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Microfinance Banks' Investment Portfolio and Standard of Living in Nigeria: an Empirical Study

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Abstract

There are two important missions of microfinance banks, financial and social. The social mission has brought to the fore the role of microfinance credit, investment, and other activities in improving the social well-being of the people. Thus, this study aims to examine the effect of the investment activity of microfinance banks on the standard of living in Nigeria between 1992 and 2018 using annual time series data. Based on Autoregressive Distributed Lag (ARDL) model and in the company of cointegrating regression techniques as robustness checks, this study finds evidence of a long-run relationship between standard of living and microfinance investment portfolio, with the lagged value of the latter having a significant negative effect on per capita income (a proxy for standard of living) in the long-run but the significant positive association was confirmed in the short run. The study concludes that microfinance banks' investment activity is only a short term means of raising the standard of living in Nigeria, for in the long run, rather than raising, it reduces the standard of living in Nigeria significantly. Therefore, it is recommended that microfinance banks' activity be directed towards financially profitable ventures and more socially rewarding outlets capable of improving the social well-being of the people, thereby helping raise the standard of living in Nigeria.

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1. Introduction

Behind the activities of man is the desire for a better life. This better life which reflects in the form of standard of living, is a function of one's income level generated from trade, business, employment etc. According to Okafor (2016), the standard of living, which is inversely related to poverty, is the degree of comfort, wealth, material goods and necessities of life available to a particular socio-economic class of people. Standard of living also means the ability of an individual to assess basic necessities of life with no difficulty (Akpunonu, Nkechukwu and Okonkwo. 2017). The level of per capita income is a key index of the standard of living of a country. Other indicators include good housing, employment class, poverty reduction, quality of education, literacy level, quality food, quality and availability of social amenities (Akpunonu et al. 2017).

Microfinance banks have been considered friendly institutions available to the poor in that they provide the poor with the needed credit (Okafor, 2016). Thus, microfinance entails providing financial services to the economically active poor and low-income earners and their micro-businesses (Kasali et al., 2015; Mustapha, Yusuf and Abdullahi. 2019). Microfinance could be formal, informal or semi-formal. A typical example of formal microfinance is the microfinance bank (MFB), an incorporated entity holding a valid banking licence to practice microfinance banking business; it has two main missions, financial and social. The former mission is concerned with making enough profits to satisfy the financial needs of its teeming stakeholders. The latter (social mission) is concerned with improving the social-economic lives of the people through raising the standard of living, alleviating poverty, human capacity building, raising social security etc.

Microfinance formally has its origin traced to the Grameen Bank, which, in 1976, Muhammad Yunus founded on the outskirts of Chittagong University campus, Jobra, Bangladesh. Other countries of the world, including Nigeria, have their non-formal microfinance in the form of microcredit; formal microfinance institutions began in Nigeria in 2005 with the launch of the Microfinance Bank Policy by the Central Bank of Nigeria (CBN). These banks are established to cater to the economically active poor people's needs by providing them with savings, payment, credit, capacity building, and other services to improve their socio-economic lives, thus reducing poverty by raising their standard of living. This suggests that poverty reduction and standard of living are at the heart of microfinance. Therefore, Mustapha, Yusuf and Abdullahi (2019) argue that microfinance is an innovative financial arrangement designed to attract the poor as either borrowers or savers. Furthermore, credit availability has been considered one source to fight poverty, which helps improve the quality of living and, consequently, the standard of living (Okafor, 2016).

Apart from microcredit, another activity of microfinance banks is an investment. Microfinance banks also get involved in permissible investment portfolios to fulfil their double bottom lines of financial profitability and social mission accomplishment. Empirically, most previous studies posit that microfinance institutions have registered their positive impact on poverty alleviation or standard of living elevation through microcredit. In the same vein, some calibre of studies focused on the microfinance bank-growth nexus (Eigbiremolen and Anaduaka (2014); Ayodele and Arogundade (2014); Sultan and Masih (2016); Apere (2016); Jude and Emori (2017); Ezeanyeji et al. (2020). A review of past studies also exposes a lack of emphasis on microfinance banks' investment portfolios and their effect on people's standard of living. Most past studies have confirmed the positive role of Islamic banks (Tabash and Dhankar (2013), Tabash and Dhankar (2014), Osmanovica, Kb and Stojanovic (2020)); microfinance banks (Eigbiremolen and Anaduaka (2014)), investment (Chidoko and Sachirarwe (2015), Apere (2016), Sultan and Masih (2016), Apere (2016)); foreign direct investment (Ek (2007), Chigbu et al. (2015), Alabi (2019), Babarinde (2020)); on economic growth. However, the extent to which the investment portfolio of microfinance banks impacts the living

standard of people is largely less explored by previous studies.

Microfinance banks have dual missions the social mission of poverty alleviation and the financial mission of financial returns to stakeholders. The former mission has received less consideration in post empirical investigations than the latter, especially when microfinance banks' investment portfolio is used as a performance yardstick. Therefore, this current study attempts to fill the lacuna by empirically investigating whether microfinance banks' investment portfolio positively or negatively impacts the standard of living in Nigeria from 1992 to 2018. This study is situated within the Autoregressive Distributed Lag(ARDL) model while three cointegration regression techniques, namely, Fully Modified Ordinary Least Squares (FMOLS), Dynamic Ordinary Least Squares(DOLS) and Canonical Cointegrating Regression (CCR) techniques serve the purposes of robustness checks.

Therefore, the main aim of this study is to evaluate the impact of microfinance banks' investment portfolios on the standard of living in Nigeria. The specific objectives of the study are to: determine the impact of microfinance banks' investment activity on the standard of living in Nigeria; examine the impact of microfinance bank loans and credit on the standard of living in Nigeria; and evaluate the impact of microfinance banks' deposit liabilities on the standard of living in Nigeria.

This current study contributes to microfinance-standard of living literature by providing empirical evidence on both long-run and short-run impacts of microfinance banks' investment portfolios on Nigeria's standard of living. Thus, this study also establishes evidence of a long-run relationship between standard of living and microfinance investment portfolio, with the latter having a significant negative effect on the standard of living in the long run, but significant positive nexus was confirmed between the duo in the short run. It is also documented in this study that microfinance banks' investment activity is only a short term means of raising the standard of living in Nigeria, for in the long run, rather than raising, it reduces the standard of living in Nigeria significantly.

In this paper, in addition to this introduction, section two is on review of related literature on microfinance banks and the standard of living nexus. The study's methodology is described in section three. Section four reports and discusses empirical data analyses, and finally, section five focuses on the conclusion and recommendations of the study.

2. Literature Review

Standard of living has been explained in literature along three broad lines of thought: standard of living as the utility of life (Pigou, 1952); standard of living as economic provision or opulence; and standard of living conceptualized as a type of freedom. To Pigou (1952), the standard of living is equated with economic welfare, the standard of real income and material prosperity. According to the opulence view of Deutsch and Silber (1999), the standard of living refers to the quantity and quality of goods and services that the individual is free to use. The third strand of conceptualization of standard of living led by Sen (1984) considers the standard of living as the freedom to carry out something and the ability to live comfortably well. This current study aligns with Pigou's view of the standard of living, which relates standard of living to real income, a term considered to be relatively much more measurable. Hence, the economic dimension of living standard, which is in the form of the portion of real income in the economy that an individual has as his or her own share, can be said to indicate his share of the country's economic welfare.

Microfinance provides micro-credit and other financial services and products to the economically active poor and small and medium scale business enterprises. A microfinance bank has been defined as any company licensed by the CBN to provide financial services such as savings and deposits, loans, domestic fund transfers, and other financial and nonfinancial services to microfinance clients (CBN, 2020).

According to CBN (2020), the permissible activities of microfinance banks in Nigeria are: acceptance of various types of deposits; provision of credit, housing micro loans, payment services banking services, and ancillary services; issuance of debentures; acting as a collecting banker in respect of money or banking instruments; acting as agent for the provision of mobile banking, micro insurance and other approved services; appointment of agents to provide financial services on its behalf; provision of loan disbursement services for the delivery of the credit programme of government, agencies, groups and individual; maintenance and operation of various types of account with other banks in Nigeria; investment in suitably approved money market instruments; operation of micro leasing facilities, microfinance related hire purchase and arrangement of consortium lending; participation in CBN Intervention Fund and funds other sources; provision of microfinance related guarantees for its customers; financing agricultural inputs; investment in cottage industries and income generating projects; provision of professional advice to low-income persons; issuance of domestic commercial paper; provision of financial and technical assistance and training to microenterprises; and any other CBN-approved permissible activities.

However, there are certain financial services that MFBs are not permitted to venture into. These services and activities include foreign currency transactions (except foreign currency borrowings); international commercial papers; international corporate finance; international electronic funds transfer; clearinghouse activities; a collection of third party cheques and other instruments to clear through correspondent banks; dealing in land for speculative purposes; dealing in real estate (except for its use as office accommodation); provision of any facility for speculative purposes; leasing, renting, and sale/purchase of assets of any kind with related parties and/or significant shareholders; financing of any illegal activities; and any activity that falls outside the permissible by the CBN (CBN, 2020).

There are four kinds of MFBs available in Nigeria: Tier 1 Unit MFB, Tier 2 Unit MFB, State Microfinance Bank, and National Microfinance Bank. CBN (2020) described that Tier 1 Unit MFB is a unit MFB with urban authorization and operates in the banked and high-density areas and is allowed to open not more than four branches outside the head office within five contiguous Local Governments Areas (LGAs). Furthermore, the author describes Tier 2 Unit MFB as a unit MFB with a rural authorization that operates only in the rural, unbanked or underbanked areas and is permitted by CBN to open one branch outside the head office within the same LGA. Furthermore, a State Microfinance Bank, as described as CBN, is an MFB permitted to operate in one state or the Federal Capital Territory (FCT) and can open branches within the same State or the FCT, but such bank is not permitted to open more than two branches in the same Local Government Area unless it has established at least one branch or cash centre in every LGA of the State. A National Microfinance Bank is authorized to operate in more than one state, including the FCT (CBN, 2020).

The Microfinance Policy, Regulatory and Supervisory Framework, which CBN issued on December 15, 2005, to guide microfinance initiatives in Nigeria and this Policy Guideline has been reviewed in 2011, 2013 and recently in 2020. According to the 2020 revised Policy, the minimum capital based for MFBs in Nigeria for Tier 1 unit, Tier 2, State and National MFBs are ₦200,000,000 (Two Hundred Million Naira), ₦50,000,000 (Fifty Million Naira), ₦1,000,000,000 (One Billion Naira) and ₦5,000,000,000 (Five Billion Naira) respectively.

Microfinance is considered a channel for poverty alleviation considering its ability to empower the poor via providing access to microcredit needed by the economic actively poor to improve their productive base and enhance income growth (Weiss and Montgomery, 2005). Microfinance banks' potential to influence living standards is primarily situated within the financial intermediation framework. This notion is based on the premise that when economically active poor (the primary client of microfinance institutions) are empowered economically through the supply and transfer of

surplus investible funds, micro-credits, from the lender (surplus unit) to the borrower (deficit unit), the productive and capital base of the poor are improved, and ultimately their economic fortune and welfare are improved. Financial intermediation can be described as the exchange process and an indirect finance arrangement that entails the channelization of surplus financial resources (funds) existing in the surplus sector of the economy to the deficit sector of the economy for trade and investment through the instrumentality of financial intermediaries (banks and non-bank financial institutions). Accordingly, Allen and Santomero (1998) argue that banks have promoted financial intermediation by taking household deposits and making loans to economic agents requiring capital. The authors note that the traditional financial intermediation theory focuses on the real-world market features of transaction costs and asymmetric information.

The extent to which microfinance bank activities have impacted the living standard of people and/or poverty reduction has been examined empirically by some scholars, among whom are Weerasinghe and Dedunu (2017), who investigated the role of microfinance in the standard of living in Kurunegala District, Sri Lanka. The study found a significant positive relationship between microcredit, advisory support, saving and living standard of the poor in the country. In another study, Žiaková and Verner (2015) also report that microfinance positively affects poverty reduction in Jordan. Furthermore, Lopatta and Tchikov (2017) examined the relationship between microfinance and economic development using transnational data. The scholars find a bidirectional causality between both microfinance institutions' social and financial performance and economic development. Similarly, Ali et al. (2015) posit that through the vehicle of investment, microfinance enhances the economic development in West Punjab. Furthermore, Karsch and Deek (2019) also conclude that small micro-financing facilitates Palestine's economic growth and stability. However, Maîtrot and Niño-Zarazúa (2017) also posit that microfinance facilitates changes in the financial life of the poor in the short run. The scholars found inclusive evidence of microfinance as an effective tool for poverty alleviation.

Furthermore, from Uddin and Hossain's (2020) impact of microfinance services on poverty reduction in Bangladesh, the authors reveal that micro-credit, savings, micro-insurance, and training influence poverty reduction in Bangladesh. Ayam et al. (2020) also confirm the positive role of microfinance in women's empowerment and standard of living in La-Nkwantanang Madina municipality, Ghana. The study further explains that access to micro-credits increased participants' incomes and savings, improved their standard of living and increased their participation in decision making within the family. Shaikha et al. (2016) also examined the impact of microfinance on poverty in South Asian Association for Regional Co-operation (SAARC) member countries. The study found significant negative associations of microfinance loans with the poverty headcount ratio and the poverty gap. The study also found that microfinance loans positively affect education, health, and living standard in the selected countries.

Moreover, Fayyaz and Khan (2021) also indicate that microfinance initiatives have a significant positive impact on enhancing the quality of life, personal empowerment, and familial harmony of the female borrowers in Pakistan. Imtiaz et al. (2014) examined the effect of micro-financing on small businesses and poverty reduction in District Faisalabad, Pakistan. The study concludes that micro-financing facilitates poverty alleviation in Pakistan. Ingabire and Ogoi (2021) submit that through the empowerment of the poor and facilitation of start-ups, growth and expansion of micro and small businesses, microfinance loan has encouraged asset building, job creation, poverty reduction and improved standard of living in Rwanda Ssembajjwe and Ncwadi (2020) investigated the role of microfinance on poverty alleviation in Uganda. The study concludes that microfinance institutions play a significant role in poverty alleviation through the interplay of loan sizes, family employment, gross income, and education. Muharremi and Madani (2021) explored microfinance services' impact

on Albania's rural creditors. The study indicates that microfinance operations have improved living standards in Albania. Chowdhury et al. (2021) evaluated the economic and social impact of microfinance programs in Bangladesh. The study reveals that microfinance programs facilitated poverty alleviation, income generation, and savings. From the review of international literature above, it is seen that most studies emphasized the micro-credit function of microfinance institutions with evidence of the same promoting standard of living/poverty reduction in different countries.

Several studies have also been carried out in Nigeria, focusing on poverty and its relationship with microfinance activities. For instance, Idowu and Salami (2011) determined the impact of microfinance banks on hairdressers' living standards in Ogbomoso North Local Government Area, Oyo State, Nigeria. The study established a significant relationship between microfinance bank efforts and the standard of living of hairdressers in the area. Kasali et al. (2015) also analysed the effect of microfinance on poverty alleviation in Nigeria and found that microfinance tends to reduce poverty in Nigeria but is not as efficient as in other countries of the world. Furthermore, Mustapha, Yusuf and Abdullahi (2019) surveyed the impact of Rima MFB on income and poverty in Goronyo LGA, Sokoto State, Nigeria. It was shown that through the instrumentality of agricultural input credit facilities, the MFB helped reduce poverty in terms of depth and severity. In the same vein, Alani and Sani (2014) investigated the effects of MFBs on rural dwellers in Kogi state. The authors reveal that MFBs can improve the lives of the economically active poor in the area. Imoisi and Opara (2014) also show a positive relationship between microfinance and the improved standard of living of the recipients of these microcredits in Edo State, Nigeria. In a related study, Audu and Achegbulu (2011) concluded that microfinance has the potential to reduce material poverty in Nigeria.

In their study, Aigbokhan and Asemota (2011) also found evidence of significant positive effects of access to microfinance on poverty reduction and social capital formation in Edo and Delta States, Nigeria. Agbaeze and Onwuka (2014) determined the effect of micro-credit on poverty alleviation in Enugu East LGA of Nigeria. The study results show that access to micro-credit has a positive but not significant impact on poverty alleviation among the rural populace. However, in his study, Okafor (2016) found no significant positive association between microfinance banks and living standards in Nigeria. Moreover, Murad and Idewele (2017) show that microfinance investment has a significant positive impact on economic performance in Nigeria in the long run but negative non-significant in the short run. Idowu and Oyeleye (2012) examined the impact of microfinance banks on poverty alleviation in Oyo State, Nigeria. The results revealed that microfinance banks have positively and significantly impacted their living standards. Obayagbona's (2018) study reveals that microfinance assets and loan-to-deposit ratio have significant effects on poverty alleviation in Nigeria, while microfinance gross earnings and microfinance bank loans have a significant negative impact on poverty alleviation in the country. Aliyu et al. (2021) also submit that access to microfinance and financial literacy positively and significantly influences the poverty reduction of Muslim women entrepreneurs in Bauchi state, Nigeria.

Oduwa (2021) show that microfinance banks play a key role in the economic empowerment of beneficiaries in the Egor Local Government Area of Edo State, Nigeria. Uyang et al. (2021) assert that a significant association exists between access to credit facilities and poverty alleviation in terms of improved income among the people of Cross River State, Nigeria. Furthermore, Ihenetu (2021) examined microfinance bank lending and poverty reduction in Nigeria. The study observes that microfinance bank lending had a significant long-run effect on poverty reduction in Nigeria but in the short run. Cole and Akintola (2021) also indicate a positive relationship between microfinance bank credit and economic growth in Nigeria. Fapetu, Adegoriola and Azeez (2021) assessed the impact of microfinance banks on poverty reduction in Nigeria. The study shows that microfinance banks' loans positively and significantly impact poverty. Idolor and Imhanlahimi (2017) surveyed the

impact of microfinance banks on poverty in Edo State, Nigeria. The study establishes that microfinance banks have very minimal presence in rural communities, hence their minimal impact. In another study, Bamidele and Danlami (2021) also proved that access to microcredit institutions in the study area positively impacts poverty reduction. Nwakoby and Okanya (2021) argue that microfinance banks have impacted poverty alleviation, increasing people's living standards in Nigeria.

In a related study, Tabash and Dhankar (2014) examined the link between Islamic finance and economic growth in Qatar and found a long-run, positive and significant relationship between Islamic banks' financing and economic growth. Similarly, a strong positive association was established between Islamic banks' financing and economic growth in the UAE by Osmanovica, Kb and Stojanovic (2020). Furthermore, Tabash and Dhankar (2013) established a long-run positive and significant correlation between Islamic banks' financing and economic growth in Bahrain. These show that Islamic financing constitutes a viable instrument of countries' economic growth that taps from the goldmine of opportunities and facilities available in that place.

In an attempt to improve people's standard of living, countries consider the option of foreign direct investment (FDI). In his study, Akinmulegun (2012) found no significant relation between FDI and the standard of living in Nigeria. This is unlike Babarinde (2020) in Nigeria and Ek (2007) in China, who show that FDI has a significant positive effect on the countries' economic growth. Similarly, Chidoko and Sachirarwe (2015) also discovered that investment positively affects economic growth in Zimbabwe.

In summary, the empirical review reveals that predominant extant empirical studies focused on the credit functions of microfinance institutions and their role in economic growth/poverty reduction. Quite a number of empirical evidence supports the positive role of MFI in poverty reduction and the growth of the economy. However, some pockets of evidence still exist on the negative role. While most studies focused on poverty reduction, they only investigated the long-run impact of MFI on poverty reduction. Unlike the previous study, this current study is handy by examining both the long-run and short-run impacts of MFB on the standard of living in Nigeria. This study is situated within the ARDL model, while three cointegrating regression techniques, FMOLS, DOLS and CCR, constitute robustness checks.

1. Research Methodology

This research applied the Nigerian data set, secondary in nature, annual in frequency, for 1992 to 2018 obtained from the World Bank's World Development Indicators (WDI) and Central Bank of Nigeria (CBN)'s statistical bulletin. Using a time-series approach, the Autoregressive Distributed Lag (ARDL) was applied to determine the role of microfinance bank investment activity in the standard of living in Nigeria. Preliminary tests of the augmented Dickey-Fuller(ADF) unit root and Phillips-Perron (PP) unit root tests, and Johansen cointegration tests, were carried out before estimating the ARDL model. After that, models diagnostics (namely, normality, heteroscedasticity, serial correlation, model specification, and parameter stability tests) and three cointegrating regression techniques (Fully Modified Ordinary Least Squares, Dynamic Ordinary Least Squares, and Canonical Cointegrating Regression) were employed as robustness checks of the long-run ARDL estimates.

The variables of the study are described in Table 1. In the table, except SOL, all other variables are explanatory variables.

Table 1. Variables Description

Variable	Definition and Measurement	Source
SOL	The Standard of living is captured by GDP per capita. It is the ratio of GDP to the total population.	WDI
MFBIA	Microfinance investment activity is the total amount of investment of microfinance banks as presented in their Statement of Financial Position (SOFP).	CBN
MFBL	Microfinance bank loans and credit granted to their customers, as presented in their SOFP.	CBN
MFBD	Microfinance banks deposit liabilities, as presented in their SOFP.	CBN
TGEX	Total government expenditure-the amount of money in billion Naira expended by the Nigerian government within the economy. It is a control variable for the government sector.	CBN
INFR	The inflation rate is the consumer price index, annual per cent changes. It is used to control macroeconomic stability.	WDI

Source: Author's compilation from the literature review.

3.1. Model specification

Drawing from the work of Okafor (2016) on microfinance and the standard of living in Nigeria, this current study focuses on microfinance investment activities vis-à-vis their impacts on the standard of living in Nigeria. Thus, the standard of living is expressed as a function of microfinance bank investment, accompanied by other relevant explanatory variables, namely, microfinance bank loans, microfinance bank deposits, total government expenditure and inflation rate. The linear function of the stated relation is specified in equation (1) below.

$$SOL = MFBIA + MFBL + MFBD + TGEX + INFR \quad (1)$$

Econometrically, the linear equation specified in (1) is stated in equation (2), thus

$$SOL_t = MFBIA_t + MFBL_t + MFBD_t + TGEX_t + INFR_t + e_t \quad (2)$$

The ARDL model is specified in equation (3) below.

$$\begin{aligned}\Delta SOL_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\, \Delta SOL_{t-1} + \sum_{i=0}^{n} \beta_{2i}\, \Delta MFBIA_{t-i} + \sum_{i=0}^{n} \beta_{3i}\, \Delta MFBL_{t-i} + \sum_{i=0}^{n} \beta_{4i}\, \Delta MFBD_{t-i} \\ + \sum_{i=0}^{n} \beta_{5i}\, \Delta TGEX_{t-1} + \sum_{i=0}^{n} \beta_{6i}\, \Delta INFR_{t-1} + \Psi_1 SOL_{t-1} + \Psi_2 MFBIA_{t-1} + \Psi_3 MFBL_{t-1} \\ + \Psi_4 MFBD_{t-1} + \Psi_5 TGEX_{t-1} + \Psi_6 INFR_{t-1} + \Psi_7 ECT_t \\ + \mu_t \end{aligned} \quad (3)$$

Where;

Δ =first difference operator;
β_0 = the drift component;
μ_t = the error term;
β_1 - β_6 = the parameters of the short-run dynamics of the model;
Ψ_1 -Ψ_6 = the parameters of the long-run relationship;
Ψ_7 =the coefficient of the error correction term(ECT).

Theoretically, MFBIA, MFBL, MFBD, and TGEX, are expected to be positively signed with SOL, while INFR is expected to be negative.

4. Results and Discussions

4.1. Unit Root Test

The unit root properties of the time series data are examined prior to the actual estimation of the ARDL model. This is necessary to avoid the incursion of the problem of spurious regression. The augmented Dickey-Fuller (ADF) and Phillips-Peron (PP) unit root test results in Table 2 show that none of the variables is stationary at level, but they all became stationary after the first differences.

This implies that all the variables are integrated into the order one.

Table 2. Unit Root Tests

Variable		ADF Unit Root Test				PP Unit Root Test		
		I	T& I	I(d)		I	T& I	I(d)
SOL	Level	2.248 [0.999]	-1.160 [0.897]	I(1)	level	3.788 [1.000]	-1.157 [0.898]	I(1)
	Δ	-2.062 [0.260]	-3.542* [0.058]		Δ	-1.953 [0.304]	-3.879** [0.028]	
MFBIA	Level	0.671 [0.989]	-0.984 [0.929]	I(1)	level	0.671 [0.989]	-0.984 [0.929]	I(1)
	Δ	-4.602*** [0.001]	-5.148*** [0.001]		Δ	-4.601*** [0.001]	-5.149*** [0.001]	
MFBL	Level	2.429 [0.999]	0.239 [0.996]	I(1)	level	2.335 [0.999]	-0.260 [0.987]	I(1)
	Δ	-1.746 [0.395]	-5.415*** [0.001]		Δ	-4.419*** [0.002]	-9.952*** [0.000]	
MFBD	Level	3.735 [1.000]	0.317 [0.997]	I(1)	level	4.966 [1.000]	-0.533 [0.974]	I(1)
	Δ	-6.706*** [0.000]	-6.400*** [0.000]		Δ	-6.719*** [0.000]	-18.348*** [0.000]	
TGEX	Level	2.418 [0.999]	-0.580 [0.971]	I(1)	level	2.665 [1.000]	-0.434 [0.980]	I(1)
	Δ	-1.462 [0.534]	-4.917*** [0.003]		Δ	-3.843*** [0.007]	-4.972*** [0.002]	
INFR	Level	-1.979 [0.293]	-2.001 [0.573]	I(1)	level	-2.002 [0.283]	-2.001 [0.573]	I(1)
	Δ	-4.885*** [0.000]	-5.022*** [0.002]		Δ	-4.912*** [0.000]	-6.124*** [0.000]	

Source: Author's computation.

Note: [] represents p-value; Δ denotes first difference; I=intercept; T&I= Trend and Intercept.

4.2. Cointegration Tests

Johansen and F-Bounds tests are applied as tests of cointegration among the variables. Two versions of the Johansen's test (the trace and Max-eigenvalue) statistics reject the null hypothesis of no cointegration, favouring two co-integrating equations between the variables at the 0.05 level (see Table 3). This is because the respective calculated value exceeds the critical value at a 5% significance level. This suggests a cointegrating relationship between the variables. The F-Bounds test further buttressed this position (reported in Table 4).

Table 3. Johansen Cointegration Tests

Unrestricted Cointegration Rank: Trace Test					Maximum Eigenvalue		
Hypothesized		Trace	0.05		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**	Statistic	Critical Value	Prob.**
None	0.984	194.105*	95.753	0.000	103.639*	40.077	0.000
At most 1	0.851	90.466*	69.818	0.000	47.605*	33.876	0.000
At most 2	0.619	42.860	47.856	0.136	24.174	27.584	0.128
At most 3	0.376	18.685	29.797	0.515	11.804	21.131	0.567
At most 4	0.229	6.881	15.494	0.591	6.505	14.264	0.549
At most 5	0.014	0.375	3.841	0.539	0.375	3.841	0.539

* denotes rejection of the hypothesis at the 0.05 level. **MacKinnon-Haug-Michelis (1999) p-values

Source: Author's computation.

The null hypothesis of the relationship of the level in the Bounds test is rejected since the calculated F-statistics (26.548) exceeds the upper bound values at the three ideal levels of significance (4.15,

3.38, 3.00). This suggests a long-run relationship between standard of living and microfinance investment activity in Nigeria in the period under review.

Table 4. F-Bounds Cointegration Test

Test Statistic	**F-statistic**	**26.5485**	**K**	**5**
Critical Values		Level of Significance	Lower Bounds I(0)	Upper Bounds I(1)
		10%	2.08	3.00
		5%	2.39	3.38
		1%	3.06	4.15

Source: Author's computation.

4.3. ARDL Model Estimation

4.3.1. ARDL Long Run Estimates

The ARDL model results in Table 5 indicate the regression line intercept of ₦7981.374. The value is positive but non-statistically significant, with a very high P-value of 0.204. This shows that the per capita GDP in Nigeria will be constant at ₦7981.374 per annum when all the other variables are assumed unchanged. Microfinance investment activity in level form is positively signed (0.036) but not statistically related (0.202) to the standard of living, but its 1-year lagged value (-0.062) and p-value (0.080) show that microfinance bank investment activity (MFBIA (-1)) has a negative and statistically significant relationship with the standard of living in the long run. This implies that rather than raising the standard of living, microfinance investment activity hampers the standard of living in Nigeria at 6.23%. The microfinance loan (MFBL) coefficient is negative (-0.573) but statistically significant with a P-value of 0.007. This suggests that microfinance loans have a powerful negative connection with living standards in Nigeria in the long run. In other words, an inverse relationship exists between MFBL and SOL, such that a unit increase in microfinance loans to citizens will result in about an ₦0.57K decrease in per capita GDP in Nigeria in the long-run *ceteris paribus*. Microfinance deposits in both their current and 1-year lagged form (MFBD and MFBD (-1)) have positive coefficients (0.511 and 0.594) and p-values of 0.069 and 0.033, respectively. This implies that microfinance deposit promotes a standard of living in Nigeria. Government expenditure and inflation rate are positively and negatively signed with a coefficient of 2.176 and -21.774, respectively, but neither exerts significant influence on living standards in Nigeria in the long run.

Table 5. ARDL Model Estimation Results

Dependent Variable: SOL				
Model: ARDL(1, 1, 0, 1, 0, 0)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
SOL(-1)	0.933	0.080	11.659	0.000***
MFBIA	0.036	0.027	1.325	0.202
MFBIA(-1)	-0.062	0.033	-1.856	0.080*
MFBL	-0.573	0.189	-3.026	0.007***
MFBD	0.511	0.264	1.938	0.069*
MFBD(-1)	0.594	0.256	2.319	0.033**
GEX	2.176	7.476	0.291	0.774
INFR	-21.774	137.359	-0.158	0.875
C	7981.374	6047.989	1.319	0.204
F-statistic	1497.803			0.000***
R-squared (R^2)	0.998			
Adjusted R^2	0.997			
Durbin-Watson	2.070			

Source: Author's computation.
Note: ***, **, and * denote statistically significant at 1%, 5% and 10%.

Generally, in the long run, microfinance investment activity, microfinance loans, and microfinance deposits are significant determinants of the standard of living, with the first two endangering living standards but the last variable exerting a positive impact on living standards in Nigeria.

The Durbin-Watson (D.W) statistics of the ARDL model (in Table 5) is 2.07, and this is approximately 2; thus, we can conclude that there is an absence of serial correlation associated with the regression result. The F-statistics (1497.803) and an associated p-value (0.000) imply that the f-statistics is statistically significant at 1%. We can thus conclude that the overall fitness of the model is good and of high predictive power. The R-squared (0.998) shows that 99% of the variation in the dependent variable (standard of living) in the ARDL model is explained jointly by the explanatory variables.

4.3.2. ARDL Short Run and ECM Estimates

Table 6 shows that microfinance bank investment activity (MFBIA) has a coefficient of 0.036 and a p-value of 0.068. This suggests that microfinance bank investment activity has a statistically significant and positive relationship with living standards in the short run. Similarly, a microfinance bank deposit is positively signed (0.511) and is statistically significant (0.000) at 1%. This suggests that microfinance bank deposit spurs the standard of living in Nigeria in the short run. The error correction term (ECT) is correctly signed (with a coefficient of -0.066) and statistically significant at 1%. The model adjusts any disturbance to restore long-run equilibrium among the variables at 6.63% per annum.

Table 6. ARDL Short Run and Error Correction Regression

Dependent Variable: D(SOL)				
Model: ARDL(1, 1, 0, 1, 0, 0)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(MFBIA)	0.036	0.018	1.943	0.068*
D(MFBD)	0.511	0.110	4.615	0.000***
ECT	-0.066	0.004	-15.856	0.000***
R^2	0.813			
Adjusted R^2	0.796			
Durbin-Watson	2.070			

Source: Author's computation.
Note: *** and * denote statistically significant at 1% and 5%.

4.4. ARDL Model Post Estimation Diagnostics

A. Normality Test

The Jacque-Berra normality statistics (4.516) with its p-value (0.104) (as shown in Figure 1) leads to the non-rejection of the normality hypothesis. This confirms the normality of the estimated ARDL model.

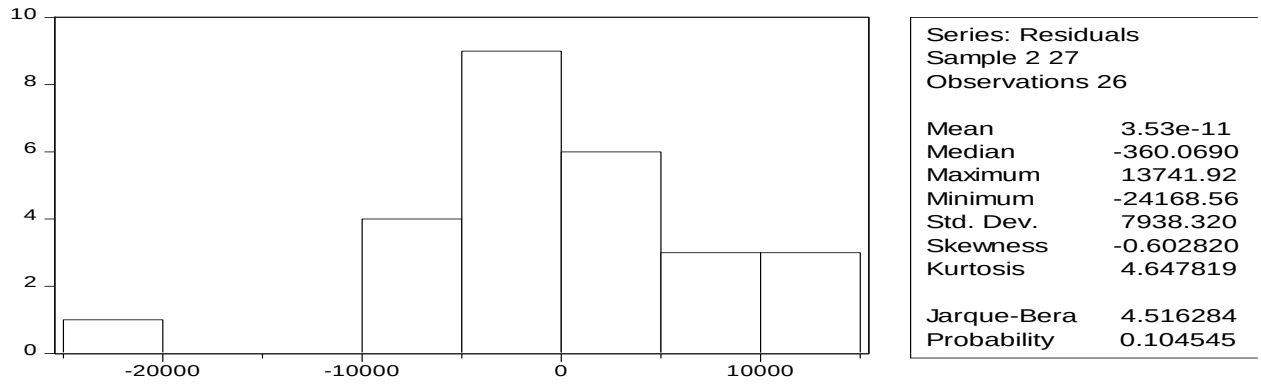

Figure 1. Normality-Histogram Test
Source: Author's design.

B. Heteroscedasticity Test

The Breusch-Pagan-Godfrey heteroscedasticity test (reported in Table 7) shows that F-statistic (1.231), Chi-square statistic (9.540) and scaled explained SS (7.439) have their p-values (0.339, 0.298 and 0.490) exceeding the ideal (1%, 5% and 10%). This led to the non-rejection of the hypothesis of no heteroscedasticity. This implies that the ARDL model is homoscedastic.

Table 7. Breusch-Pagan-Godfrey Heteroscedasticity Test

F-statistic	1.231	Prob. F(8,17)	0.339
Obs*R-squared	9.540	Prob. Chi-Square(8)	0.298
Scaled explained SS	7.439	Prob. Chi-Square(8)	0.490

Source: Author's computation.

C. Serial Correlation Tests

Table 8 reports the Breusch-Godfrey serial correlation LM test with F-statistic (0.464) and Chi-square statistic (1.515) having very high p-value (0.637 and 0.468). Therefore, the hypothesis of the absence of serial correlation is not rejected. It can be concluded that there is zero autocorrelation among the variables in the ARDL model.

Table 8. Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.464	Prob. F(2,15)	0.637
Obs*R-squared	1.515	Prob. Chi-Square(2)	0.468

Source: Author's computation.

D. Model Misspecification Error Test

In Table 9, the Ramsey Regression Equation Specification Error Test (RESET) test with t-statistic (0.815) and F-statistic (0.665) having high p-values of 0.426 each. Hence, the hypothesis of the absence of model misspecification error is not rejected, implying that the estimated ARDL model functional form is correctly specified.

Table 9. Ramsey RESET Test

	Value	Df	Probability
t-statistic	0.815	16	0.426
F-statistic	0.665	(1, 16)	0.426

Source: Author's computation.

E. Model Parameter Stability Test

The result of the model parameter stability test using the cumulative sum of recursive (CUSUM) residuals technique is depicted in Figure 2. The plot of the test in the graph lies within the 5% critical upper and lower bounds. This implies that the ARDL model parameters are relatively stable over time. Hence, its estimates are regarded as basically reliable, *ceteris paribus.*

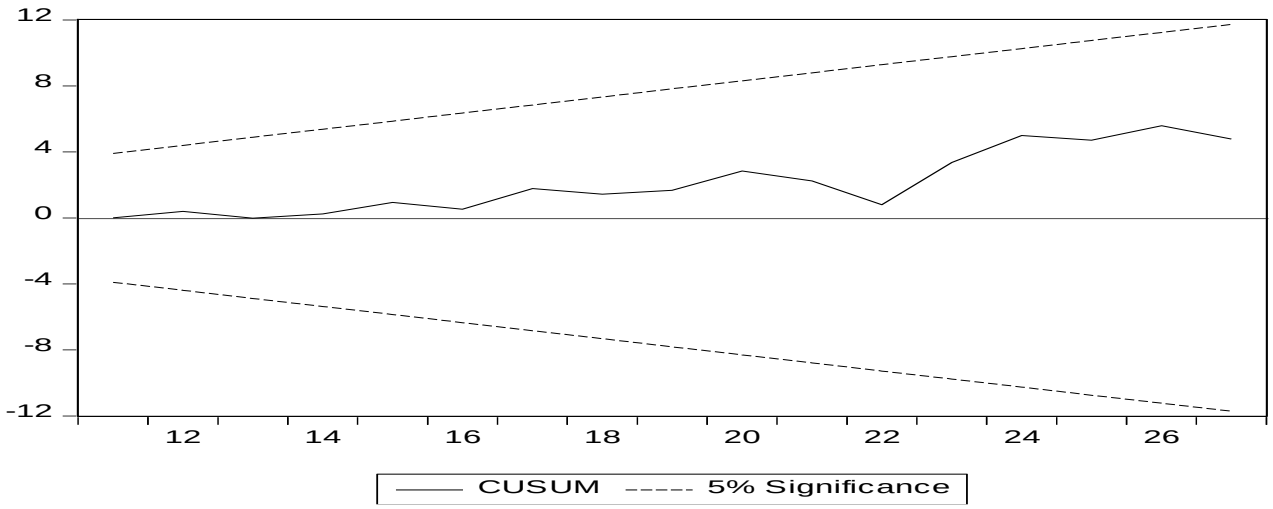

Figure 2. CUSUM Stability Test
Source: Author's design.

4.5. Model Robustness Checks

This study applied three cointegrating regression estimators, namely, FMOLS, DOLS and CCR, as robustness checks of the long-run estimates of the ARDL model. The results of the three cointegrating regression models (reported in Table 10) indicate that the current value of microfinance banks' investment activity, though positive, does not have a significant long-run impact on living standards in Nigeria. This further reinforces the non-significant but positive relationship between the current value of microfinance banks' investment activity and the standard of living in Nigeria, as shown by the ARDL long-run estimates (see Table 5).

Table 10. Model Robustness Checks

Dependent Variable: SOL						
	FMOLS Estimates		**DOLS Estimates**		**CCR Estimates**	
Variable	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**
MFIV	0.072	0.187	0.030	0.650	0.062	0.296
MFL	-0.355	0.438	-0.442	0.456	-0.490	0.378
MFD	0.820	0.228	1.502	0.197	1.222	0.271
GEX	70.855	0.000***	66.211	0.002***	64.598	0.000***
INFR	-235.038	0.495	-162.633	0.655	-255.141	0.473
C	14651.16	0.291	16706.63	0.302	16924.68	0.265
R-squared (R^2)	0.984	R-squared (R^2)	0.994	R-squared (R^2)	0.983	
Adj. R^2	0.980	Adjusted R^2	0.990	Adjusted R^2	0.979	

Source: Author's computation.

5. Conclusion

Drawing on annualized time-series data obtained from the Central Bank of Nigeria's statistical bulletin and World Development Indicators, we empirically evaluated the impact of microfinance

bank investment portfolios on the standard of living in Nigeria from 1992 to 2018.

The study shows that in the long run, microfinance investment activity, microfinance loans, and microfinance deposits are significant determinants of the standard of living, with the first two endangering living standards but the last variable exerting a positive impact on living standards in the country. However, in the short run, a microfinance bank investment portfolio has a statistically significant and positive relationship with the standard of living in Nigeria. Similarly, microfinance bank deposit spurs the standard of living in Nigeria in the short run. The error correction term (ECT) reveals that the model adjusts any disturbance to restore long-run equilibrium among the variables at 6.63% per annum.

Therefore, this study concludes that microfinance banks' investment activity is only a short term means of raising the standard of living in Nigeria, for in the long run, rather than increasing the living standards, microfinance banks' investment activity significantly reduces the standard of living in the long run in Nigeria. Therefore, in raising the standard of living in Nigeria, rather than using microfinance banks' investment approach, the microcredit approach should be embraced as most other studies reveal the positive nexus between it and economic growth and development and, by extension, standard of living. This may not be unconnected with the notion that most investment on the face of the Statement of Financial Position of these MFBs is mostly financially profit-oriented rather than socially beneficial. Suppose these investments made by MFBs will make the desired impact in the long run. In that case, there is a need for government and organized private sector and international donor organizations to partner with MFBs in assisting them in investing in portfolios designed to help them fulfil their social mission and attain their financial objectives.

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