Assessment of Credit Risk Management and Financial Performance of Microfinance Banks

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ABSTRACT

Many times, microfinance companies price credit incorrectly and fail to take all embedded costs into account, which increases the risks involved and makes mitigation a herculean task. This study used panel data from the income statement and balance sheet of the five selected Nigerian microfinance banks (five cross-sections) for ten (10) years spanning between 2012 and 2021 to examine the effect of credit risk management (via Non-performing loan to total deposit ratio, Non-performing loan to total loan and advance ratio, Capital adequacy ratio) on financial performance (proxied by returns on asset) while making provision for key control variables like Leverage ratio and Firm size. This study made use of panel data methodology and the random effect was found most appropriate for modeling the data. The result shows that credit risk management is not significant in explaining the performance of microfinance banks in Nigeria. This is evident from the fact that the selected banks were over-prudent in their credit risk management policy which includes not giving out enough loans and hence resulting in low income. The over-prudent credit risk management by these banks is evident from their descriptive statistics. The selected microfinance banks are keeping too much money as reserves. When banks are not using their assets (giving loans and advances) to generate income, they will eventually lose money. As long as it's tied to returns for microfinance banks, credit risk is not a bad thing. According to empirical theory, bank returns increase as risk increases, but the bank must moderate its risk and anticipate returns.

Keywords: Credit risk management, Non-performing loan to total deposit ratio, Non-performing loan to total loan and advance ratio, Capital adequacy ratio, Financial performance, Returns on asset

INTRODUCTION

The financial sector particularly microfinance is one of the key drivers of economic development in a country. In the quest for economic progress, particularly in a developing nation like Nigeria, their lending activities to people, Small and Medium-scale Enterprises (SMEs), and industries are essential (Afolabi, Obamuyi & Egbetunde, 2020; Kajola, Adedeji, Olabisi & Babatolu, 2018).

Microfinance banks are specific organizations that offer low-income people with severally financial and wealth management services which include micro-credit, savings, etc. intending to enhance the economic stability of small-scale businesses in urban as well as rural areas (Abubakar, Tobi & Abdullahi, 2020). However, due to their evolving nature and the challenging business climate in which these companies operate, microfinance banks just like any other conventional banks are faced with several risks (Ramazan & Gulden, 2019). The equity, liabilities, market value and profitability of these financial institutions could all be adversely affected by each of these risks (Koch & MacDonald, 2014). Credit risk, however, is one of the most momentous risks that confront banks generally since loans that these banks grant are the main source

of revenue for the banking industry (Ramazan & Gulden, 2019). Credit risk is probably the major risk confronting these institutions, and the sustainability of banks' operations rests more on how well this risk is managed (Gieseche, 2004). Due to the unexpected devaluation of the Naira against other foreign currencies, increase in global oil prices and drastic drop in equities market indices, banks in Nigeria have been put under strain because of the declining quality of their loan assets (BGL Banking Report, 2010). Microfinance institutions commonly find themselves wrongly pricing loans and neglecting to include all intrinsic costs; as a result, the risks incurred increase and are harder to offset (Sudi & Maniagi, 2020). Inaccurate credit grading and identification among these businesses are the cause of these issues. Vulnerability and defaulting become the norm as a result of the inadequate examination of the risks connected with loans and disregard for the impact on the organization. Managing these risks is what is referred to as credit risk management.

Credit risk management refers to the approaches, practices, and controls put in place at a company to achieve optimal receivables of customers' payments, hence lowering the risk of nonpayment (Mokogi, 2003). The long-term survival of a financial organization depends on the effectiveness of credit risk management, which is a vital part of a comprehensive risk management plan. It helps cut down on bank losses. As a crucial step in the lending process, credit risk management is fundamental for the banking sector, according to Misker (2015). Retaining credit risk exposure lowers bank risk while safeguarding the bank from the detrimental effects of credit risk. Any institution that offers financial services, particularly the microfinance business, must have a strong credit risk management program. Operational credit risk management occurs, when a microfinance institution has set policies or measures to govern their actions when extending credits in ways that minimize the detrimental effect on their capital and incomes (Abubakar, Tobi & Abdullahi, 2020).

Financial performance, on the other hand, is commonly defined as a firm's stability and profitability. The risk elements are referred to as its stability, and the financial return is referred to as its profitability (Mohamed & Onyiego, 2018). Financial performance, which is assessed by net income and cash from operations, refers to a firm's capacity to make fresh resources from ongoing operations over a given time (Danson, 2012; Ally, 2013). The amount of money a firm makes or loses over a specific period is measured by its financial performance. To evaluate the financial performance of banks, various metrics have been employed. These measures include Net Interest Margin (NIM), Return on Asset (ROA), and Return on Equity (ROE) (Murthy & Sree, 2003; Alexandru, Genu & Romanescu, 2008).

The nexus between credit risk management and financial performance has been established and empirical works of the literature show that credit risk management has a positive effect on the financial performance of banks (Abubakar, Tobi & Abdullahi, 2020; Kajola, Adedeji, Olabisi & Babatolu, 2018; Kurawa & Garba, 2014; Asfaw & Veni, 2015; Harcourt, 2017). Bank failures will be eliminated if risks are well-managed in banks, and the economy would be steady (Jaseviciene & Valiuliene, 2013). Controlling the non-performance of advances is essential for the functioning of a specific microfinance foundation and the financial environment of the economy (Kangethe, Oluoch, & Nyangau, 2019).

Even though many studies have looked at the effect of credit risk management on the financial performance of banks, the majority of the studies are centered on commercial banks. Very few studies have considered microfinance banks. Also, to the best of my knowledge, there seems to be no study that has investigated how the financial performance of microfinance banks (dependent variable measured by ROA) is influenced by credit risk management (independent variable) in terms of Non-performing loan to total deposit ratio, Non-performing loan to total loan and advances ratio, Capital adequacy ratio while allowing for control variables such as Leverage ratio and Firm size. Against this background, this article aims at investigating the effect of credit risk management on the financial performance of Microfinance banks in Nigeria. Consequent to that, this article specifically:

1. Investigate the effect of Non-performing loan to total deposit ratio on the financial performance of

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Microfinance banks in Nigeria.
2. Ascertain the effect of Non-performing loans to total loan and advance ratio on the financial performance of Microfinance banks in Nigeria.
3. Analyze the effect of the Capital adequacy ratio on the financial performance of Microfinance banks in Nigeria.

This article is divided into five parts. A general summary of the study is given in Section 1 (problem statement and research objectives), and the empirical assessment of relevant literature is presented in Section 2. Materials and methods are covered in Section 3. Data analysis and empirical findings are described in Section 4. The last section which is Section 5 contains the study's conclusions and recommendations for policy.

LITERATURE REVIEW

Abubakar, Tobi, and Abdullahi (2020) analyzed the impact of credit risk management on the financial performance of Nigerian-listed microfinance banks. Data were acquired from two microfinance banks listed on the Nigerian Stock Exchange from 2012 to 2017 through their annual reports and accounts. Using multiple regression, panel regression, and Pearson correlation, the collected data were statistically analyzed. The results showed that the loan loss provision ratio, and capital adequacy ratio indirectly and significantly predicted the financial performance of the selected. However, the non-performing loan to total loan ratio showed to be a positive and significant predictor of financial performance. Bank size and inflation are the two controls that are unrelated to financial performance. According to the anticipated income theory that underpins this study, credit risk management was found to have a substantial impact on the financial performance of microfinance banks in Nigeria.

Sudi and Maniagi (2020) analyzed the effect of credit risk management techniques on the financial performance of Nairobi microfinance enterprises. The study's specific objective was to determine the effect of credit reminder practices, credit risk control practices, viability identification practices, and credit risk grading practices on the financial performance of Kenyan microfinance enterprises. With a sample size of 96 replies, this study's population consisted of 1147 employees of Nairobi's microfinance organizations. Utilizing questionnaires distributed to each branch's branch managers and credit managers, this study gathered primary data. The results of the study supported that all the enlisted credit risk measures were the significant determinant of the performance of Kenyan microfinance firms. The study suggests that organizations should concentrate more on strengthening credit risk management techniques to be more competitive and handle more volatile environments. To improve performance, organizations should streamline their risk management culture.

In Nairobi County, Kenya, Kangethe, Oluoch, and Nyangau (2019) assessed the effect of credit risk management on the loan performance of deposit-taking Microfinance organizations. All 13 of Nairobi's microfinance institutions that accept deposits served as the study's target population. The Krejcie and Morgan (1970) method was used to select a sample of 118 microfinance employees. The study found that changes in credit evaluation techniques, credit risk management, credit terms, and credit approvals significantly affect how well microfinance organizations perform in terms of their loan performance. According to study findings, microfinance institutions should enhance their processes for recognizing, analyzing and assessing risks emerging from credits.

The impact of credit risk management on the financial performance of ten Nigerian-listed deposit money banks from 2005 to 2016 was quantitatively examined by Kajola, Adedeji, Olabisi, and Babatolu (2018). The independent variable, credit risk management, was substituted by three factors: Capital Adequacy Ratio, Non-performing Loan to total Deposit Ratio and Non-performing Loan to Total Loan Ratio. The study made use of two financial performance measures which include Return on Equity and Return on

Asset. The findings revealed that proposed credit risk measures show a noteworthy link with financial performance. Based on the study's findings, deposit money bank management should implement strict credit rules that would assist banks in efficiently evaluating the creditworthiness of their clients. Current methods for monitoring, detecting, and controlling credit risk should be developed by regulatory bodies.

Juma, Otuya and Kibati (2018)focused on how credit management (debt recovery and credit standard) impacted the financial performance of deposit-taking SACCOS in Nakuru town. About 74 workers were sampled out of the total population consisting of 220 staff. Employees completed questionnaires to collect the data. The simple linear regression analysis showed that credit management (debt recovery and credit standard) has a significant impact on the SACCOS' financial performance. According to the article's findings, all the investigated constructs are significant in explaining SACCO's financial performance. According to the report, SACCOs should improve debt recovery procedures and establish efficient credit management standards.

MATERIALS AND METHODS

The secondary data for this article were gotten from the income statement and balance sheets of the selected microfinance banks in Nigeria. The data contained a panel data of five microfinance banks (five cross-sections) for ten (10) years spanning between 2012 and 2021 for some credit risk management indicators such as Non-performing loan to total deposit ratio, Non-performing loan to total loan and advance ratio, Capital adequacy ratio. The data also captured the financial performance indicator which is returns on assets and finally the control variables such as Leverage ratio and Firm size.

Multiple regression analysis was done in this study. Using the panel data regression approach, the models are estimated. The three commonlyadopted regression models (i.e. fixed effect and random effect method, pooled OLS) for panel data were employed to examine the causal link between the response and predictor variables. Table 1 below provides an overview of the model option.

Table 1: Model Selection Criteria

Fixed Effect	**Random Effect**	**Selection**
If no fixed effect	If no random effect	Choose the Pooled OLS
If there is a fixed effect	If no random effect	Select fixed effect model
If no fixed effect	If there is a random effect	Choose the Random effect model
If there is a fixed effect	If there is a random effect	Use Hausman test to select the best model from eitherfixed or random effect

Source: Park, 2011.

The regression equation for this work is specified as:

Where are the regression coefficients, Return on asset (ROA), Non-performing loan to total deposit ratio (ND), Non-performing loan to total loan and advance ratio (NT), Capital adequacy ratio (CA). The data will also capture the financial performance indicator which is returns on assets and finally, the control variables such as Leverage ratio (LR), Firm size (FZ), and ? is the error term. Variables Description and Formulas are accessible in Table 2 below

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Table 2: Variables Description and Formulas

Variables	Classification	Description
Return on asset (ROA)	Dependent Variable	It offers details on how well management has made revenue fromthe company's assets. ROA=Profit after tax/Total Asset
Non-performing loan to total depositratio (ND)	Independent Variable	This is an effective method of managing credit risk. An extremelylow ratio indicates minimal risk for the bank, but it also indicates that it is not employing its assets to create revenue and might evenexperience a financial loss. ND=Non-performing loan/Total deposit.
Non-performing loan to total loan andadvance ratio (NT)	Independent Variable	This represents the proportion of non-performing loans in a bank's loan portfolio compared to all of its outstanding debt.NT=Non-performing loan/Total loan and advance.
Capital adequacy ratio (CA)	Independent Variable	It is a measure of the bank's long-term ability to meet its commitments. CA=Shareholders' fund/Total assets.
Leverage ratio (LR)	Control Variable	This is used to evaluate a company's capacity to fulfill itsfinancial obligations. LR= Long-term debts/Total assets
Firm size (FZ)	Control Variable	Firm size is frequently cited as a crucial, essential firm attribute. Itis the **extent of available resources.** FZ=Log of Total Asset

DATA ANALYSIS AND RESULT

The panel data of five microfinance banks (five cross sections) for a ten (10) year interval spanning from 2012 to 2021 is presented below. These include data on Return on asset (ROA), Non-performing loan tototal deposit ratio (ND), Non-performing loan to total loan and advance ratio (NT), Capital adequacy ratio (CA), Leverage ratio (LR), and Firm size (FZ).

Table 3: The Data

Microfinance banks	Years	Deposit Amount (N'000)	Non-performing loan amount (N'000)	Loan and advances Amount (Net)(N'000)	Shareholders fund (N'000)	Total Asset (N'000)	Long term debt (N'000)	Profit After tax (N'000)
NPF MFB	2012	3,271,585	93,049	4,780,335	3,850,844	7,790,984		535,541
	2013	3,858,052	126,460	5,559,453	3,916,894	8,680,638		391,320
	2014	4,803,374	140,184	6,527,210	4,079,893	10,865,189	499,113	477,816
	2015	6,610,113	287,288	7,881,519	4,251,493	12,334,021	630,795	514,598
	2016	6,792,391	163,058	9,095,801	4,652,289	12,361,872	349,249	554,903
	2017	9,095,801	178,052	9,008,675	4,652,289	15,952,341	1,550,468	631,890
	2018	10,465,119	860,250	10,593,635	4,646,591	17,597,552	2,078,843	195,749
	2019	11,327,058	946,724	13,776,931	5,327,939	19,583,717	1,965,665	796,425
	2020	14,838,805	495,507	16,667,615	5,481,584	25,096,975	2,995,809	614,417
	2021	16,278,901	529,548	17,447,816	5,730,965	31,967,345	2,708,090	707,493
ACCION MFB	2012	543,310	432,299	1,886,176	1,418,739	2,704,335	182,364	284,683
	2013	1,048,751	500,642	3,025,012	1,639,619	3,953,163	479,550	392,948
	2014	1,421,819	277,945	3,975,266	2,567,489	5,086,236	554,614	622,555
	2015	2,120,599	681,556	5,294,462	3,000,360	6,789,014	1,087,259	545,941
	2016	2,013,517	952,251	5,826,119	3,359,645	7,538,090	1,177,734	538,220
	2017	2,392,578	880,702	6,959,938	3,905,640	8,746,431	1,474,453	809,761
	2018	2,809,253	1,084,099	8,219,748	4,609,714	11,012,082	2,349,494	1,050,137
	2019	4,013,511	1,080,765	9,394,157	5,245,587	12,216,158	1,975,445	915,342
	2020	4,309,677	1,471,411	8,337,995	5,365,527	12,881,605	2,538,050	132,007
	2021	3,810,250	1,797,184	11,674,684	5,936,384	14,719,897	3,687,058	570,857

INFINITY MFB	**2012**	222,481	12,993	305,496	163,236	484,935	80,625	76,548
	2013	256,456	12,959	391,664	224,639	590,143	88,125	76,998
	2014	267,716	15,540	523,729	321,952	708,168	99,533	113,681
	2015	340,407	22,146	682,939	402,688	955,898	188,791	86,950
	2016	381,699	27,984	759,912	502,728	1,080,915	140,799	110,104
	2017	505,600	48,908	874,298	611,568	1,269,190	112,225	121,337
	2018	642,860	54,931	1,126,357	720,240	1,570,713	164,250	113,779
	2019	781,370	57,303	1,403,000	857,308	1,850,615	147,472	145,940
	2020	896,822	132,620	1,842,208	955,108	1,639,215	659,792	107,114
	2021	970,822	153,219	2,114,743	1,131,436	3,122,710	836,892	185,642
CAPSTONE MFB	**2012**	92,272	77	126,960	55,747	150,720	0	1,576
	2013	101,425	420	183,403	58,003	169,102	0	2,256
	2014	148,497	2,020	111,936	58,765	279,072	50,000	1,411
	2015	246,258	3,280	261,519	116,241	446,037	75,000	5,568
	2016	176,996	4,070	287,864	115,189	348,845	50,000	-1,002
	2017	203,299	3,450	311,227	115,236	374,995	50,000	47
	2018	277,059	7,100	259,639	115,431	398,572	-	194
	2019	356,768	7,115	382,583	115,738	477,251	-	307
	2020	320,079	15,903	314,986	118,925	542,917	-	3,188
	2021	312,188	25,271	376,626	125,767	542,195	-	6,841
ASHA MFB	**2012**	366,992	692	563,394	341,554	823,475	0	135,865
	2013	550,412	701	794,198	474,554	1,112,600	0	133,192
	2014	649,035	1,200	1,141,623	714,055	1,534,328	0	239,309
	2015	773,540	580	1,488,824	623,850	2,262,241	310,667	239,286
	2016	735,909	1,156	1,363,310	855,677	2,071,126	312,435	231,827
	2017	876,295	3,910	1,828,185	855,677	2,071,126	346,037	237,004
	2018	1,010,987	17,360	2,232,894	920,681	3,730,463	3,714	563,193
	2019	1,263,569	84,530	2,866,285	3,170,340	5,109,735		506,954
	2020	4,596,335	1,042,535	12,158,811	7,421,158	15,486,249	1,165,498	57,211
	2021	5,939,986	1,295,096	16,182,363	10,176,146	19,513,335	-	2,648,385

Source: Balance sheet and income statement for the selected Microfinance banks

Table 4: Descriptive statistics of Data

	ROA	**ND**	**NT**	**CA**	**LR**	**FZ**
Mean	0.068144	0.123270	0.054090	0.384038	0.102658	6.426904
Median	0.070050	0.054250	0.032750	0.413100	0.106800	6.393300
Maximum	0.165000	0.795700	0.229200	0.620500	0.402500	7.504700
Minimum	-0.002900	0.000700	0.000400	0.179300	0.000000	5.178200
Std. Dev.	0.050775	0.168225	0.054810	0.102172	0.087462	0.647206
Skewness	0.241322	1.987099	1.323594	-0.106085	0.750599	-0.135165
Kurtosis	1.912587	6.917262	4.063095	2.410009	4.047879	1.791922
Jarque-Bera	2.948778	64.87331	16.95369	0.818971	6.982596	3.192771
Probability	0.228919	0.000000	0.000208	0.663992	0.030461	0.202628
Sum	3.407200	6.163500	2.704500	19.20190	5.132900	321.3452
Sum Sq. Dev.	0.126328	1.386683	0.147205	0.511513	0.374830	20.52489
Observations	50	50	50	50	50	50

Source: Eviews 9.0. Output (Computed by the Author)

The table demonstrates that the average for ROA, ND, NT, CA, LR and FZclusters around 0.068144, 0.123270, 0.054090, 0.384038, 0.102658 and 6.426904respectively. As a result, since the means of each

series are consistently between its maximum and lowest values, all of the series display high levels of consistency.In addition, the computed average ROA is an indication the selected microfinance banks are performing well financially. All the computed credit risk management measures also show that the selected banks have been prudent in credit risk management practices. This is an indication of a significant reduction in credit risk. ROA, ND, NT, and LR are all positively skewed, suggesting that the series' extent of departure demonstrates an upward trend from 2012 to 2021. But CA and FZ are negatively skewed. ROA, CA, and FZ have a platykurtic distribution (Kurtosis < 3) but ND, NT and LR have a leptokurtic distribution (Kurtosis < 3). This shows that all the series are not normally distributed.

The three mostadopted regression models (fixed effect and random effect method, pooled OLS) for panel data were employed to examine the causal link between the response and predictor variables. In case the fixed and random effects don't work, pooled OLS estimation was also done. The researcher first contrasted the random effects with the alternative, the fixed effect, to determine between fixed and random effects. Table 5 below provides an overview of the model selection.

Table 5: Regression Results

	Fixed Effect Model		**Random Effect Model**		**Pooled OLS**	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
const	0.423951	<0.0001	0.403336	<0.0001	?0.0376513	0.5963
ND	0.106874	0.2323	0.114879	0.1862	0.265508	0.0839
NT	?0.515017	0.0780	?0.533137	0.0571	?0.958416	0.0468
CA	?0.0602014	0.1933	?0.0546043	0.2237	0.230682	0.0018
LR	?0.124711	0.0156	?0.122497	0.0118	0.0275592	0.7268
FZ	?0.0474877	0.0023	?0.0446508	0.0015	0.00521129	0.6375
Goodness of Fit						
Mean dependent var		0.068144		0.068144		0.068144
Sum squared resid		0.020602		0.216441		0.085423
R-squared		0.836882				0.323657
LSDV F(9, 40)		22.80238				
F(5, 44)						4.211157
Log-likelihood		123.9128		65.11457		88.35713
Schwarz criterion		?208.7054		?106.7570		?153.2421
rho		0.063552		0.063552		0.570298
S.D. dependent var		0.050770		0.050770		0.050770
S.E. of regression		0.022695		0.069353		0.044062
Within R-squared		0.522788				
Adjusted R-squared						0.050770
P-value(F)		0.000000				0.044062
Akaike criterion		?227.8256		?118.2291		0.050770
Hannan-Quinn		?220.5445		?113.8605		0.044062
Durbin-Watson		1.154069		1.154069		0.050770
Breusch-Pagan test(p-value)				0.000118		
Hausman test				**0.424785**(p>0.05)		

Source: Researcher computation using Gretl Econometric Software

This section compares the results of the three most used panel regression models. First, the Fixed Effect model was compared with the Random Effects model. The outcomes revealed that both the fixed and random effect models have a good fit. The fixed effect model's goodness of fit was determined using the LSDV F(9, 40) = 22.80238 ($p<0.05$). Likewise, The Breusch-Pagan test ($p<0.05$) was also used for determining the fit for a random effect. Since both Fixed and Random Effect models have a good fit; a Hausman's test was carried out. Hausman's test shows that the Random Effect model has a better fit than the Fixed Effect model, consequently, the interpretation of the result is based on the random effect model.

Regarding to the selected random effect model, the findings shows that ND ($?_1$ =0.114879, $p> 0.05$), NT ($?_2$ =?0.533137, $p> 0.05$)and CA ($?_3$=?0.0546043, $p> 0.05$)have an insignificant effect on ROA. This is an indication that the credit risk management measure is not a significant predictor of the financial performance of microfinance banks in Nigeria. However, LR ($?_4$=0.114879, $p< 0.05$), NT ($?_5$=?0.533137, $p< 0.05$) has a significant effect on ROA.

As suggested by the formulated specific objectives of the study, the result shows that the financial performance of Microfinance institutions in Nigeria is not significantly influenced Non-performing loan-to-total deposit ratio, Non-performing loan-to-total loan and advance ratio, and Capital adequacy ratio.

CONCLUSION AND RECOMMENDATION

This article used panel data from five microfinance banks to explore the connection between credit risk management (an independent variable) and financial performance (a dependent variable) of microfinance banks in Nigeria. The researcher found it easy to compare the study's findings to earlier research and more recent studies on the topic.

According to the findings, it is concluded that credit risk management has no significant effect on the performance of microfinance institutions in Nigeria. This study outcome is divergent from the work of Abubakar, et al (2020); Kajola, et al (2018). The implication of these findings is that the selected banks were over-prudent in their credit risk management policy which includes not giving out enough loans and hence resulting in low income. These banks' over-prudent credit risk management is evident from their descriptive statistics. The selected microfinance is keeping too much money as a reserve. When banks are not using their assets (giving loans and advances) to generate income, they will eventually lose money. As long as it's tied to returns for microfinance banks, credit risk is not a bad thing. According to empirical theory, bank returns increase as risk increases, but the bank must moderate its risk and anticipate returns. That is, a microfinance bank needs to keep a healthy balance and plan for its profits. In addition to this, the microfinance bank is required to maintain a sizable capital reserve to cover credit risk in the event of failure. To reduce the risk of default, the microfinance bank must also enhance its credit mitigation practices, portfolio grading, and lending standards. Between reserves and loan disbursements, good credit risk management should strike a balance.

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APPENDIX

Raw Data

Microfinance banks	Years	Deposit Amount (N'000)	Non-performing loan amount (N'000)	Loan and advances Amount (Net)(N'000)	Shareholders fund (N'000)	Total Asset (N'000)	Long term debt (N'000)	Profit After tax (N'000)
NPF MFB	2012	3,271,585	93,049	4,780,335	3,850,844	7,790,984		535,541
	2013	3,858,052	126,460	5,559,453	3,916,894	8,680,638		391,320
	2014	4,803,374	140,184	6,527,210	4,079,893	10,865,189	499,113	477,816
	2015	6,610,113	287,288	7,881,519	4,251,493	12,334,021	630,795	514,598
	2016	6,792,391	163,058	9,095,801	4,652,289	12,361,872	349,249	554,903
	2017	9,095,801	178,052	9,008,675	4,652,289	15,952,341	1,550,468	631,890
	2018	10,465,119	860,250	10,593,635	4,646,591	17,597,552	2,078,843	195,749
	2019	11,327,058	946,724	13,776,931	5,327,939	19,583,717	1,965,665	796,425
	2020	14,838,805	495,507	16,667,615	5,481,584	25,096,975	2,995,809	614,417
	2021	16,278,901	529,548	17,447,816	5,730,965	31,967,345	2,708,090	707,493
ACCION MFB	2012	543,310	432,299	1,886,176	1,418,739	2,704,335	182,364	284,683
	2013	1,048,751	500,642	3,025,012	1,639,619	3,953,163	479,550	392,948
	2014	1,421,819	277,945	3,975,266	2,567,489	5,086,236	554,614	622,555
	2015	2,120,599	681,556	5,294,462	3,000,360	6,789,014	1,087,259	545,941
	2016	2,013,517	952,251	5,826,119	3,359,645	7,538,090	1,177,734	538,220
	2017	2,392,578	880,702	6,959,938	3,905,640	8,746,431	1,474,453	809,761
	2018	2,809,253	1,084,099	8,219,748	4,609,714	11,012,082	2,349,494	1,050,137
	2019	4,013,511	1,080,765	9,394,157	5,245,587	12,216,158	1,975,445	915,342
	2020	4,309,677	1,471,411	8,337,995	5,365,527	12,881,605	2,538,050	132,007
	2021	3,810,250	1,797,184	11,674,684	5,936,384	14,719,897	3,687,058	570,857
INFINITY MFB	2012	222,481	12,993	305,496	163,236	484,935	80,625	76,548
	2013	256,456	12,959	391,664	224,639	590,143	88,125	76,998
	2014	267,716	15,540	523,729	321,952	708,168	99,533	113,681
	2015	340,407	22,146	682,939	402,688	955,898	188,791	86,950
	2016	381,699	27,984	759,912	502,728	1,080,915	140,799	110,104
	2017	505,600	48,908	874,298	611,568	1,269,190	112,225	121,337
	2018	642,860	54,931	1,126,357	720,240	1,570,713	164,250	113,779
	2019	781,370	57,303	1,403,000	857,308	1,850,615	147,472	145,940
	2020	896,822	132,620	1,842,208	955,108	1,639,215	659,792	107,114
	2021	970,822	153,219	2,114,743	1,131,436	3,122,710	836,892	185,642

CAPSTONE MFB	**2012**	92,272	77	126,960	55,747	150,720	0	1,576
	2013	101,425	420	183,403	58,003	169,102	0	2,256
	2014	148,497	2,020	111,936	58,765	279,072	50,000	1,411
	2015	246,258	3,280	261,519	116,241	446,037	75,000	5,568
	2016	176,996	4,070	287,864	115,189	348,845	50,000	-1,002
	2017	203,299	3,450	311,227	115,236	374,995	50,000	47
	2018	277,059	7,100	259,639	115,431	398,572	–	194
	2019	356,768	7,115	382,583	115,738	477,251	–	307
	2020	320,079	15,903	314,986	118,925	542,917	–	3,188
	2021	312,188	25,271	376,626	125,767	542,195	–	6,841
ASHA MFB	**2012**	366,992	692	563,394	341,554	823,475	0	135,865
	2013	550,412	701	794,198	474,554	1,112,600	0	133,192
	2014	649,035	1,200	1,141,623	714,055	1,534,328	0	239,309
	2015	773,540	580	1,488,824	623,850	2,262,241	310,667	239,286
	2016	735,909	1,156	1,363,310	855,677	2,071,126	312,435	231,827
	2017	876,295	3,910	1,828,185	855,677	2,071,126	346,037	237,004
	2018	1,010,987	17,360	2,232,894	920,681	3,730,463	3,714	563,193
	2019	1,263,569	84,530	2,866,285	3,170,340	5,109,735		506,954
	2020	4,596,335	1,042,535	12,158,811	7,421,158	15,486,249	1,165,498	57,211
	2021	5,939,986	1,295,096	16,182,363	10,176,146	19,513,335	–	2,648,385

Descriptive stat

	ROA	ND	NT	CA	LR	FZ
Mean	0.068144	0.123270	0.054090	0.384038	0.102658	6.426904
Median	0.070050	0.054250	0.032750	0.413100	0.106800	6.393300
Maximum	0.165000	0.795700	0.229200	0.620500	0.402500	7.504700
Minimum	-0.002900	0.000700	0.000400	0.179300	0.000000	5.178200
Std. Dev.	0.050775	0.168225	0.054810	0.102172	0.087462	0.647206
Skewness	0.241322	1.987099	1.323594	-0.106085	0.750599	-0.135165
Kurtosis	1.912587	6.917262	4.063095	2.410009	4.047879	1.791922
Jarque-Bera	2.948778	64.87331	16.95369	0.818971	6.982596	3.192771
Probability	0.228919	0.000000	0.000208	0.663992	0.030461	0.202628
Sum	3.407200	6.163500	2.704500	19.20190	5.132900	321.3452
Sum Sq. Dev.	0.126328	1.386683	0.147205	0.511513	0.374830	20.52489
Observations	50	50	50	50	50	50

Model: Fixed-effects, using 50 observations

Included 5 cross-sectional units

Time-series length = 10

Dependent variable: ROA

	Coefficient	Std. Error	t-ratio	p-value	
const	0.423951	0.0906734	4.676	<0.0001	***
ND	0.106874	0.0881225	1.213	0.2323	
NT	−0.515017	0.284715	−1.809	0.0780	*
CA	−0.0602014	0.0455001	−1.323	0.1933	
LR	−0.124711	0.0493918	−2.525	0.0156	**
FZ	−0.0474877	0.0145887	−3.255	0.0023	***

Mean dependent var	0.068144	S.D. dependent var	0.050770
Sum squared resid	0.020602	S.E. of regression	0.022695
LSDV R-squared	0.836882	Within R-squared	0.522788
LSDV F(9, 40)	22.80238	P-value(F)	4.39e-13
Log-likelihood	123.9128	Akaike criterion	−227.8256
Schwarz criterion	−208.7054	Hannan-Quinn	−220.5445
rho	0.063552	Durbin-Watson	1.154069

Joint test on named regressors –

Test statistic: F(5, 40) = 8.76402

with p-value = P(F(5, 40) > 8.76402) = 1.11435e-05

Test for differing group intercepts –

Null hypothesis: The groups have a common intercept

Test statistic: F(4, 40) = 31.4634

with p-value = P(F(4, 40) > 31.4634) = 7.17103e-12

Model: Random-effects (GLS), using 50 observations

Included 5 cross-sectional units

Time-series length = 10

Dependent variable: ROA

	Coefficient	Std. Error	z	p-value	
const	0.403336	0.0946590	4.261	<0.0001	***
ND	0.114879	0.0869070	1.322	0.1862	
NT	−0.533137	0.280183	−1.903	0.0571	*
CA	−0.0546043	0.0448754	−1.217	0.2237	
LR	−0.122497	0.0486294	−2.519	0.0118	**
FZ	−0.0446508	0.0141062	−3.165	0.0015	***

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Mean dependent var	0.068144	S.D. dependent var	0.050770
Sum squared resid	0.216441	S.E. of regression	0.069353
Log-likelihood	65.11457	Akaike criterion	−118.2291
Schwarz criterion	−106.7570	Hannan-Quinn	−113.8605
rho	0.063552	Durbin-Watson	1.154069

'Between' variance = 0.00516255

'Within' variance = 0.00041204

theta used for quasi-demeaning = 0.911016

Joint test on named regressors –

Asymptotic test statistic: Chi-square(5) = 42.8935

with p-value = 3.88328e-08

Breusch-Pagan test –

Null hypothesis: Variance of the unit-specific error = 0

Asymptotic test statistic: Chi-square(1) = 14.8249

with p-value = 0.00011797

Hausman test –

Null hypothesis: GLS estimates are consistent

Asymptotic test statistic: Chi-square(4) = 3.86357

with p-value = 0.424785

Model: Pooled OLS, using 50 observations

Included 5 cross-sectional units

Time-series length = 10

Dependent variable: ROA

	Coefficient	Std. Error	t-ratio	p-value	
const	−0.0376513	0.0705560	−0.5336	0.5963	
ND	0.265508	0.150105	1.769	0.0839	*
NT	−0.958416	0.468476	−2.046	0.0468	**
CA	0.230682	0.0693629	3.326	0.0018	***
LR	0.0275592	0.0783920	0.3516	0.7268	
FZ	0.00521129	0.0109818	0.4745	0.6375	

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Mean dependent var	0.068144	S.D. dependent var	0.050770
Sum squared resid	0.085423	S.E. of regression	0.044062
R-squared	0.323657	Adjusted R-squared	0.050770
F(5, 44)	4.211157	P-value(F)	0.044062
Log-likelihood	88.35713	Akaike criterion	0.050770
Schwarz criterion	−153.2421	Hannan-Quinn	0.044062
rho	0.570298	Durbin-Watson	0.050770