, with broad disparities in

income, has seen a broad push towards financial deepening, e.g., the National Financial Inclusion Strategy launched in 2012 (Central Bank of Nigeria, 2012). Yet, the effectiveness of such policy interventions can be questioned using social exclusion theory. The hypothesis is that if the inherent social and structural disparities—discrimination by gender, geographical imbalances, and weak financial infrastructure—are not addressed, even if the provision of financial services is increased, it may not be sufficient to reverse income inequality (Demirgüç-Kunt et al., 2018). For instance, Akinbami (2016) observes that financial inclusion in Nigeria is only infertile or rare among the most underprivileged segments, who are persistently shut out for socio-economic grounds. The social exclusion theory's applicability here thus has a double function: not merely does it reiterate the need for making financial services inclusive and accessible, but it also points to the need to address broader social policies designed to confront pervasive systemic inequalities. This combined approach is in accordance with current literature advocating financial inclusion policy to be tied to broader social and economic reforms in order to achieve a dramatic reduction in income inequality (Allen et al., 2016; Honohan & King, 2012).

2.5 Theoretical Framework

The Financial Intermediation Theory is employed as this study's theoretical framework. According to this theory, financial intermediaries such as banks,. microfinance institutions, and mobile money operators play a central role in linking savers with borrowers and thereby enabling the efficient allocation of resources (Diamond, 1984). In the Nigerian case, where a considerable percentage of the population is still outside the ambit of formal financial services

(World Bank, 2018), intermediaries can help bring about financial inclusion in the form of accessible financial products that respond to the needs of low-income households. Through instruments like microcredit, deposit savings, and insurance products, intermediaries empower poor consumers to engage in economic activity, invest in small enterprises, and smooth consumption, thereby evening out income inequality (Beck, Demirguc-Kunt & Levine, 2007). In addition, the theory points towards the possibility of new financial intermediaries like mobile banking in eradicating traditional barriers to access to finance, especially in rural and low-income areas (Ozili, 2018). Through reducing information asymmetry and transaction costs, financial intermediaries can make the poor have easier access to savings and credit, and this will create inclusive economic growth and reduction in income inequality. Thus, the theory provides us with a relevant and dynamic lens through which to consider how increased financial inclusion can reduce the income gap in Nigeria, highlighting the importance of an effective and inclusive financial system in promoting sustainable development.

2.6 Empirical Review

Etudaiye-Muhtar (2024) investigates the impact of financial inclusion on Nigeria's income inequality between 1985 and 2019 using the Autoregressive Distributed Lag (ARDL) estimation technique. In line with the special agent theory of financial inclusion, findings indicate that increased access to financial services closes the income inequality gap significantly. The research also finds that education and economic growth reduce income inequality while population growth raises it. The research hypothesizes that financial inclusion

policies, combined with economic reforms and education, are essential to addressing Nigeria's income inequality.

Suhrab, Chen and Ullah (2024) examines the relationship between digital financial inclusion (DFI) and income inequality for BRICS nations, considering the moderating effect of technological innovation (TI) and infrastructure development (ID). Using Driscoll-Kraay (DK) and fixed effects tests, research finds DFI having a significant impact in reducing income inequality. Moreover, TI and ID emphasize this effect, suggesting that technological and infrastructure growth can increase financial access comparatively. By making transactions more convenient and available for basic services, TI and ID can stimulate an inclusive economy, thus reducing income inequality in BRICS countries.

Atadouanla Segning et al. (2024) examines financial inclusion's impact on income inequality between 27 sub-Saharan nations, with socio-cultural controls, using generalized method of moments (GMM). The nations were differentiated by religion and language of colonization and found that financial inclusion reduces the level of income inequality in Christian-majority and French-speaking countries. However, no such impact was observed in English-speaking and Islamic-majority countries, perhaps due to Islamic banking norms and different colonial legacies. The research also discovers an inverted U-shaped relationship between financial inclusion and income inequality in the entire sample and Christian-majority countries, necessitating culturally unique financial inclusion policies in order to effectively reduce income differentials.

Verma and Giri (2024) analyzes how financial inclusion is able to decrease income inequality across Asian economies from the period 2005 to 2019 using various econometric techniques such as Pedroni cointegration, FMOLS, and ARDL. The research proves that, in the long run, financial inclusion, as indicated by such indicators as bank branches, deposit accounts, outstanding loans, and domestic credit, has an effect on income inequality. On the other hand, these indicators have no meaningful effect in the short run. The one-way causal effect of financial inclusion on income inequality suggests that policy interventions for increased access to financial services can be an effective way of mitigating income inequality in the long term.

Orekoya and Akintunde (2023) analyzes the impact of financial inclusion on income inequality in Nigeria using three financial indicators: depth, access, and stability, based on 1981-2021 data using the ARDL method. Financial stability negatively but statistically insignificantly impacts inequality in the short term, and financial depth positively but statistically significantly impacts inequality. Standard of living has a strongly negative relationship, and economic growth has a positive relationship with inequality. Economic stability has a positive but an insignificant relationship in the long term, while financial access and economic growth have significant positive relationships. Financial depth and the standard of living, however, have negative relationships with inequality, with the latter being significant. The study indicates that economic development and financial access can be detrimental to income inequality if not regulated properly.

Adeleke and Olomola (2023) investigate the impact of financial inclusion on poverty and inequality in Nigeria using a Vector Autoregressive (VAR) model and quarterly data covering

the period 2004-2018. It is established that there is no statistically significant relationship between alternative measures of financial inclusion and poverty reduction, suggesting that financial inclusion programs have not been able to effectively reduce poverty in Nigeria. But the evidence points to a robust long-term relationship between bank credit in the domestic economy to the private sector and a fall in income inequality. The evidence also indicates that institutional quality and inflation exert no relevant influences on poverty and inequality in Nigeria. This implies that economic inclusion policies will have to be redone and tailored to address specific structural issues in order to be more effective in poverty and inequality reduction in Nigeria.

Chinnakum (2023) examines the effects of financial inclusion on poverty and income inequality across 27 developing countries in Asia from 2004 to 2019. Using a composite financial inclusion index (FII) constructed via principal component analysis (PCA) and generalized method of moments (GMM) for estimation, the study finds that financial inclusion significantly contributes to the reduction of poverty and income inequality. In addition, the research indicates the role of economic growth and openness to trade. Growth in the economy is found to reduce income inequality, while openness to trade increases the well-being of poor households, although it co-varies with inequality. The study highlights the role of financial inclusion in the overall policy against poverty and inequality in Asian developing economies.

Kebede, Naranpanawa, and Selvanathan (2023) examine the relationship between financial inclusion and income inequality in 23 African countries during the period 2004-2018. Using an endogenous panel threshold model, they find that the higher the rate of financial inclusion,

the more favorable it is for income distribution, particularly in high-inequality countries. Panel quantile regression reveals that the positive impacts of financial inclusion on income inequality are more pronounced in quantiles with greater inequality. The study further demonstrates the magnitude of the positive impact of financial inclusion is larger when accompanied by institutionally better institutions. This suggests that the efficacy of financial inclusion in lowering inequality not only hinges on its use but also on institutions' quality.

Lee, Lou, and Wang (2023) investigate the contribution of digital financial inclusion to poverty alleviation in China based on provincial-level data from 2011 to 2019. The evidence indicates that digital financial inclusion contributes to poverty alleviation with varying degrees of effect based on poverty levels as quantile regression analysis estimates. The contribution of income level and income distribution is also found by mediation regression in this process. Apart from that, the study employs a spatial Dubin model to show that there is a spillover effect of digital financial inclusion in reducing poverty with a "U"-shaped non-linear relationship. The implication of such a finding is that digital financial inclusion will not only decrease poverty but can, in some situations, exacerbate it, which supports that policy design attention needs to be given.

Koomson, Villano, and Hadley (2020) analyze the influence of financial inclusion on poverty and vulnerability to poverty among Ghanaian households based on information from the seventh Ghana Living Standards Survey (2016/17). Utilizing multiple correspondence analysis to generate a financial inclusion index and three-stage feasible least squares methodology, the research identifies that 23.4% of Ghanaians are in poverty, while 51% are poverty-vulnerable.

Financial inclusion is associated with a 27% reduction in the likelihood of a household being poor and a 28% reduction in exposure to future poverty. Financial inclusion benefits women-headed households and rural areas more than men-headed households and urban areas, indicating that financial inclusion policies need to be place-specific and gender-specific so that they can have the widest possible impact on poverty reduction.

Demir, Pesqué-Cela, Altunbas, and Murinde (2022) examine the relationship among FinTech, income inequality, and financial inclusion in 140 nations using the Global Findex surveys' data for the years 2011, 2014, and 2017. Drawing conclusions based on quantile regression analysis, they find that FinTech reduces income inequality both directly and indirectly, with most of its impact coming through financial inclusion. The study indicates that financial inclusion has the drastic reduction impact on inequality across all quantiles, with higher impacts in richer countries. This implies that while FinTech is an effective instrument for reducing income inequality, its influence varies by the income level of the nation, highlighting the importance of the country-specific strategy in using FinTech to be as effective as possible in reducing inequality.

Ibrahim and Aliero (2020) analyze the potential for financial inclusion to contain income disparity in Nigeria with the use of longitudinal data over three waves of Nigerian household surveys. With the use of instrumental variable linear and quantile regressions, the study achieves a strong positive relationship between financial inclusion and per capita income. Financial inclusion first led to income divergence, which raised inequality among households. However, income convergence occurred for middle- to high-income households in the second

wave, and for the lowest income households in the third wave. These findings suggest that even though financial inclusion can deepen inequality in the short run, it has the ability to create income convergence in the long run, and that this has implications for its ability to reduce income disparities in the long run.

Afolabi (2020) examines the impact of financial inclusion on inclusive growth in Nigeria from 1981 to 2017 using the Auto-Regressive Distributed Lag (ARDL) model. The empirical research utilizes annual data from the Central Bank of Nigeria (CBN) and World Development Indicators (WDI) with variables such as rural loans, the number of banks' branches, the money supply-GDP ratio, private sector credit to GDP, and per capita GDP. The findings indicate that financial inclusion, as represented by such variables as increased rural loans, increased bank branches, and increased liquidity, has a significant positive impact on inclusive growth in both the short run and the long run. However, high interest rates were observed to suppress such growth. The research identified targeted financial policy as key to increasing access to the rural and poor areas of the financial services for sustainable economic growth.

Aribaba et al. (2020) examine the relationship between poverty reduction among poor income earners in Nigeria between 2004 and 2019 and financial inclusion programs. Following a causal-comparative research design, the study uses data from the Central Bank of Nigeria (CBN) and applies Ordinary Least Squares (OLS) and Error Correction Model (ECM) in analysis. These key variables are Loan to Depositor Ratio (LDR), Loan to Rural Areas (LRA), Financial Deepening Indicators (FDI), and Social Investment Loans (SIL) to Small and Medium Enterprises (SMEs), with Poverty Index (PI) and Per Capita Income (PCI) being the

dependent variables. Based on the research, it is determined that schemes on financial inclusion play a major role in curbing poverty as well as raising per capita income, thereby improving living standards. The evidence suggests that financial inclusion can be a useful poverty alleviation instrument, especially via social investment schemes to SMEs and rural communities.

Omar and Inaba (2020) examine the impact of financial inclusion on poverty and income inequality in 116 developing countries with an unbalanced panel data set over 2004-2016. They construct a new financial inclusion index using a vast number of financial sector outreach indicators. Their evidence indicates that per capita income, internet users ratio, age dependency ratio, inflation, and income inequality variables have a great influence on financial inclusion levels. The study can present robust evidence that financial inclusion is a crucial factor in reducing poverty rates and income inequality for developing economies. Such evidence highlights the relevance of financial inclusion as an essential policy tool for equity-oriented economic facilitation.

Sani Ibrahim et al. (2019) examine the relationship between financial inclusion and well-being of 1,750 rural Nigerian households by developing a multi-variable financial inclusion index. Financial inclusion is revealed to have a highly positive and significant impact on household well-being. A decomposition analysis reveals that middle- and high-income households benefit more from financial inclusion compared to low-income households, who are the primary target of these programs. In addition, non-formal livelihood activities like environmental resource exploitation and farm production help reduce welfare differentials among income groups. The

findings show that, although financial inclusion has the potential to enhance welfare, there needs to be special policies in place to ensure that poor households gain proportionately from financial inclusion initiatives.

Chu Khanh and Chu (2018) examine the effect of financial inclusion on income inequality using data from the Global Financial Inclusion database of the World Bank for 69 countries to build a financial inclusion index. From their research, they find that there is greater correlation between financial inclusion and less income inequality. They also establish that there exists a non-monotonic association between market size and income distribution in both developed and developing countries. Specifically, they find evidence supporting the Kuznets hypothesis in developing economies with an inverted U-curve relationship between income and inequality, while in industrialized economies, the curve is U-shaped. In conclusion, according to this study, financial inclusion can be a good method to curb income inequality, but one should be careful not to fall into the trap of over-expansion of financial markets.

Table 2.1 Summary of Empirical Review

S/NO	Author(s)	Year	Topic	Methodology	Findings
1	Etudaiye-Muhtar	2024	Financial inclusion and income inequality in Nigeria	ARDL	Financial inclusion reduces inequality; education and economic growth help; population growth worsens inequality.
2	Suhrab, Chen & Ullah	2024	DFI, technological innovation, and inequality in BRICS	Driscoll-Kraay, Fixed Effects	DFI reduces inequality; technological innovation and infrastructure amplify the effect.
3	Atadouanla Segning et al.	2024	Financial inclusion, inequality, and culture in SSA	GMM	Reduces inequality in Christian/French-speaking nations; no effect in Islamic/English-speaking; inverted U-shaped relationship observed.
4	Verma & Giri	2024	Financial inclusion and inequality in Asia	Pedroni Cointegration, FMOLS, ARDL	Long-run effect significant; short-run effect not significant; unidirectional causality from financial inclusion to inequality.
5	Orekoya & Akintunde	2023	Financial depth, access, and stability vs inequality in Nigeria	ARDL	Mixed results; financial access and growth may worsen inequality; standard of living reduces it.
6	Adeleke & Olomola	2023	Financial inclusion, poverty, and inequality in Nigeria	VAR	Insignificant link with poverty; domestic credit reduces inequality; institutions and inflation not significant.
7	Chinnakum	2023	Financial inclusion, poverty, and inequality in Asia	PCA (FII Index), GMM	Financial inclusion reduces poverty and inequality; trade openness and growth also contribute.

8	Kebede, Naranpanawa & Selvanathan	2023	Financial inclusion and inequality in Africa	Endogenous Threshold Model, Quantile Regression	Stronger effect in high-inequality contexts; institutional quality enhances impact.
9	Lee, Lou & Wang	2023	DFI and poverty alleviation in China	Quantile Regression, Mediation & Spatial Durbin Model	DFI reduces poverty; nonlinear "U" relationship; income distribution mediates effects.
10	Koomson, Villano & Hadley	2020	Financial inclusion and poverty vulnerability in Ghana	Multiple Correspondence, 3-Stage FLS	Financial inclusion reduces poverty and vulnerability; rural and female-headed households benefit more.
11	Demir et al.	2022	FinTech, financial inclusion, and inequality globally	Quantile Regression	FinTech reduces inequality via financial inclusion; stronger effect in higher-income countries.
12	Ibrahim & Aliero	2020	Financial inclusion and income disparity in Nigeria	IV Linear & Quantile Regressions	Initial income divergence; later convergence across income groups; long-term reduction in inequality.
13	Afolabi	2020	Financial inclusion and inclusive growth in Nigeria	ARDL	Financial inclusion promotes inclusive growth; high interest rates hinder progress.
14	Aribaba et al.	2020	Financial inclusion and poverty in Nigeria	OLS, ECM	Financial inclusion reduces poverty, raises income; effective for SMEs and rural groups.
15	Omar & Inaba	2020	Financial inclusion, poverty, and inequality in 116 countries	Panel Data, Financial Inclusion Index	Financial inclusion reduces poverty and inequality; affected by income level, inflation, age dependency.

16	Sani Ibrahim et al.	2019	Financial inclusion and household welfare in rural Nigeria	Index Construction, Decomposition	Improves welfare, but favors higher-income groups; informal strategies mitigate inequality.
17	Chu Khanh & Chu	2018	Financial inclusion and income inequality globally	Financial Inclusion Index	Inclusion reduces inequality; inverted U-shape in developing countries, U-shape in developed; supports Kuznets hypothesis.

Author's Compilation (2025)

2.7 Research Gaps

A survey of extant empirical literature reveals several limitations that restrict a broad understanding of the relationship between financial inclusion and income inequality in Nigeria. In spite of available evidence such as those of Adu et al. (2019), Oruo et al. (2020), and Nwosu and Ogunleye (2021) that financial inclusion and access to credit reduces income inequality through improved number of ATMs per 100,000 adults, number of registered mobile money accounts per 1,000 adults, outstanding loans from deposit money banks (% of GDP), and private credit to GDP ratio, others argue differently. Researchers like Aye et al. (2019), Duru et al. (2020), and Ibe et al. (2021) contend that urban, wealthier, and more financially literate individuals use financial services disproportionately, thereby deepening already existing inequalities. Furthermore, several studies (e.g., Umar et al., 2021; Nduka et al., 2022; Adeola & Evans, 2020) report statistically insignificant effects, implying financial inclusion efforts may still be too narrow or superficial to exert an influence on structural inequality. Such divergent findings refer to the absence of an empirical consensus and suggest a need for more research using more recent and wider datasets.

Another aspect where the literature is conspicuous in its silence is both the methodological approach and temporal coverage adopted by previous studies. Many of the empirical studies are limited to data ending in or before 2021, thus excluding the steep rise in digital financial access indicators such as mobile money accounts, ATM density, and private sector credit experienced in the later years. Consequently, essential structural breaks in Nigeria's financial system between the years 1995 and 2023 remain uncharted. Methodologically, a majority of the studies over-rely on the Ordinary Least Squares (OLS) approach, which fails to account for long-run dynamics and cointegrating relations among macroeconomic variables (e.g., Aye et al., 2019; Umar et al., 2021). This restrains the validity of their results, particularly in a space as dynamic as financial inclusion. There is a keen interest in research using more sophisticated techniques—such as the Fully Modified Ordinary Least Squares (FMOLS) method—that control for endogeneity and serial correlation in order to obtain more accurate long-run estimates. Therefore, this study attempts to fill both the time and methodology gaps by applying FMOLS over a longer period (1995–2023) in order to investigate the long-lasting impact of financial inclusion on income inequality in Nigeria.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter deals with the research design, population and sample of the study, sources of data, theoretical framework and model specification, measurement and operationalization of variable as well as method of data analysis.

3.2 Research Design

The suitable research design for this study is a correlational design. A correlational research design is appropriate when the goal is to examine the relationship between variables, in this case, financial inclusion indicators and income inequality over time (Creswell & Creswell, 2018). Since the study utilizes time series data, it allows the researcher to observe changes and trends over a specific period, making it possible to identify and analyze patterns in the relationship between financial inclusion and income inequality (Wooldridge, 2019). This design is particularly relevant in econometric studies where the aim is not to manipulate variables directly but rather to explore existing data to establish the nature and strength of relationships (Gujarati & Porter, 2009). The use of time series data and Fully Modified Ordinary Least Squares (FMOLS) for estimation further supports this design as it accounts for non-stationary and cointegrated variables, thus providing robust long-term relationship insights between the variables (Phillips & Hansen, 1990).

3.3 Population of the Study

The population of this study constitutes data of entire financial inclusion and income inequality indices in Nigeria.

3.4 Sample and Sampling Technique

Due to the difficulty in obtaining the data for the entire variations of financial inclusion indices affecting income inequality in Nigeria, the study's sample will be restricted to the variables of the study such as number of ATMs per 100,000 adults, number of registered mobile money accounts per 1,000 adults, outstanding loans from commercial banks (% of GDP), and private credit to GDP ratio, and GINI coefficient within the period of 1995 to 2023.

3.5 Sources of Data

To comply with the stated research objectives, the study will employ time series data mainly from secondary sources which are quantitative in nature. The data will be obtained from the annual statistical bulletin of the Central Bank of Nigeria, National Bureau of Statistics annual bulletin, Enhancing Financial Innovation & Access (EFInA) annual survey and world bank data of previous edition for the period under review. The data will cover variables of the study, including number of ATMs per 100,000 adults, number of registered mobile money accounts per 1,000 adults, outstanding loans from commercial banks (% of GDP), and private credit to GDP ratio, and GINI coefficient.

3.6 Model Specification

The regression model is adapted from previous research conducted by Tita and Aziakpono (2017). Their model is presented thus:

$\text{LogGini}(y_i) = \alpha + \beta_1$ financial inclusion $+\beta_2$ controls $+ \varepsilon_i$……(3.1)

Where; y_i measures income inequality, β_1 is the coefficient of financial inclusion, β_2 represents the coefficients of the control variables and ε_i is the white noise error term. They employed seven aspects of financial inclusion, namely: account ownership, account use for business, electronic payment, loans from formal financial institutions, formal loans to pay school fees, health insurance and formal savings.

However, the current study modifies the model of Tita and Aziakpono (2017) by utilizing number of ATMs per 100,000 adults, number of registered mobile money accounts per 1,000 adults, outstanding loans from commercial banks (% of GDP), and private credit to GDP ratio as financial inclusion metrics. Therefore, the modified model for this study is stated below:

The model is functionally expressed thus:

$GINI_t = f(ATM_t, MMA_t, LCB_t, PRC_t,)$----------*(3.2)*

The above functional model is expressed in its econometric form thus:

$GINI_t = \beta_0 + \beta_1 ATM_t + \beta_2 MMA_t + \beta_3 LCB_t + \beta_4 PRC_t +$

$\mathcal{E}_{it}$……..……..…(3.3)

Where:

$GINI_t$ = *GINI coefficient at time t*

ATM_t = *number of ATMs per 100,000 adults at time t*

MMA_t = *number of registered mobile money accounts per 1,000 adults at time t*

LCB_t = *outstanding loans from commercial banks (% of GDP) at time t*

PRC_t = *Private credit to GDP ratio at time t*

$\beta_0, \beta_1 \beta_4$ = *parameters to be estimated*

$\mathcal{E}$ = *error term signifying other variables not captured in the study*

A priori expectation of the model is:

Apriori expectations

(β_1) = Number of ATMs per 100,000 adults; *a priori* expectation is positive

(β_2) = Number of registered mobile money accounts per 1,000 adults; *a priori* expectation is positive

(β_3) = Outstanding loans from commercial banks (% of GDP); *a priori* expectation is positive

(β_4) = Private credit to GDP ratio; *a priori* expectation is positive

Hence, this is further shown here:

$\beta_1>0$, $\beta_2>0$, $\beta_3 > 0$, $\beta_4 > 0$

3.7 Method of Data Analysis

The method of data analysis for this study involves the application of the Fully Modified Ordinary Least Squares (FMOLS) technique, which is suitable for estimating long-run relationships in time series data, particularly when the variables are non-stationary and cointegrated (Phillips & Hansen, 1990). Prior to applying FMOLS, the study would conduct a series of preliminary tests. First, unit root tests such as the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test will be performed to check for the stationarity of the variables (Dickey & Fuller, 1979; Phillips & Perron, 1988). If the variables are found to be integrated of the same order, typically I(1), the next step involves testing for cointegration using tests like the Johansen cointegration test to determine if a long-run equilibrium relationship

exists among the variables (Johansen, 1988). If cointegration is established, FMOLS is then employed to provide efficient and unbiased estimates of the long-term coefficients, addressing endogeneity issues and serial correlation present in the residuals. Additionally, diagnostic tests such as the Breusch-Godfrey serial correlation LM test and the Breusch-Pagan-Godfrey test for heteroscedasticity may be conducted to ensure the robustness of the model (Godfrey, 1978; Breusch & Pagan, 1979).

3.8 Operationalization of Variables

Table 3.1: Operationalization of Variables

Variable	Type	Measurement	Source
Number of ATMs per 100,000 Adults	Independent	Number of automated teller machines (ATMs) available per 100,000 adult individuals.	Atadouanla Segning et al. (2024)
Number of Registered Mobile Money Accounts per 1,000 Adults	Independent	Number of registered mobile money accounts held per 1,000 adult individuals.	Etudaiye-Muhtar (2024)
Outstanding Loans from Commercial Banks (% of GDP)	Independent	Total outstanding loans issued by commercial banks as a percentage of the country's GDP.	Verma and Giri (2024)
Private Credit to GDP Ratio	Independent	Ratio of private sector credit provided by financial institutions to the country's GDP.	Orekoya and Akintunde (2023)
GINI Coefficient	Dependent	A measure of income inequality within a country, ranging from 0 (perfect equality) to 1 (perfect inequality).	Adeleke and Olomola (2023)

Source: Researcher's compilations (2024).

CHAPTER FOUR

DATA PRESENTATION AND ANALYSES

4.1 Introduction

This chapter focuses on the presentation and analysis of the time series data collected from the Central Bank of Nigeria Statistical Bulletin and the World Bank database, spanning the period from 1995 to 2023. The analysis was conducted using EViews (12) software, and the results are systematically displayed in tabular format. Each table is accompanied by detailed explanations to enhance understanding. The chapter is organized into key sections, including data presentation and interpretation, hypothesis testing, and a comprehensive discussion of the findings.

4.2 Data Presentation and Interpretation

4.2.1 Preliminary Analyses

This section focuses on the initial examination of the study variables. It provides a detailed overview, including a summary of the variables through descriptive statistics and an evaluation of their interrelationships using correlation analysis.

Table 4.1 Descriptive statistics

	GINI	ATM	MMA	LCB	PRC
Mean	39.20345	8.333103	50.37241	0.110655	21.06638
Maximum	45.00000	17.50000	300.0000	0.188000	51.90000
Minimum	35.10000	0.000000	0.000000	0.062000	0.102000
Std. Dev.	4.113956	7.476930	77.44882	0.032546	23.94237
Skewness	0.418683	-0.044360	1.899893	0.494316	0.282329
Kurtosis	1.544492	1.214914	5.899842	2.539563	1.168887
Jarque-Bera	3.407119	3.859905	27.60735	1.437186	4.436773
Probability	0.182034	0.145155	0.000001	0.487438	0.108784

GINI= GINI co-efficient; ATM = number of ATMs per 100,000 adults; MMA = number of registered mobile money accounts per 1,000 adults; LCB =

outstanding loans from commercial banks (% of GDP); PRC = Private credit to GDP ratio

Source: Researcher's compilation (2025)

The descriptive statistics provided in Table 4.1 offer valuable insights into the relationships between financial inclusion indicators and economic inequality, as captured by the GINI coefficient. Each variable's mean, dispersion, and distributional characteristics help to outline their underlying dynamics and potential effects on economic growth.

The mean GINI coefficient of 39.20 suggests a moderate level of income inequality across the observed dataset. The range of values, from a minimum of 35.10 to a maximum of 45.00, highlights variations in income distribution within the sample. The standard deviation of 4.11 reflects a relatively low dispersion, indicating that most countries or regions exhibit similar levels of inequality. Skewness (0.42) and kurtosis (1.54) show a slight positive skew and flatter distribution compared to a normal curve, suggesting that there are more observations clustered around the lower end of inequality, with fewer outliers on the higher end.

The average number of ATMs per 100,000 adults is 8.33, which reflects limited access to traditional banking infrastructure in the sampled regions. The wide range, from 0 to a maximum of 17.50, combined with a standard deviation of 7.48, signifies high variability in ATM penetration. The skewness (-0.04) is close to zero, indicating a near-symmetric distribution, while the low kurtosis value (1.21) shows a flatter-than-normal distribution, implying a lack of extreme outliers.

The number of registered mobile money accounts (MMA) per 1,000 adults has a mean value of 50.37, showing relatively moderate usage of mobile money platforms. However, the extreme maximum value of 300.00 and a minimum of 0 reveal significant disparities in mobile money

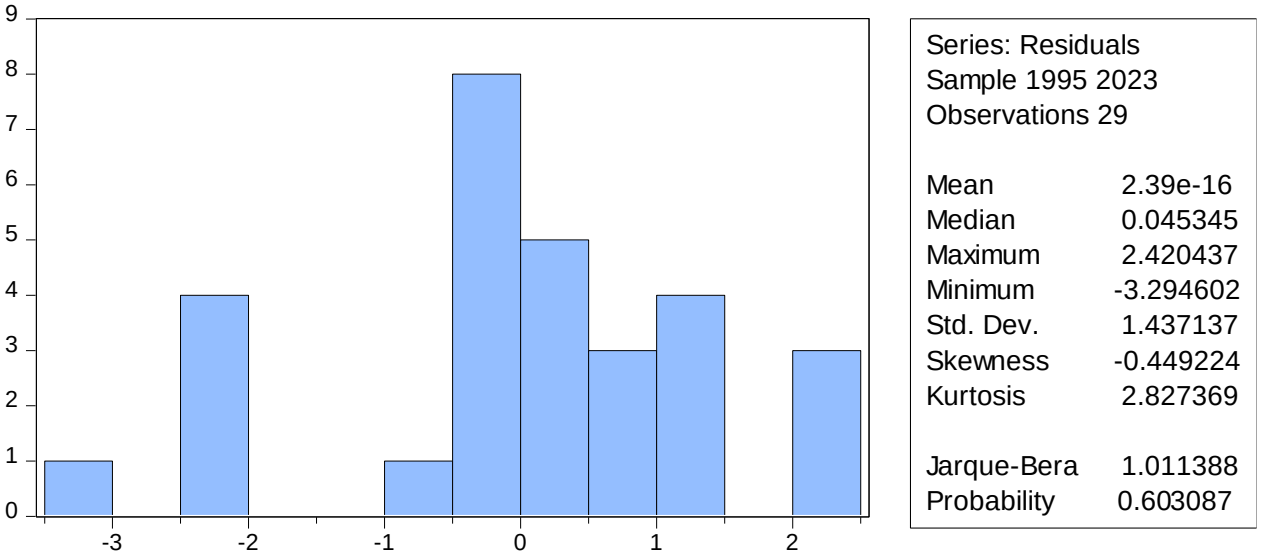
penetration across the dataset. The high standard deviation of 77.45 underscores the uneven distribution of mobile money services. Skewness (1.90) indicates a strong positive skew, meaning that a small number of countries or regions have exceptionally high mobile money usage, while the majority have lower levels. The kurtosis value of 5.89 further supports the presence of heavy tails, suggesting some extreme outliers in the data.

Outstanding loans from commercial banks, expressed as a percentage of GDP, exhibit a mean value of 0.11, which is relatively low. This suggests that commercial bank lending remains underutilized in the sampled economies. The range, from 0.062 to 0.188, and a low standard deviation of 0.03 indicate minimal variation across the dataset. The positive skewness (0.49) suggests that most countries or regions have relatively low values, with a few exhibiting slightly higher levels of commercial bank lending. The kurtosis value (2.54) is close to 3, indicating a nearly normal distribution.

The private credit to GDP ratio has a mean of 21.07, reflecting modest financial sector depth. However, the wide range, from 0.10 to a maximum of 51.90, and the standard deviation of 23.94 highlight considerable disparities in credit allocation to the private sector across the sample. The positive skewness (0.28) indicates a slight asymmetry, with more observations concentrated at lower values. The low kurtosis (1.17) indicates a flat distribution with few extreme observations.

The Jarque-Bera test statistics and their corresponding probabilities provide insights into the normality of the data. With a probability value of 0.18 for the GINI coefficient, the null hypothesis of normality cannot be rejected. Similarly, ATMs (0.15) and private credit to GDP (0.11) also do not deviate significantly from a normal distribution. However, the MMA variable

shows a very low probability (0.000001), suggesting a significant deviation from normality, which aligns with its high skewness and kurtosis values. Commercial bank loans (0.48) exhibit the most normal distribution among the variables. However, the overall normality test was conducted as shown in Figure 4.1 below.



Source: EViews 12 (2025)

The normality and key descriptive statistics for the regression variables are presented in the Histogram Normality Test illustrated in Figure 4.1. According to the results, the Jarque-Bera statistic is relatively low at 1.0114, with an associated probability value of 0.6030 (60.30%). Since this p-value exceeds the standard 5% significance threshold (0.05), the null hypothesis of a normally distributed residual cannot be rejected. This indicates that the residuals (u) are collectively observed to follow a normal distribution, which is a favorable outcome for the reliability of the regression analysis.

Table 4.2 Correlation Matrix

	GINI	ATM	MMA	LCB	PRC
GINI	1.000000				
ATM	-0.910947*	1.000000			
MMA	-0.628067*	0.708986*	1.000000		
LCB	-0.609863*	0.711749*	0.487896*	1.000000	
PRC	0.921121*	-0.952427*	-0.589047*	-0.745325*	1.000000

* Sig @ 1%; * * Sig @ 5%

Source: Researcher's compilation (2025)

The correlation analysis presented in Table 4.2 highlights the relationships between financial inclusion indicators and income inequality, as measured by the GINI coefficient. A strong negative correlation is observed between GINI and the number of ATMs (-0.91), indicating that higher ATM penetration is associated with lower income inequality. Similarly, mobile money accounts (MMA) and outstanding loans from commercial banks (LCB) are also negatively correlated with GINI (-0.63 and -0.61, respectively), suggesting that greater access to financial services through mobile platforms and bank credit contributes to reducing inequality. However, the private credit to GDP ratio (PRC) shows a strong positive correlation with GINI (0.92), implying that higher levels of private sector credit may exacerbate inequality, potentially due to unequal access to credit among different income groups. These findings underscore the dual role of financial inclusion in influencing income inequality: while broader access to financial services (e.g., ATMs, MMA, and LCB) can help mitigate inequality, disproportionate credit distribution (PRC) may widen income disparities, thereby impacting overall economic growth.

4.2.2 Unit Root Tests

Unit root tests are conducted to assess whether a time series is stationary, a fundamental requirement for producing accurate and dependable regression outcomes in econometric studies. The presence of non-stationary data can result in misleading or spurious correlations, compromising the validity of the analysis. The outcomes of the unit root tests are displayed in Table 4.3.

Table 4.3 Unit Root Tests

At Levels Panel 1				First Difference Panel 2		
Variable	**ADF Test Statistic**	**95% Critical ADF Value**	**Remark**	**ADF Test Statistic**	**95% Critical ADF Value**	**Remark**
GINI	-1.956303	-3.580623	Non-Stationary	-4.198735	-3.632896	Stationary
ATM	-2.292566	-3.587527	Non-Stationary	-5.685159	-3.603202	Stationary
MMA	0.564050	-3.622033	Non-Stationary	-3.652918	-3.644963	Stationary
LCB	-2.490247	-3.580623	Non-Stationary	-4.513750	-3.587527	Stationary
PRC	-1.829582	-3.580623	Non-Stationary	-5.297032	-3.587527	Stationary

Source: Researcher's compilation (2025)

The unit root test results in Table 4.3 provide critical insights into the time-series properties of the variables under consideration, particularly in the context of analyzing the effect of financial inclusion on economic growth. The results, derived using the Augmented Dickey-Fuller (ADF) test, reveal that all the variables—GINI (income inequality), ATM penetration, mobile money

accounts (MMA), outstanding loans from commercial banks (LCB), and private credit to GDP ratio (PRC)—are non-stationary at levels. This is indicated by test statistics that fail to exceed their respective 95% critical values. For instance, the GINI coefficient has an ADF statistic of -1.956303, which is above the critical value of -3.580623, leading to the conclusion that the variable is non-stationary. Similarly, ATM (-2.292566), MMA (0.564050), LCB (-2.490247), and PRC (-1.829582) also exhibit non-stationarity at levels.

However, after first differencing, all the variables become stationary, as evidenced by the ADF test statistics that exceed their 95% critical values. For instance, GINI becomes stationary with a test statistic of -4.198735 compared to the critical value of -3.632896. This transformation to stationarity after first differencing suggests that the variables are integrated of order one, I(1).

Given that all variables are integrated of order one (I(1)), the Fully Modified Ordinary Least Squares (FMOLS) method is justified for estimating the long-run relationships in the study. FMOLS is particularly suitable in this scenario for several reasons. First, it is designed to correct for endogeneity and serial correlation issues that commonly arise in cointegrated systems (Phillips & Hansen, 1990). Since the variables exhibit non-stationarity at levels but cointegration is assumed, FMOLS ensures that the parameter estimates are consistent and efficient by addressing potential bias caused by stochastic trends.

4.2.3 Diagnostic Tests

Table 4.4 Serial, Heteroskedasticity, and Specification Tests

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	3.019077	Prob. F(2,22)	0.0694
Obs*R-squared	6.245292	Prob. Chi-Square(2)	0.0440
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	7.218585	Prob. F(4,24)	0.0006
Obs*R-squared	15.83672	Prob. Chi-Square(4)	0.0032
Ramsey RESET Test: Specification: GINI ATM MMA LCB PRC C			
t-statistic	1.394030	23	0.1766
F-statistic	1.943320	(1, 23)	0.1766
Likelihood ratio	2.352243	1	0.1251

Source: Researcher's compilation (2025)

The diagnostic test results presented in Table 4.4 provide insights into the model's validity and robustness, particularly regarding serial correlation, heteroskedasticity, and model specification. These results are critical in determining the suitability of the estimation technique, such as Fully Modified Ordinary Least Squares (FMOLS), for analyzing the effect of financial inclusion on economic growth, with income inequality (GINI) as the dependent variable.

Serial Correlation Test

The Breusch-Godfrey Serial Correlation LM Test reveals mixed results for serial correlation in the model. The F-statistic (3.019077) has a p-value of 0.0694, which is slightly above the conventional significance level of 0.05, suggesting weak evidence of serial correlation. However, the Obs*R-squared statistic (6.245292) has a p-value of 0.0440, which falls below the 0.05 threshold, indicating some level of serial correlation in the residuals. This conflicting evidence highlights the need for a robust estimation technique that accounts for potential serial

correlation, as failing to address this issue could bias the standard errors and compromise the efficiency of the parameter estimates.

Heteroskedasticity Test

The Breusch-Pagan-Godfrey heteroskedasticity test strongly indicates the presence of heteroskedasticity in the model, with the F-statistic (7.218585) and Obs*R-squared statistic (15.83672) both having p-values of 0.0006 and 0.0032, respectively, which are well below the 0.05 significance level. Heteroskedasticity implies that the variance of the error terms is not constant, which can lead to inefficiency in Ordinary Least Squares (OLS) estimators and invalidate hypothesis tests. Thus, a method like FMOLS, which adjusts for heteroskedasticity in the residuals, becomes crucial in ensuring consistent and efficient estimates.

Specification Test

The Ramsey RESET test results, with a t-statistic of 1.394030 and an F-statistic of 1.943320, both have p-values of 0.1766, which are above the 0.05 significance level. This suggests that the model is correctly specified and does not suffer from omitted variable bias or incorrect functional form. This is an important finding, as it ensures that the observed relationships between income inequality (GINI) and the financial inclusion variables (ATM, MMA, LCB, PRC) are not driven by model misspecification.

Thus, the use of Fully Modified Ordinary Least Squares (FMOLS) is justified in this study due to its ability to address key diagnostic issues identified in the model. First, FMOLS corrects for serial correlation, as indicated by the mixed results of the Breusch-Godfrey test, ensuring efficient and consistent parameter estimates in the presence of autocorrelation (Phillips & Hansen, 1990). Second, the significant heteroskedasticity detected by the Breusch-Pagan-

Godfrey test necessitates a method like FMOLS, which adjusts for non-constant error variances, thereby preventing inefficiency in standard errors (Pedroni, 2000). Third, given that all variables are integrated of order one (I(1)) and likely cointegrated, FMOLS is ideal for estimating long-run relationships by addressing endogeneity and non-stationarity concerns (Kao & Chiang, 2000). Lastly, the Ramsey RESET test confirms correct model specification, making FMOLS particularly suited to producing unbiased and robust estimates in the context of cointegrated systems. Together, these features of FMOLS ensure reliable results in analyzing the effect of financial inclusion on economic growth via income inequality.

4.2.4 Multivariate Analysis

Table 4.5: Multivariate Analysis

Dependent Variable: GINI
Fully Modified Least Squares (FMOLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ATM	-0.087702	0.202815	-0.432424	0.6695
MMA	-0.005149	0.007374	-0.698279	0.4920
LCB	15.77531	17.29958	0.911890	0.3713
PRC	0.141700	0.058384	2.427030	0.0235
C	35.49931	3.607571	9.840225	0.0000
R-squared: 0.875888				
Adjusted R-squared: 0.854303				

Source: Researcher's compilation (2025)

The FMOLS results presented in Table 4.5 analyze the relationship between financial inclusion variables and income inequality (GINI). Among the explanatory variables, the private credit to GDP ratio (PRC) has a positive and statistically significant coefficient (0.1417, p = 0.0235), suggesting that higher private sector credit is associated with increased income inequality. This may reflect uneven access to credit, where wealthier individuals or firms benefit more than

lower-income groups. Conversely, the coefficients for ATM (-0.0877, p = 0.6695) and MMA (-0.0051, p = 0.4920) are negative but statistically insignificant, indicating that ATM penetration and mobile money accounts have no significant direct impact on reducing inequality within the sample. Similarly, outstanding loans from commercial banks (LCB) exhibit a large positive coefficient (15.7753) but remain statistically insignificant (p = 0.3713), implying no conclusive relationship with income inequality. The constant term (C) is highly significant (p = 0.0000), reflecting baseline inequality levels independent of the financial inclusion indicators. The high R-squared value (0.8759) and adjusted R-squared (0.8543) indicate that the model explains a substantial proportion of the variation in income inequality, even though most financial inclusion variables individually lack statistical significance. These results suggest that while financial inclusion contributes to economic dynamics, its impact on inequality may depend on broader contextual or institutional factors.

4.3 Hypotheses Testing

The hypotheses for this study are tested at the 5% significance level. The decision rule was to accept the null hypothesis if the p-value is greater than 0.05, otherwise, the alternative hypothesis was accepted and vice versa. The results presented in Table 4.5 were used testing the hypotheses.

Hypothesis One: There is no significant relationship between the number of ATMs per 100,000 adults and income inequality in Nigeria.

Based on the FMOLS output, the coefficient for ATM is -0.0877 with a p-value of 0.6695, which is greater than the 5% significance level (p > 0.05). Therefore, we fail to reject the null

hypothesis. This implies that the number of ATMs per 100,000 adults has no significant relationship with income inequality in Nigeria.

Hypothesis Two: The number of registered mobile money accounts per 1,000 adults has no significant impact on income inequality in Nigeria.

The coefficient for MMA is -0.0051 with a p-value of 0.4920, which is greater than 0.05. Thus, we fail to reject the null hypothesis. This indicates that the number of registered mobile money accounts per 1,000 adults does not significantly impact income inequality in Nigeria.

Hypothesis Three: Outstanding loans from commercial banks (% of GDP) do not significantly affect income inequality in Nigeria.

The coefficient for LCB is 15.7753 with a p-value of 0.3713, which is greater than 0.05. Hence, we fail to reject the null hypothesis. This suggests that outstanding loans from commercial banks (% of GDP) do not have a significant effect on income inequality in Nigeria.

Hypothesis Four: There is no significant relationship between the private credit to GDP ratio and income inequality in Nigeria.

The coefficient for PRC is 0.1417 with a p-value of 0.0235, which is less than 0.05. Therefore, we reject the null hypothesis and accept the alternative hypothesis. This indicates that there is a significant positive relationship between the private credit to GDP ratio and income inequality in Nigeria.

4.4 Discussion of Findings

The FMOLS results show that the number of ATMs per 100,000 adults (ATM) has a negative but statistically insignificant coefficient (-0.0877, p = 0.6695), indicating no significant

relationship with income inequality. This finding suggests that increasing ATM penetration alone may not directly impact income inequality in Nigeria. This result contrasts with studies like Adegboye and Fakunmoju (2020), who found that a higher ATM density reduces income inequality by increasing access to formal financial services. The lack of significance in this study might stem from limitations in the ATM network's geographical distribution, with rural areas still underserved (Okoro & Ekeocha, 2021). Moreover, while ATMs are a vital aspect of financial inclusion, their impact on reducing inequality likely requires complementary measures, such as financial literacy programs and mobile banking, to ensure equitable access across all population segments (Akinlo & Onifade, 2022). This aligns with Olaoye and Salami's (2021) view that ATMs are often more accessible in urban areas, making their inequality-reducing potential limited without broader financial infrastructure development.

Moreover, the number of registered mobile money accounts (MMA) also showed a negative but statistically insignificant relationship with income inequality (-0.0051, $p = 0.4920$), implying that mobile money services do not significantly impact inequality in this study. This finding contrasts with research by Agyekum, Addo, and Atta (2020), who demonstrated that mobile money services significantly enhance financial inclusion for low-income and rural populations, thereby reducing inequality. One possible explanation for this disparity is the quality of engagement with mobile money accounts in Nigeria, as highlighted by Ozili (2020), who emphasized that dormant or inactive accounts undermine the full potential of mobile money in promoting financial inclusion. Additionally, infrastructure challenges, such as inconsistent network coverage in rural areas, may hinder the effectiveness of mobile money in

reaching underserved populations (Andrianaivo & Kpodar, 2019). Therefore, while mobile money is a promising tool for financial inclusion, its ability to reduce inequality depends on improved infrastructure, active usage, and supportive regulatory frameworks (Ejiogu, 2019).

Similarly, the FMOLS results reveal that outstanding loans from commercial banks (LCB) have a positive but statistically insignificant coefficient (15.7753, $p = 0.3713$), suggesting that the volume of loans relative to GDP does not significantly affect income inequality in this study. This finding contrasts with research by Ogbuabor (2019), who argued that increased access to loans for SMEs reduces inequality by creating jobs and promoting income distribution. However, the result may reflect a skewed allocation of loans in Nigeria, as noted by Adedoyin (2020), who highlighted that bank credit often disproportionately benefits wealthier individuals and corporations in urban areas, leaving low-income and rural populations underserved. Moreover, high borrowing costs and stringent loan conditions may further limit the access of poorer groups to commercial bank loans (Adegbite, 2021). This underscores the need for targeted credit policies aimed at ensuring equitable access to loans, particularly for marginalized groups, to maximize the potential of commercial bank lending in reducing inequality.

Finally, the private credit to GDP ratio (PRC) is the only variable with a statistically significant positive relationship with income inequality (0.1417, $p = 0.0235$). This finding indicates that higher private credit relative to GDP increases inequality, likely because credit disproportionately benefits wealthier individuals and larger enterprises, as noted by Akinlo and Akinpelu (2021). This result aligns with the argument of Asongu and Odhiambo (2022), who

cautioned that an unregulated expansion of credit markets can exacerbate inequality by favoring those already integrated into formal financial systems. Similarly, Salami and Adebayo (2023) observed that in Nigeria, credit allocation is often biased toward the affluent, leaving lower-income groups unable to access the benefits of financial resources. To mitigate this, policies should focus on promoting inclusive credit access, such as microfinance initiatives and SME-focused lending, to ensure that private credit expansion contributes to reducing, rather than increasing, income inequality.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

The study examined income inequality, access to credit, and financial inclusion in Nigeria spanning periods from 1995 to 2023 based on the accessibility of data. Four hypotheses were raised and evaluated using the fully modified ordinary least squares estimator. In concluding the research, this final chapter documents the summary of findings, conclusion and recommendations of the study.

5.2 Summary of Findings

Based on the analysis conducted, the following findings were made:

1. The FMOLS results show that the number of ATMs per 100,000 adults (ATM) has a negative but statistically insignificant coefficient (-0.0877, p = 0.6695), indicating no significant relationship with income inequality.
2. Moreover, the number of registered mobile money accounts (MMA) also showed a negative but statistically insignificant relationship with income inequality (-0.0051, p = 0.4920), implying that mobile money services do not significantly impact inequality in this study.
3. Similarly, the FMOLS results reveal that outstanding loans from commercial banks (LCB) have a positive but statistically insignificant coefficient (15.7753, p = 0.3713),

suggesting that the volume of loans relative to GDP does not significantly affect income inequality in this study.

4. Finally, the private credit to GDP ratio (PRC) is the only variable with a statistically significant positive relationship with income inequality (0.1417, p = 0.0235).

5.3 Conclusion

This study has provided valuable insights into income inequality, access to credit, and financial inclusion in Nigeria from 1995 to 2023. The findings indicate that while traditional financial inclusion metrics such as the number of ATMs, mobile money accounts, and outstanding loans show no significant impact on reducing income inequality, the private credit-to-GDP ratio has a statistically significant and positive relationship with income inequality. This suggests that the distribution of private credit in Nigeria may disproportionately favour wealthier individuals or entities, thereby exacerbating income inequality. These results highlight the need for targeted financial inclusion policies that go beyond increasing access to financial services and instead focus on equitable credit distribution and inclusive financial practices to address the persistent challenge of income inequality in Nigeria.

5.4 Policy Implication

The findings suggest that financial inclusion policies in Nigeria must move beyond merely expanding financial services infrastructure, such as ATMs and mobile money platforms, to addressing deeper systemic issues that hinder equitable access to these services. The insignificant impact of ATMs and mobile money accounts on income inequality highlights the

need for targeted efforts to extend these services to underserved rural areas and low-income populations, alongside initiatives to improve financial literacy and encourage active usage. The positive relationship between private credit to GDP and income inequality indicates that credit markets are skewed toward wealthier individuals and larger enterprises, emphasizing the need for policies that prioritize affordable and inclusive credit facilities, such as microfinance programs and SME-focused lending schemes. Furthermore, commercial bank lending practices should be reformed to ensure broader access for marginalized groups, with supportive frameworks to reduce borrowing costs and simplify loan conditions. Overall, policymakers must adopt a holistic approach that integrates financial inclusion with complementary measures such as digital infrastructure development, education, and regulatory oversight to ensure that the benefits of financial inclusion translate into meaningful reductions in income inequality and sustainable economic growth.

5.5 Recommendations

Based on the above findings, the following recommendations are made:

1. Since the private credit-to-GDP ratio has a significant positive relationship with income inequality, policymakers should implement measures to ensure equitable access to credit. This includes prioritizing loans to underserved groups, such as small and medium-sized enterprises (SMEs), women, and low-income individuals, while creating incentives for financial institutions to extend credit to marginalized communities. Such efforts can help reduce income inequality by ensuring that credit is used for productive and inclusive purposes.

2. Although mobile money accounts showed an insignificant impact on income inequality, efforts should be made to increase their usage, particularly in rural and underserved areas. Initiatives such as reducing transaction fees, enhancing digital financial literacy, and expanding mobile network coverage can encourage greater adoption. Mobile money services should also be linked to programs like microfinance and social protection schemes to directly target income redistribution and poverty reduction.
3. The insignificant impact of outstanding loans suggests inefficiencies in how credit is used. Financial literacy programs should be introduced to educate borrowers on managing loans effectively and using them for productive ventures. Policymakers should also consider monitoring loan distribution and enforcing regulations to minimize non-productive loans or credit concentration in wealthier segments, thereby promoting broader economic participation.
4. While ATMs currently have no significant impact on income inequality, improving their distribution and functionality in underserved areas could enhance financial access. Financial institutions should integrate ATMs with more advanced features, such as bill payment, mobile money transfers, and account opening, to make them more impactful for low-income users. Subsidizing ATM installation in rural areas and linking ATM use to financial inclusion programs could help bridge the gap in financial accessibility.

5.6 Contribution to Knowledge

This study contributes to the growing body of literature on access to credit, financial inclusion and income inequality in developing economies, particularly within the Nigerian context, by

providing empirical evidence on the nuanced relationship between financial access and inequality over nearly three decades (1995–2023). Unlike previous studies that primarily emphasized the expansion of financial infrastructure as a means to enhance inclusion, this research establishes that not all forms of financial access yield equitable outcomes. The significant positive relationship between private credit-to-GDP and income inequality underscores the structural bias in Nigeria's credit system, where financial deepening tends to benefit wealthier individuals and corporations rather than low-income earners. Moreover, the study advances existing scholarship by employing the Fully Modified Ordinary Least Squares (FMOLS) technique, which effectively corrects for endogeneity and serial correlation in long-run relationships, thereby producing robust estimates. Consequently, this study enriches academic discourse by demonstrating that the effectiveness of financial inclusion policies depends not merely on access expansion but on ensuring equitable credit distribution and active financial participation across socioeconomic strata, offering a framework for policymakers to integrate inclusivity within financial sector reforms.

5.7 Suggestions for Further Studies

Future studies could extend the time frame beyond 2023 to capture the evolving dynamics of financial inclusion and income inequality in Nigeria, particularly with the increasing adoption of digital financial services and fintech innovations. Expanding the time frame would allow researchers to assess the long-term impacts of recent financial policies and technological advancements. Comparative studies across multiple countries, particularly in Sub-Saharan Africa, could also provide cross-national insights into the varying effects of financial inclusion

strategies on income inequality. Additionally, shorter intervals of analysis (e.g., quarterly or monthly data) could offer a more granular perspective on the short-term effects of financial inclusion policies, especially in response to economic reforms or shocks.

From a methodological perspective, future research could adopt more advanced econometric techniques, such as the Generalized Method of Moments (GMM) or Dynamic Panel Data Models, to address potential endogeneity issues and capture dynamic relationships between financial inclusion and inequality. Moreover, including additional variables such as financial literacy rates, digital literacy, gender disparities in financial access, and informal financial services could provide a more comprehensive understanding of the factors influencing income inequality. Mixed-method approaches, incorporating qualitative data from interviews with policymakers, financial institutions, and underserved populations, could complement quantitative findings and shed light on the structural barriers to equitable financial inclusion. Such studies would help build a more nuanced understanding of how financial inclusion can effectively contribute to reducing income inequality in Nigeria and other developing economies.

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