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Determinants of the Performance of South Africa's Microfinance Institutions: A fixed effects approach

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[1]Tintswalo Mohlala
Tintswalo.Mohlala@fnb.co.za

[2]Godfrey Marozva
marozg@unisa.ac.za

&

[3]Tsholofelo Legotlo
legottg@unisa.ac.za

[1,2&3]Department of Finance, Risk Management and Banking, University of South Africa

Abstract

Microfinance institutions (MFIs) play a vital role in alleviating poverty by providing financial services to economically disadvantaged populations while maintaining financial sustainability. Although numerous studies have explored the relationship between the performance of microfinance institutions (MFIs) and its determinants, few, if any, have examined this nexus within the context of a pandemic. Furthermore, the landscape of microfinance institutions has evolved over time, as have the factors influencing their performance. This study examines the factors influencing MFI performance in South Africa from 2008 to 2020. The findings reveal that macroeconomic variables significantly impact MFI performance. As expected, economic growth enhances MFI profitability, indicating its crucial role in shaping institutional success. Additionally, the customer base for MFIs expands as unemployment rises, ultimately leading to improved performance. However, inflation and exchange rate fluctuations negatively affect MFI performance. Microeconomic factors also influence MFI performance, though their effects vary by profitability metric. Institutional size

and operational efficiency positively contribute to performance, whereas loan growth has a negative impact. These findings provide valuable insights for policymakers, emphasizing the key determinants of MFI sustainability. Strengthening these factors can support the long-term viability of MFIs, thereby fostering economic growth and poverty reduction.

Keywords: *Performance, profitability, MFIs, fixed effects, micro- and macro-economic factors.*

1. Introduction

Microfinance emerged as a significant commercial model in 1983 when the Grameen Bank project, led by Muhammad Yunus, evolved into an independent financial institution (Buthe, 2000). The initiative, initially launched in Jobra village, Chattogram district, Bangladesh in 1976, began as an action research pilot aimed at providing banking services to rural poor communities (Buthe, 2000). Yunus's innovative approach has since inspired similar initiatives across the globe, revolutionizing financial services and empowering marginalized populations. Globally, the MFI market is dominated by South Asian countries such as Bangladesh, Vietnam and India and currently has 85.6 million borrowers (Asian Development Bank, 2022). These countries facilitate the development of MFIs to facilitate an improved standard of living for the poor and reduce poverty (Anwaar, Ali, & Saleem, 2022). Globally, Microfinance Institutions (MFIs) are widely recognised as a valuable development tool in many developing countries due to their demonstrated success in improving the well-being of impoverished communities. Accordingly, the global microfinance industry has served a minimum of 140 million clients since <year>(reference), at a global market value of 156.7 billion dollars and was projected to grow by 11.98% by 2020 (Mia, Banna, Noman, Alam & Rana, 2022).

Microfinance Institutions (MFIs) were introduced in Africa to address challenges such as high unemployment and poverty rates (Mia, 2022). Their primary goal was to promote economic growth and development. Traditional savings schemes like "susu" have long been part of Africa's financial landscape. The susu savings system originates from West Africa, particularly in countries such as Ghana and Nigeria. Susu, a form of rotating savings and credit association (ROSCA), allowed community members to pool their savings and provide loans to each other, fostering mutual support. In south Africa MFIs were introduced through stokvels, the first known formal stokvel is documented from

1932 (Kritzinger, 1996). The concept gained significant popularity in the mid-20th century, particularly among migrant laborers working in South Africa's gold and diamond mines, who formed burial societies to collectively cover funeral expenses (Kritzinger, 1996).

Over time, stokvels have evolved into various forms of communal savings schemes, playing a crucial role in South Africa's informal economy.The modern concept of microfinance emerged in the 1980s, drawing inspiration from these practices (Blavy, Yulek & Basu, 2004). Formal MFIs aimed to provide financial services to underserved and unbanked populations, building on the foundation of traditional systems like susu. These schemes collected money from members, saved it, and provided low-interest loans. They contributed significantly to ensuring that the poor had access to financial services, gained financial literacy, and learned how to develop and operate their businesses successfully. (Agbloyor, Asongu & Muriu, 2021)

South Africa's distinctive economic environment makes it an appropriate context for revisiting the determinants of Microfinance Institutions (MFIs). The country has experienced substantial fluctuations in interest rates, economic growth, and unemployment, creating a valuable setting for examining how these factors influence the performance and sustainability of MFIs. Variations in interest rates provide an opportunity to assess their effects on MFI profitability and operational stability, while uneven economic growth, characterised by cycles of expansion and contraction, enables an evaluation of how MFIs contribute to economic resilience. Persistently high unemployment, intensified by the COVID-19 pandemic, further underscores the importance of MFIs in fostering entrepreneurship and self-employment. Studying South Africa therefore offers critical insights into the role of MFIs in promoting economic stability under changing macroeconomic conditions.

According to Skowronski (2010), MFIs in South Africa emerged in the 1980s with the objective of providing loans, insurance, and savings facilities to low-income individuals. These institutions were developed to support poor households and informal micro-enterprises by enhancing their access to financial services. MFSA (2024) reports that South Africa currently has approximately 1 676 052 micro-enterprises, a figure that continues to grow as demand for microfinance services increases. Typical MFI-funded activities include spaza shops, fruit and vegetable stalls, taverns, and crèches. The sector is regulated by the Development Microfinance Association (DMA) and Microfinance South Africa

(MFSA), which implement strategies to strengthen the industry and facilitate access to financial resources. MFIs are most impactful when they generate sustainable profits while maintaining low operational costs. Their success depends both on profitability and the number of low-income clients reached, hence the need to investigate the main drivers of MFI performance.

Following the 2007–2009 global financial crisis and the more recent COVID-19-related financial disruptions, compounded by geopolitical risks such as conflicts in the Middle East and the Russia–Ukraine war, donor investment in South Africa has been highly volatile. World Bank statistics show a decline from a peak of USD 1.42 billion to USD 1.04 billion in 2022. These developments necessitate a re-examination of the macro- and microeconomic determinants of MFI performance. South Africa continues to face significant challenges, including fluctuating interest rates, uneven growth, and high unemployment (Enaifoghe, Aina & Durokifa, 2021), all of which affect MFIs in diverse ways. Consequently, this study aims to examine the macro- and microeconomic determinants of MFI profitability in South Africa to promote sustainable growth of the sector.

Although numerous studies have examined the nexus between MFI performance and its determinants, limited research has focused on pandemic conditions (Chaulagain & Lamichhane, 2022; Hermes & Hudon, 2019; Fersi & Boujelbéne, 2016). Furthermore, there is no consensus on performance measures due to MFIs' dual objectives of financial sustainability and social impact. Understanding profitability drivers enables MFIs to manage key factors strategically, ensuring sustainability within South Africa's regulatory environment. Microeconomic indicators such as income levels, employment, access to finance, and economic activity significantly affect borrower behaviour and repayment capacity. Higher income and employment improve credit reliability, whereas rising living costs increase default risks.

South Africa also presents growth opportunities for MFIs. D'Espallier, Hudon and Szafarz (2013) found that 20–25% of MFIs were no longer subsidy-dependent by 2010, highlighting progress toward sustainability. As reliance on subsidies is not a viable long-term strategy, examining performance determinants provides valuable policy guidance on strengthening financial sustainability, reducing poverty, and addressing inequality.

The remainder of this article is structured as follows. Section 2 briefly highlights and discusses the theoretical and empirical literature on the

determinants of MFIs' performance. In Section 3, the methodology is discussed. The methodology includes a discussion of data and variables as well as the model specification. This is followed by the preliminary and empirical analysis in Section 4, where the descriptive stats, correlations and regressions are discussed. In section 5, conclusions are drawn, implications of the study and policy recommendations are discussed.

2. Literature Review

There are numerous studies that have examined the profitability of Microfinance Institutions (MFIs). This study focuses on the theoretical and empirical literature relating to MFI profitability in South Africa. Three key theories underpin profitability, namely capital structure theory, market power theory, and efficiency theory.

Market power theory explains the influence of pricing within a market between buyers and sellers. Chiu, Davoodalhosseini, Jiang and Zhu (2023), Filho (2011), and Shepard (1997) define market power as the ability of suppliers to increase product prices without reducing supply. In other words, suppliers can influence market prices by controlling production. Market power is expressed in two forms: the Structure–Conduct–Performance (SCP) model and Relative Market Power (RMP). This theory provides valuable insights into MFI performance by examining how pricing control and competitive dynamics affect profitability. MFIs operating in areas with limited competition may exercise significant market power by setting higher interest rates on loans, which can enhance profitability. However, this may undermine their social mission of providing affordable financial services to underserved populations. Additionally, MFIs that establish strong brand loyalty, benefit from regulatory advantages, or achieve economies of scale may deter new market entrants. Reduced competition enables them to maintain stable or higher profit margins, thereby improving financial performance.

In their seminal work, Modigliani and Miller (1958) argue that capital structure is irrelevant to firm value under perfect market conditions. However, capital structure remains a critical financial decision because it directly affects a firm's risk and return. Poor capital structure choices, such as excessive reliance on high-cost debt, imbalance between equity and borrowed funds, or misalignment with risk profiles, can increase the cost of capital and reduce firm value. Conversely, sound capital structure decisions enhance firm value. Despite the Modigliani and Miller (1958)

irrelevance proposition, subsequent research suggests the existence of an optimal capital structure that maximises firm value while minimising the cost of capital by balancing risk and return. However, financial managers still lack a precise methodology for determining this optimal structure (Susanto, Pradipta & Cecilia, 2019).

Capital structure theory is particularly relevant to MFIs, which face the dual challenge of achieving financial sustainability while fulfilling social objectives. Like traditional financial institutions, MFIs must balance the benefits of debt, such as tax shields and lower cost of capital, against the risks of financial distress and bankruptcy. MFIs with moderate debt levels may leverage equity to expand operations, improve outreach, and enhance profitability. Conversely, excessive debt exposes MFIs to financial instability, especially in volatile economic environments. High interest rates negatively affect performance by increasing borrowing costs, while lower rates improve sustainability. Economic growth and inflation also influence profitability and borrowing costs, underscoring the importance of monitoring macroeconomic conditions to maintain institutional stability and effectiveness.

Efficiency theory further explains MFI performance. Kablan (2014) defines efficiency as the extent to which a decision-making unit approaches its production possibility frontier, which represents optimal combinations of inputs to produce a unit of output. Abel and Bara (2017) argue that efficiency in banking is multidimensional, with allocative and technical efficiency being the most widely discussed forms.

Allocative efficiency refers to the extent to which resources are directed toward their most valuable use. An allocatively efficient MFI ensures that scarce resources, such as donor funds, equity capital, or borrowed funds, are channelled into high-impact activities, including lending to underserved communities at affordable rates. Poor allocative efficiency leads to high operating costs, inefficient lending practices, and misallocation of capital, reducing both profitability and outreach.

Technical efficiency occurs when a firm produces maximum output from a given set of inputs. An MFI that uses its resources efficiently can minimise operational costs, improve loan disbursement, and enhance financial inclusion. Badunenko, Fritsch and Stephan (2008) describe allocative efficiency as a firm's ability to select optimal input combinations at a given time, while scale efficiency relates to output levels and average costs associated with production size. Thus, efficiency

theory provides a framework for empirically assessing operating performance.

Overall, these theories collectively provide a comprehensive framework for understanding the determinants of MFI profitability and sustainability within the South African context.

2.2 Empirical Literature

Factors influencing profitability include market share, brand image, firm size, competition, and cost of production (Pieri & Verruso, 2019; Fonseca, Moreira & Mota, 2024). Firms with lower production costs tend to achieve higher profitability due to reduced expenditure on raw materials, labour, and operating expenses. Akhtar, Yusheng, Haris and Javaid (2022) investigated the impact of financial leverage on sustainable growth, market performance, and profitability, revealing an inverted U-shaped relationship between leverage and performance, suggesting that moderate debt enhances profitability while excessive leverage diminishes it.

Adhikary and Papachristou (2017) analysed 114 MFIs in South Asia to identify country- and industry-specific profitability drivers. Their findings indicate a positive and significant relationship between return on assets (ROA) and market dominance, implying that MFIs with stronger market positions benefit from competitive advantages and higher profits. Similarly, Different, Mbira and Tapera (2016) examined MFIs in Zimbabwe (Bulawayo, Masvingo, and Matabeleland) between 2009 and 2015 and found that risk management, corporate governance, information technology, and innovation were strongly associated with profitability.

Ngumo, Collins and David (2020) found in Kenya that operational efficiency and firm size significantly influence performance. Parvin, Hossain, Mohiuddin and Cao (2020) examined capital structure and observed that excessive debt increases bankruptcy risk and negatively affects ROA. Ibrahim and Mohamed (2020), analysing 43 MFIs in Sub-Saharan Africa (2013–2017), found that firm size, age, and GDP significantly influence performance, with size exerting a positive and significant effect on outreach at the 1% level. Collectively, these studies confirm that profitability is driven by multiple factors that require strategic management. Common profitability indicators include ROA, net interest margin (NIM), and return on equity (ROE).

Hermes and Hudon (2019) argue that the relationship between performance and its determinants is moderated by the trade-off between financial sustainability and social objectives. Since MFIs primarily serve financially excluded populations, it is essential to revisit performance drivers in the South African context.

Macroeconomic factors such as economic growth, inflation, interest rates, and regulatory conditions also significantly influence MFIs. Economic growth improves income and employment, enhancing repayment capacity (Memon et al., 2022). Inflation has mixed effects: moderate inflation may stimulate demand, while high inflation erodes loan values and increases default risk (Ahmed & Isa, 2023). High interest rates raise borrowing costs and constrain outreach, whereas lower rates improve affordability (Walde & Makori, 2022). Exchange rate volatility increases financial risk, particularly for MFIs with foreign currency exposure (Adusei & Obeng, 2019; CGAP, 2006).

South Africa has an estimated 23% unbanked adult population (World Bank Global Findex). COVID-19 increased poverty by 2.5% (mild) and 2.6% (severe), reaching 51.7% and 51.8%, respectively (Chitiga-Mabugu et al., 2021). Although inequality declined slightly, unemployment remains high at 34%, with post-pandemic growth averaging 2%. These structural conditions underscore the importance of reassessing the determinants of MFI performance in South Africa.

3. Methodology

This study follows a methodology similar to that of Katuka and Mavhunga (2016) and Pieri & Verruso (2019). This study was conducted in South Africa and data will be collected from the World Bank, Microfinance Information Exchange (MIX), and the financial statements of SARB BA900. The study used convenience sampling due to the availability of MFI-specific data. The study focused on 20 MFIs which have publicly available data on their websites in South Africa from a population of 1150. The study used data from 2008 – 2020 to account for economic variation in order to establish an accurate impact of the determinants during that period.

The profitability measures that were used to evaluate firm performance are ROA, ROE and NIM. These variables allow one to observe the performance of the firm, and whether MFIs are profitable and operate efficiently in the long run. The study used descriptive statistics to analyze the dependent variables and independent variables.

Thus, descriptive statistics were used to summarize, organize, and present the main features of a dataset in a clear and concise manner. Correlation analysis was performed to evaluate the correlations that existed between the variables. Also, the study used the fixed effects model in line with other studies (see for example Janda & Turbat, 2013) to evaluate the deterministic relationship between the variables given that purposive sampling was used to select the MFIs. The Random Model was not suitable as the MFIs were not randomly selected from a larger population.

3.1 Dependant Variables

Table 1 explains how ROA, ROE and NIM are measured. Al-Qudah, (2016) writes that ROA gives an indication of how management can use the company's total assets to generate earnings. ROE measures the amount of profit that is given to shareholders. When ROE is high, it indicates that shareholders will receive high earnings. NIM provides an indication of the company's earnings. It is the interest that the MFI charges to individuals. Katuka and Mavhunga (2016); Dissanyake (2012) used ROA, ROE and NIM in their study to measure firm performance.

Table 1: Profitability Measures for MFIs (Dependant Variables)

Variable	Measure
Return on Equity (ROE)	ROE = Net Income / Shareholder's equity
Return on Asset (ROA)	ROA = Net Income / Total Average Assets
Net Interest Margin (NIM)	NIM = Return on Investment – interest paid / Average Assets

Source: Author's compilation

3.2 Independent Variables

Table 2 provides a summary of the independent variables and how they are measured. The independent variables that will be used in this study are operating costs, size, loan growth rate, GDP growth, lending rate, unemployment rate and inflation rate.

Table 2: Summary of Independent variables for MFIs.

Independent Variables	Definition	Proxy	Expected sign	Source of data	Proxy by
Operating efficiency (COST)	This is when the changes in operating expenses, revenue, total asset turnover and operating risk affect the performance of a business. This is when operating income can cover all the operational costs of the firm like salaries, administrative costs, and loans.	Cost of operations	Positive	Published financial statements from MFIs' websites	Pieri & Verruso (2019); Kawshala (2017)
Size: (SIZE)	The operational capacity and capital structure of a firm. It is made up of firms assets, equity and employees.	Total assets and total market value of equity	Positive/ Negative	Published financial statements from MFIs' websites	Dissanayake (2012)
Loan growth rate (LGR)	It is the asset transactions that exist between borrowers and the banks at a specific time, where the borrower must repay with interest	Percentage change in loan portfolio	Positive	Published financial statements from MFIs' websites	Wu, Nguyen & Nguyen, (2022)
GDP growth: (GDPG)	The growth rate of the value of goods and services in a country.	Real GDP growth rate	Positive	South African Reserve Bank	Dissanayake (2012)
Lending rate (RATE)	Charge that lender charges on asset.	South Africa bank lending rates	Negative/ Positive	South African Reserve Bank	Borjessson & Hulton (2016); Refera (2014) Adhikary and Papachristou (2014)
Unemployment: (UNEMP)	The state in which a number of people are not working.	Percentage of unemployed labour force	Negative	South African Reserve Bank	Borjessson & Hulton (2016); Refera (2014) Adhikary &

					Papachristou (2014)
Inflation rate (INFL)	Is the rate at which the value of a currency is falling. This will result in the value of goods and services in a country increasing.	CPI – consumer price index	Negative/ Positive	South African Reserve Bank	Borjesson & Hulton (2016); Refera (2014) Adhikary & Papachristou (2014)

3.3 Empirical Model

The empirical model was developed based on the design of Shrestha (2023) and Muriu (2012) to examine the impact of profitability in South Africa, the study will cover macro-economic determinants and micro-economic determinants. The model will be analyzed by E-views software and stats software.

The Fixed effects regression equation:

$$ROA_{it} = \alpha_{it} + \beta_1 ROA_{it-1} + \sum_{n=1}^{i} \beta_2 X_{it} + \sum_{n=1}^{i} \beta_3 Z_{it} + + \mu_i + \varepsilon_{it} \quad (1)$$

$$ROE_{it} = \alpha_{it} + \sum_{n=1}^{i} \beta_2 X_{it} + \sum_{n=1}^{i} \beta_3 Z_{it} + + \mu_i + \varepsilon_{it} \quad (2)$$

$$NIM_{it} = \alpha_{it} + \sum_{n=1}^{i} \beta_2 X_{it} + \sum_{n=1}^{i} \beta_3 Z_{it} + + \mu_i + \varepsilon_{it} \quad (3)$$

Where:
ROEit is the return on equity and is used to measure profitability.
ROAit is the return on Assets and is used to measure profitability.
NIMit is the net interest margin and is used to measure profitability.
πit -1 is the lagged dependent variables.
X it it represents the macro-economic determinants
Z it it represents the MFI specific determinants that is micro-economic fundamentals
B i it represents the estimated coefficient
μI it represents the MFI specific time invariant effect which is unobserved.
ε it is the error term which is across all independent variables

The results will be illustrated in using the fixed effects regression model. Equation 1 is dynamic as ROA was found to be persistent. However, Equations 2 and 3 are static in nature as ROE and NIM were found not to be linked to their previous period values/ lagged values.

4. Results and Discussion

Table 3 provides a summary of descriptive statistics which are both for dependent and independent variables for profitability. The descriptive statistics that were drawn from the calculated profitability measures are ROE, ROA and NIM, which are the dependent variables. The independent variables were split into macro-economic and micro-economic variables: where the macro-economic variables tested were exchange rate (XCHA,) gross domestic product (GDPG), employment rate (UNEMPL), inflation rate (INF), lending rate (LR). Whilst the micro-economic variables tested were total assets (TA) representing the size of the micro finance institution, total equity (TE), operating expenses (OE), loan portfolio rate (LGR).

Table 3 shows that NIM is positively skewed at 4.96 and has a mean of 0.17 and standard deviation is 0.28 and varies from negative 0.03 to 1.98 for the period under review. The ROA is negatively skewed at -4.56 and varies from negative 0.95 to 0.52 with a mean of 0.01 and standard deviation of 0.13. Katuka and Mavunga (2016) conducted a study in Zimbabwe for the period 2010 to 2014. Their results found that the minimum for ROA ranged between negative 0.11 and 0.05, the standard deviation was 0.028 and the skewness is positively skewed at 2.24 with a mean of 0.01. There is a difference between our results and the results of Katuka and Mavunga (2016), because there could be there are more poor people in Zimbabwe than South Africa. The ROA in our study is negative 4.56; this is because the MFIs issue loans to high-risk clients who fail to repay the loans or the managers of these firms are not highly skilled to manage the business.

The ROE is positively skewed at 5.50 and has a mean of 0.21 with a standard deviation of 0.86 and varies from negative 2.54 to 6.80. In the study of Abrar and Javaid (2016), the mean ROE ranged from 12.86 and 17.91 and had a mean of 2.4 with a standard deviation of 0.73. Their results are larger and contrary to ours because it was conducted in seventy countries in the world which covered six regions globally and ours only focuses on South Africa. The ROE in our study has a mean which is below 1, this indicates that MFIs will struggle to achieve profits in the long run.

Variables	Mean	Median	Maximum	Minimum	Std, Dev,	Skewness	Kurtosis	Jarque-Bera	Probability
NIM	0,17	0,16	1,98	-0,03	0,28	4,96	30,57	2790,53	0,00
ROA	0,01	0,02	0,52	-0,95	0,13	-4,56	42,00	5212,43	0,00
ROE	0,21	0,13	6,80	-2,54	0,86	5,50	46,83	6637,74	0,00
GDPG	0,96	1,41	3,19	-6,43	2,51	-1,89	6,16	79,03	0,00
EMPL	25,93	24,89	32,50	22,00	2,61	1,05	3,83	16,46	0,00
INF	4,36	4,60	6,16	0,09	1,49	-1,61	5,61	55,77	0,00
LR	10,02	9,80	15,10	7,70	1,78	1,63	5,66	57,56	0,00
LGR	53,96	0,06	737,15	-1,00	267,69	5,07	28,31	2230,57	0,00
SIZE' Million	70. 6	3 .1	1 930	28,44	272	5,07	31,22	2922,52	0,00
OE '000	2 ,1	-10,32	137	-141	27.1	0,71	23,22	1335,33	0,00

Table 3: Descriptive Statistics Summary
Source: Author's Compilation

The macro-economic variables have a strong impact on MFIs because factors such as economic growth can help increase the development of a country (Donou-Adonsou & Sylwester, 2015).). The results show that the XCHA is positively skewed at 0.18 and varies from 7.25 to 16.46, with a mean of 11.14 and standard deviation of 3.06. The GDPG is negatively skewed at 1.89 and has a standard deviation of 2.51 and a mean of 0.96 and varies from negative 6.43 to 3.19. EMPL is positively skewed at 1.05 and varies from positive 22.00 to 32.50 with a mean of 25.93. INFL is negatively skewed at 1.61 and has a mean of 4.36 whilst LR is positively skewed at 1.63 and has a mean of 10.02. The micro-economic variables affirm that LGR is positively skewed at 5.07 and varies from negative 1 to 734.85 with a standard deviation of 267.69 and mean of 53.96. TA is positively skewed at 5.07 and varies from 28.44 to 193 billion. This is an indication that the balance sheet of MFIs have large assets under management. OE is positively skewed at 0.71 and has a mean of 2.1 million with a standard deviation of 2.7 million, this indicates that the MFIs have large operating expenses. OE is positively skewed at 4.51 and ranges from negative 8.17 million to 153 billion and has a standard deviation of 2,5 million.

Muriu (2011) investigated the macro-economic variables in Africa during the period 1997-2008 and found that GDP ranges from negative 2.43 to 2.37 with a mean of 0.99 and standard deviation of 0.845. The inflation rate ranged from negative 0.09 to 0.43 with a mean of 0.67 and standard deviation of 0.063. The results of Muriu (2011) are different to this study because the time when they conducted their study the

economy had experienced economic fluctuations such as experiencing high poverty and unemployment rates and economic recession (Rena & Msoni, 2017). Whereas Adhikary and Papachristou (2017) conducted their study in South Asia and found that ROA minimum value ranges between -0.9721 and 0.55; the mean for ROE was 0.078; the GDP per capita ranged from 0.016 to 0.204. Katuka and Mavunga (2016) found that the ROA was 0.01 meaning that the MFI inception for ROA was at 1.084%; the average ROE was 0.02. In addition, they found that the mean of ROE had a greater variability than ROA. Abrar and Javaid (2016) found that the operational efficiency was 1%; ROA had a mean of 2.4%; ROE was 9.7% and average equity to asset ratio was 29%; the mean loan -balance per borrower was 53% and the debt-to-equity ratio was 3.9%.

4.1 Correlation

This section briefly discusses the correlations.

Table 4: Correlation

Variables	NIM	ROA	ROE	GDPG	EMPL	INF	LR	LOAN	TA	OE
NIM	1,0000									
ROA	- 0,0048	1,0000								
ROE	- 0,0279	0,6841***	1,0000							
GDPG	0,0401	0,2657**	0,1024	1,0000						
EMPL	- 0,0086	- 0,1615	- 0,0084	-0,7512***	1,0000					
INF	- 0,0019	0,0124	- 0,0066	- 0,1490	0,0935	1,0000				
LR	- 0,0339	0,1518	0,1025	0,2929***	-0,5266***	-0,5330***	1,0000			
LGR	- 0,1242	- 0,0154	- 0,0777	0,1403	- 0,1304	- 0,0419	- 0,1407	1,0000		
TA	0,0465	0,0630	0,1357	- 0,0262	- 0,0303	- 0,1203	0,1020	0,9928***	1,0000	
OE	0,0896	0,0103	- 0,0917	- 0,1562	0,3273	- 0,0543	- 0,2168	- 0,1118	- 0,0251	1,0000

Source: Owner's Compilation

In Table 4, the study finds that the correlation between the variables is less than 1. ROA and ROE are highly positively correlated (0.68) and the relationship is significant. There is no need to worry on the problem of multi-collinearity as they are both dependent variables and tested in different equations. In the full sample it shows that NIM is positively

correlated with GDPG, TA and OE, this means that when GDPG, TA and OE increases, NIM will also increase, but negatively correlated with UNEMPL, INFL, which means that when UNEMPL, INFL increases, then NIM will decrease and vice versa. ROA is positively corelated with GDPG, INFL, LR, TA and OE but negatively corelated with UNEMPL, LGR. ROE is positively corelated with GDPG, LR and TA and negatively corelated to UNEMPL, INFL, LGR and OE. NIM and LGR are moderately correlated at 12.42%. ROA and GDPG are moderately corelated at 26.57%. ROE and TA are moderately correlated at 13.57%.

4.2 Regression Analysis

This study investigate the macro- amd micro-economic determinants of MFIs in South Africa. Equations 1 to Equation 3 were tested empirically through the four commonly used panel data models: Pooled effects model, Random effects model, Fixed effects model and Feasible generalized least squares (FGLS). Though the Hausman test could have been used to choose the most appropriate model between the fixed effects model and the random effects model, this study focused on the fixed effects model as the purposive sampling method was employed in the study (See for example Katuka & Mavunga, 2016; Dissanayake, 2012; Borjossen, 2016). All the models were run and presented specifically to capture the diagnostic statistics and for comparability. Therefore, the results of the most appropriate model i.e. fixed effects model were discussed in detail. The results are presented in Table 5 through 10, with the diagnostic statistics presented first then the main results.

Table 6 through 8 in the Appendix presents results diagnostics tests for the determinants of MFIs. The diagnostic statistics included the tests of joint validity of cross-sectional individual effects, Breush Pagan (1980) LM test for random effects, the Hauman's test, test for heteroscedasticity and cross-sectional dependence. The test for joint validity of cross-sectional effects was used by Chow Test or F- test for poolability or individual effects and the validity for cross-sectional effects. The diagnostic statistics were mostly in order serve for cross sectional dependence and heteroskedasticity. Therefore, the models were run with Driscoll and Kraay (1998) robust standard errors as in Hoechle (2007). The empirical results are presented in Table 5 and discussed thereafter.

Table 6 revealed that there is a positive and significant relationship between size and the performance measured by ROA, NIM, and ROE. This shows that as MFIs increase in size or grow in capacity, their performance improves and MFIs. According to Vinasithamby (2015),

due to economies of scales, the size of a firm is important as the MFI is exposed to more opportunities. Different from the results in this study, Meiryani, Hanna Uli Pakpahan, Wahyuningtias, Mad Daud and Liawatimena (2021) found that size has no statistically significant impact to performance while Linares-Zegarra and Wilson (2017) found that size has a small negative effect on performance.

Results revealed a negative and significant relationship between performance as measured by ROE or ROA and loan portfolio growth rate (LGR). Thus, when the loan growth rate increases the return on assets and return on equity for the MFIs deteriorates. This is in line with Bekalu, Lemie and Gutu (2019) that loan portfolio is negatively related to performance. Contrary to the findings here, Adhikary and Papachristou (2017) found that the size of the loan portfolio positively impacts performance. Results here could be explained by the fact that most MFIs do not have proper and robust risk management systems and hence an increase in loan portfolios might mean increase in bad debts.

In line with expectation the operational expenses were found to be positive and significantly associated with performance as measure by ROE and NIM. Suggesting that the higher the operational efficiencies the higher the profitability the MFI is. Since the operating expenses given in this case is a measure of firms' efficiency and a measure on how well MFIs can provide services to customers, the positive connection is warranted.

Table 5: Table showing the determinants of MFIs' performance.

Models	Fixed Effects	Fixed Effects	Fixed Effects
Variables	ROA	ROE	NIM
L.ROA	0.177		
	(0.227)		
SIZE	0.0514**	0.0623***	-0.0972*
	(0.0177)	(0.015)	(0.0423)
LGR	-0.0537*	-0.222***	-0.0626
	(0.0210)	(0.0156)	(0.0525)
LOE	0.0158	0.731***	0.509***
	(0.0173)	(0.109)	(0.0421)
GDPG	0.0248*	0.121***	10.55***
	(0.0101)	(0.00642)	(2.776)
LR	0.0390*	0.207***	0.484***
	(0.0173)	(0.011)	(0.0309)
UNEMPL	0.0278***	0.225	0.244***
	(0.00134)	(0.135)	(0.0804)
INF	0.0156	0.147***	0.140
	(0.0276)	(0.005)	(0.0948)
EXCH	-2.333**	-0.0687	-0.0760***
	(0.445)	(0.0880)	(0.0175)
_cons	-1.259**	-7.903	-42.92
	(0.445)	(4.167)	(27.31)
N	72	78	72
Groups	6	6	6
R^2	0.303	1.19	0.425
Wald chi2/ F-Stats	3.14**	4 3***	104**
Hausman -Chi2	5.97	34.67***	3.92

Driscoll and Kraay robust standard errors in parentheses $^{*}p < 0.05$, $^{**}p < 0.01$, ***

There is a positive and significant relationship between gross domestic product (GDPG) and performance. Implying that as the GDPG increases, the performance of MFIs also increases. This is in line with

economic theory proposition that as economic activities increase households and firms borrow more and the risk of default decreases. This consequently improve MFIs' profitability. Alimukhamedova (2013) opines that stable economic growth has a positive impact on the economy, it ensures that households have improved access to financial services, and this allows them to escape from poverty. The results confirm Bekalu et al., (2019) and Adhikary and Papachristou's (2017) findings that GDPG enhances MFIs' performance.

The lending rates were found to impact the performance of MFIs positively and significantly. When MFIs charge high lending rates, their profitability improves given that most of their source of income is through grants, donations, and owner's equity. On the contrary, Adhikary and Papachristou (2017) found that there is a negative relationship between performance and lending rate, this is because high interest rates result in high loan losses, and this reduces the number of loans that MFIs can issue to customers.

The results revealed a positive and significant relationship between unemployment and the performance of MFIs as measured by ROA and NIM. This means that when the rate of UNEMPL is high then MFIs will have high profits. These results are contrary to the findings of Ncanywa and Getye (2016), they found that unemployment is negatively related with micro-finance credit because when individuals are unemployed, they are less likely to demand loans from banks and this makes it difficult for MFIs to issue loans at a competitive interest rate. Results here could be explained by the fact that the unemployed are excluded from the formal banking sector and resort to MFIs for bridging finance. This will increase the MFIs' loan portfolios.

Inflation was found to impact the performance of MFIs as measured by ROE positively and significantly. However, the exchange rate is negatively related to performance as measured by ROA and NIM. This implies that when exchange rates are low, then MFIs will make more profits and vice versa. The capital markets for most MFIs is underdeveloped and most of the MFIs are not actively involved in the foreign currency market. Holden and Holden (2004) found that MFIs accept foreign funds to increase exposure to the foreign markets and not necessarily for liquidity needs.

4. Conclusion

This study examined the macro- and micro-economic determinants of MFIs' performance in South Africa using the Fixed Effects model, a panel data approach. In line with literature ROA, ROE and NIM were used as proxies for performance. Results reported in this article revealed that all the examined macro-economic variables had an impact on the performance of Microfinance institutions. All the performance measured were found to improve with Gross domestic product growth rate and lending rates. Also, the return on assets and net interest margin improved with increase in unemployment. However, the net interest margin and return on assets deteriorated with the increase in exchange rates. The return on equity was enhanced with increases in inflation.

Likewise, all micro-economic variables had an influence on MFIs' performance though this was dependent on the measure of profitability used. Performance as measured by return on assets and return on equity were found to be improved with improvement in size of the MFI. Similarly, the net interest margin and return on equity increased with enhancement of operation efficiency. Lastly but not least, the loan growth rate was found to negatively affect return on assets and return on equity.

This study provides valuable insights to parastatals, development corporations, small loans industry, government policy makers, NGOs and investors of MFIs. The enhancement of MFIs' performance will lead to proliferation of poverty reducing programs. Also, to ensure that MFIs market is sustainable in South Africa, this study provides critical information from the macro and micro-economic perspectives. In conclusion, the understanding of macro and micro-economic fundamentals that influence MFIs' performance will strengthen the mandate of microfinance institutions in their quest and pursuit to alleviate poverty by providing the poor with access to financial services in a bid to improve their livelihood.

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Appendix 1: Diagnostic statistics

Table 6: Table showing diagnostic tests for the determinants of MFIs performance as measured by return on assets (ROA)

Test	Test Statistic	P - Value	Inference
Joint validity of cross-sectional individual effects ***H0 :*** $\alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ ***HA:*** : $\alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=1.09	0.3768	Cross-sectional individual effects are not valid.
Breusch Pagan (1980) LM test for random effects ***H0:*** $\delta_\mu 2 = 0$ ***HA:*** $\delta_\mu 2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity Breusch-Pagan / Cook-Weisberg ***H0:*** $\delta_i 2 = \delta$ *for all i* ***H0:*** $\delta_i 2 \neq \delta$ *for all i*	Chi2 =120.77	0.0000	The variance of the error term is not constant. Heteroscedasticity is present.
Cross Sectional dependence Pesaran Frees	P-CSD=-0.394 F-CSD=0.840	0.6933 Alpha=0.10: 0.2136 Alpha=0.05: 0.2838 Alpha=0.01: 0.4252	The is cross-section dependence amongst the groups

Table 7: Table showing diagnostic tests for the determinants of profitability of MFIs as measured by return on equity (ROE)

Test	Test Statistic	P - Value	Inference
Joint validity of cross-sectional individual effects ***H0 :*** $\alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ ***HA:*** : $\alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=9.31	0.005	Cross-sectional individual effects are not valid.
Breusch Pagan (1980) LM test for random effects ***H0:*** $\delta_\mu 2 = 0$ ***HA:*** $\delta_\mu 2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.

Heteroscedasticity Breusch-Pagan / Cook-Weisberg ***H0:*** $\delta_i 2 = \delta$ ***for all i H0:*** $\delta_i 2 \neq \delta$ ***for all i***	Chi2 =47.07	0.0000	The variance of the error term is not constant. Heteroscedasticity is present.
Cross Sectional dependence Pesaran Frees	P-CSD= 0.947 F-CSD=0.411	0.3436 Alpha=0.10: 0.1984 Alpha=0.05: 0.2620 Alpha=0.01: 0.3901	The is cross-section dependence amongst the groups

Table 8: Table showing diagnostic tests for the determinants of profitability of MFIs as measured by net interest income (NIM)

Test	***Test Statistic***	***P - Value***	***Inference***
Joint validity of cross-sectional individual effects ***H0 :*** $\alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ ***HA:*** : $\alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=1.00	0.4257	Cross-sectional individual effects are not valid.
Breusch Pagan (1980) LM test for random effects ***H0:*** $\delta_\mu 2 = 0$ ***HA:*** $\delta_\mu 2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity Breusch-Pagan / Cook-Weisberg ***H0:*** $\delta_i 2 = \delta$ ***for all i H0:*** $\delta_i 2 \neq \delta$ ***for all i***	Chi2 =64.23	0.0000	The variance of the error term is not constant. Heteroscedasticity is present.
Cross Sectional dependence Pesaran Frees	P-CSD= 1.929 F-CSD=1.273	0.0537 Alpha=0.10: 0.2136 Alpha=0.05: 0.2838 Alpha=0.01: 0.4252	The is cross-section dependence amongst the groups