Cogent Economics & Finance

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/oaef20

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To cite this article: Rowland Seyram Koku Dabi, Nugraha, Disman & Maya Sari (2023) Capital structure, financial performance and sustainability of Microfinance Institutions (MFIs) in Ghana, Cogent Economics & Finance, 11:2, 2230013, DOI: 10.1080/23322039.2023.2230013

To link to this article: https://doi.org/10.1080/23322039.2023.2230013

Published online: 10 Jul 2023.

Dabi et al., *Cogent Economics & Finance* (2023), 11: 2230013
https://doi.org/10.1080/23322039.2023.2230013

cogent economics & finance

FINANCIAL ECONOMICS | RESEARCH ARTICLE

Capital structure, financial performance and sustainability of Microfinance Institutions (MFIs) in Ghana

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Received: 17 August 2022
Accepted: 22 June 2023

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Reviewing editor:
David McMillan, University of Stirling, UK

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Abstract: The study examines the effect of capital structure on financial performance and sustainability of Microfinance Institutions in Ghana. We investigate the role of debt-to-equity ratio, equity-to-asset ratio, and deposit-to-loan ratio in guaranteeing financial performance and sustainability. We implement multiple regression methods to investigate the relationship between the observed performance indicators and a set of explanatory variables. The empirical analysis involves 51 Ghanaian MFIs reporting on the MIX market. We find strong empirical support for the notion that asset size is significantly and positively related to asset returns, self-sufficiency, and financial sustainability. Also, capital structure variables are strongly associated with profitability but exert insignificant impacts on operational self-sufficiency and financial instability of MFIs. The macroeconomic environment also matters to the profitability, self-sufficiency, and sustainability of MFIs. The ability of the MFIs to improve security and lessen the risk is critical in ensuring profit efficiency and self-sufficiency.

Subjects: Economics; Finance; Business, Management and Accounting

Keywords: capital structure; microfinance institution; financial sustainability; financial performance; macroeconomic factors

1. Introduction

Microcredit effectively eliminates poverty worldwide (Qiao & Li, 2021; Tirumalsety & Gurtoo, 2021). Credit, savings, insurance, and other financial services are provided to the poor as a microfinance financial package (Orichom & Omeke, 2021). Consequently, microfinance institutions (MFIs) offer financial services to the poor. In several developing countries, MFIs lend money to low-income communities and help them establish various microentrepreneurial businesses (Baklouti, 2015).

In Ghana, MFIs have risen to prominence as crucial lending institutions in the development process. MFIs are the main credit institutions for local businesses and entrepreneurs in the country. The story of the relative financial deepening and inclusion in Ghana cannot be told without the important role of MFIs (Aubert et al., 2009; Durango et al., 2022), microfinance banks in Ghana depend primarily on personal relationships to service their clients, most of whom live in rural areas. Loans are given and repaid weekly by MFI field personnel who visit borrowers' residences. Financial and non-financial advice is also provided to clients through field staff. As a result, MFIs incur

a greater transaction cost per loan due to their field staff's involvement in providing trade and training services to their clients, which affects their financial performance and sustainability.

There are several reasons to investigate the capital structure, financial performance, and sustainability of MFIs. Duho et al. (2021) assert that when it comes to small and micro firms and the poor, MFIs are crucial sources of finance since larger banks and capital markets are usually unable to offer alternative financing. The financial sustainability of MFIs is a prerequisite for institutional sustainability (Bayai & Ikhide, 2018). It was argued that unsustainable MFIs would not benefit the poor in the future since the MFIs will cease to exist (Naz et al., 2019). Therefore, there is the need for MFIs to effectively manage their capital to remain profitable and sustainable to provide credit to the poor continually. According to Panigrahi et al. (2021), a firm's capital structure consists of many financing options for its assets. Accordingly, the capital structure of MFIs consists of both debt and equity. Saif-Alyousfi et al. (2020) opine that the capital structure consists of three major capital structure components. These include retained profits, external equity (new share issuance), and loan capital (borrowing through debt instruments).

In recent years, capital structure has been a more prominent issue in finance, notably after the 2008 financial crisis and subsequent government bailouts and institutional restructuring initiatives (Makinen & Solanko, 2018). Capital structure considerations take centre stage when rescue funds are made available during a financial or banking crisis. Corporate finance has placed considerable emphasis on how organisations choose their capital structure. Since Modigliani and Miller (1958) groundbreaking study on the irrelevance of capital structure in investment decisions, a vibrant body of theoretical literature has evolved to explore the capital structure decisions of corporations under a variety of different assumptions. The term "equity finance" is synonymous with common stock and preferred stock. The phrase debt financing is inclusive of both short- and long-term loans. In addition, they fund their activities via short- and long-term loans.

In many economies, MFIs are crucial for financial intermediation. Understanding the capital structures of MFIs is crucial for the financial sustainability of these institutions (Lassoued, 2021). Consequently, it is considered that the firm's capital structure affects its financial performance and sustainability (Lassoued, 2021; Simatupang et al., 2019). Others utilise asymmetric information or game theory frameworks in which debt or equity is used as a signalling mechanism or strategy tool; nonetheless, agreement on how organisations choose their capital structure is lacking (Nenu et al., 2018). This study aims to bridge this gap by investigating the capital structure of MFIs in Ghana to comprehend better how these organisations choose their capital structure.

Since capital constraints have hampered the success of microfinance programmes, their sustainability is diverse; how to support these organisations most efficiently is crucial (Zhao et al., 2022). There have been studies on the influence of capital structure on the financial sustainability and financial performance of MFIs, with few studies including the two variables in the same study in other jurisdictions (Orichom & Omeke, 2021; Parvin et al., 2020; Wambua, 2018). The capital structure, financial performance, and sustainability of MFIs in Ghana have not been the subject of much empirical study. We examine how financial and operational self-sufficiency and return on assets influence the capital structure of MFIs.

We analyse the capital structure of MFIs and explore how improvements to the capital structure may improve the financial sustainability of MIFs in Ghana. We investigate the ideal debt-to-equity ratio, equity-to-asset ratio, and deposit-to-loan ratio for guaranteeing financial performance and sustainability.

The rest of the paper consists of a literature review where the research's conceptual framework and theoretical underpinnings are discussed in the next section. Also, methods and materials employed in investigating the study objectives are discussed in the third section. This is followed by

an analysis and discussion of results and, finally, conclusions and implications of the study discussed.

2. Literature review

In this section of the research, we discussed the pertinent literature on capital structure, financial performance and financial sustainability of MFIs. It covers microfinance and financial performance and sustainability, MFIs capital structure, the nexus between capital structure and financial performance and sustainability of MFIs and theoretical review.

3. Microfinance and financial sustainability

Various scholars have described microfinance institutions in various ways. Microfinance often refers to the provision of savings and loans to low-income clients (Legerwood, 1999). In addition, Robinson (2001) defined microfinance as small-scale financial services—primarily credit and savings—provided to people who farm, fish, or herd; who operate small or micro-enterprises where goods are manufactured, recycled, or sold; who provide services and earn wages or commissions; and who earn income by renting small amounts of land, vehicles, draught animals, or machinery. Microfinance is also defined as providing small-scale financial services to low-income persons (Hartarska, 2005). Microfinance is an effective tool for alleviating poverty because it offers financial services to individuals who either lack access to commercial banks and other financial institutions or are disregarded (Hlupo Ms et al., 2022). For long-term poverty reduction, however, MFIs must be sustainable since failing MFIs would be unable to help the poor in the future owing to their death (Schreiner, 2002).

Multiple meanings have been assigned to the word "sustainability." However, scholars and professionals have lately agreed to establish two more degrees of sustainability beyond the original three or four: operational self-sufficiency [OSS] and financial self-sufficiency [FSS] (Kalu et al., 2018). The FSS examines if a financial institution earns sufficient revenue from loans to cover operating expenses, financing costs, loan loss provisions, and cost of capital that are not included in the OSS. The cost of capital represents a company's ability to safeguard the value of its shares against inflation (Kalu et al., 2018). Tehulu (2013) characterised an MFI as operationally sustainable at 100 percent OSS and financially sustainable at 110 percent OSS. Total financial income divided by the sum of financial expenditure, operating expense and loan loss provision expense equals operational sustainability (OSS).

Remer and Kattilakoski (2021) recognised that charging market-based interest rates on loans to pay administrative and operational expenses is crucial for financial sustainability. According to Henock (2019), financial sustainability is only possible when the interest paid on loans exceeds the cost of increasing the principal. If loan rates exceed operating expenses, the MFI is viable. The skilful distribution and collection of loans contribute to financial stability. Loan disbursement must be economical (the loan amount is important). However, loan recovery must be cost-effective and contribute to the financial viability of an MFI (Henock, 2019).

MFLs capital structure

A business's capital structure is generally defined as the ratio of owned to borrowed capital concerning its long-term growth strategy. When calculating these metrics, experts differ on what should be included in the equity and debt mix. Equity usually comprises the company's common and preferred stock and retained profits occasionally (Moyer et al., 2014). Borrowed money accounts for a part of the company's long-term debt in the capital structure composition (L. Gitman, 2015). On the other hand, focusing only on long-term borrowings may underestimate overall debt capital since some companies may be partly financed by short-term debt (L. J. Gitman et al., 2018). Consequently, recent studies of capital structure calculation suggest that short-term debt (excluding accounts payable) should be considered a permanent component of the capital structure (Moyer et al., 2014).

Prior research has established that the capital structure may be described as "a company's mix of financing sources." Maintaining an appropriate financial structure is critical for every business (Ahmed & Ahmed, 2019; Khachatryan et al., 2017). Simerly and Li (2000) argue that the option is important not just for maximising shareholder profits but also for the impact such choices have on an organisation's ability to adapt to its competitive environment. Empirical studies of capital structure determinants have mostly concentrated on the United States and other developed economies, with the topic under-researched in developing nations like Ghana. Booth et al. (2001) analyse the capital structure of ten (10) developing countries to find factors influencing it. Booth et al. (2001) concluded that, despite institutional differences, problems affecting industrialised countries equally affect developing ones. Bhaduri (2002) empirical study on corporate borrowing was limited to the Indian market. The author posited that the optimal capital structure is often determined by considering profit growth, firm size, cash flow, and productivity.

Financial firms' capital structures differ from non-financial firms' capital structures due to either a trade-off between debt and equity issuance or a hierarchical organisation of funding sources, namely debt, internal finance, and equity issuance/equity raising (N'Guessan & Hartarska, 2021). Equity comprises retained profits, common stock (owner equity), and other reserves. Commercial borrowing and deposits for deposits-taking MFIs constitute debt.

A characteristic of MFI finance is that a portion of MFIs' external financing is subsidised (Hansen et al., 2021). Donors, certain charities, and socially responsible investors continue to support many MFIs. Globally, it is estimated that 70% of MFIs continue to get subsidies from donors, governments, and other sources (International Monetary Fund, 2014). Subsidised external debt, often known as soft loans or concessionary borrowings, is negotiated under preferential terms, i.e., below-market rates by MFIs with the government (Adusei & Sarpong Danquah, 2021). They are often given by government assistance agencies (for example, the United States Agency for International Development, or USAID), multilateral banks (for example, the World Bank), or apex organisations and foundations (Adusei & Sarpong Danquah, 2021).

Soft equity, sometimes known as subsidised equity, is a financial instrument mostly distributed through micro-investment conduits (Hudon & Traca, 2011). Donors' anticipated returns are, in this instance, less than the market rate. Finally, MFIs are subsidised via contributions and cash, and contributors, in this instance, do not expect to receive anything in return. Subsidised equity is included in the definition of equity.

Domestic credit markets were the primary source of financing for MFIs since 2008, according to the Consultative Group to Assist the Poor and ADA (Appui au Développement Autonome). However, since they primarily operate as non-governmental organisations (NGOs), where deposits account for a relatively modest portion of their financial resources, some MFIs fund their development via foreign capital markets (Galema et al., 2011). Hudon and Traca (2011) indicate that this is also largely the case because the credit markets in the countries where MFIs operate are underdeveloped.

4. Capital structure and financial performance, and sustainability of MFIs

Given the declining financial performance of MFIs, efficiency evaluation is paramount (Wagner & Winkler, 2013). Achieving financial sustainability requires MFIs to offer long-term solutions that do not need raising interest rates or cutting services. "Sustainability" refers to MFIs' economic viability (Zeller & Meyer, 2002). MFIs have progressively started accepting deposits from clients, enabling the poor to save. By becoming deposit-taking institutions, MFIs may serve more unbanked clients and help them save money (Malikov & Hartarska, 2018). MFIs with donor assistance may choose outreach above efficiency (De Aghion & Morduch, 2004). Khachatryan et al. (2017) indicated that profit-driven private loans might be more successful than state money in achieving social objectives. MFIs' funding arrangements may also be categorised as liability or equity. Debt and equity

financing for MFIs must be understood. Each fund incurs distinct costs that contribute to the rate paid to borrowers (Khachatryan et al., 2017).

MFIs combine funds from many sources to provide the best mix of funds at the lowest cost. Again, commercial funds are needed to develop microfinance. The interests of capital stakeholders influence MFI's financial performance (Khachatryan et al., 2017). They used seemingly unrelated regression to examine MFI panel data from Eastern Europe (SUR). Grants, they say, help increase outreach, while concessional loans help increase outreach without compromising financial results. According to Tchuigoua (2014), the quantity of foreign money accessible to MFIs is affected by creditors' rights and financial sector development. As a result, MFIs will have greater access to external funding, supplementing the conventional banking sector.

Abrar and Javaid (2016) assess profitability using Return on Assets (ROA), Operational Self-Sufficiency (OSS), and Return on Equity (ROE), and the number of female borrowers, size of regulations, and age. The random-effects model was utilised in the analysis of unbalanced panel data from about 70 countries during 2004–2010. They found that deposits are the cheapest type of MFI borrowing. They also found that MFIs with high leverage ratios outperform MFIs with low leverage ratios. MFIs having a higher number of female borrowers are more lucrative owing to lower default rates. Female borrowers have a high propensity to pay on time than male borrowers to pay on time. V. Bogan (2007) also found that an MFI's assets and capital structure are linked to performance. On the other hand, outreach and grants as a percentage of assets have a negative effect on sustainability but a positive impact on MFI cost per borrower. It was found that increasing large MFI grant use decreases operational self-sufficiency. V. Bogan (2007) argue that long-term funding may lead to inefficient operations due to a lack of market competition. As a result, funding may hinder MFIs' transition into viable businesses.

Kar (2012) analysed a large panel dataset using (GMM) and (IV) estimation methods to investigate the impact of capital and financing arrangements on MFI performance. The study found that increasing leverage improves profit efficiency in MFIs by boosting ROA, ROE, and operating expenses per dollar borrowed (OELP). The financing structure had little impact on the breadth of outreach. In Ghana (Kyereboah-Coleman, 2007), studied MFIs from 1995 to 2004. The study reports that MFIs are severely indebted and depend on external funding, she found using fixed and random effects methods. According to the researchers, they also perform better because they can access a larger client base, gain from scale economies, and are better able to deal with moral hazards and adverse selection.

Size is seen as a risk indicator. Berger and DiPatti (2006) observe that larger corporations (in terms of total assets) are more diversified, have greater risk management knowledge, and benefit more from government guarantees (too big to fail). Gropp and Köhler (2010) examine a sample of European banks and demonstrate that liabilities rise in proportion to the bank's size. Additionally, they see a negative correlation between size and deposits. According to Khachatryan et al. (2017), size does not aid MFIs in raising money. However, they do discover that Latin America's big MFIs are more leveraged. Due to the low chance of insolvency for larger businesses, they are more likely to be leveraged. The empirical evidence on the impact of risk on the financial structure of MFIs enterprises is inconclusive. Frank and Goyal (2003) conclude that risk is not a dependable driver of the capital structure. The latter's findings indicate a negative and statistically significant link between leverage and risk. In the regulated banking business, it is expected that riskier institutions would retain greater ownership.

Gropp and Köhler (2010) discover that risk decreases leverage considerably. Additionally, the risk of default for a financial institution might be significant if the credit portfolio's quality is poor or severely polluted. Outstanding loans account for a significant share of these organisations' overall assets. Consequently, it is anticipated that a heavily polluted portfolio will raise the institution's risk of failure. Institutions with a low-quality portfolio often mitigate their risk of collapse by increasing

their equity and decreasing their indebtedness. Berger et al. (2014) postulate that banks with more vulnerable consumers should retain extra capital. Moreover, the portfolio's quality gives insight into the efficacy of the MFI's credit risk management mechanisms. As a result, it is hypothesised that lenders and donors see MFIs with low portfolio risk as less dangerous. External debt and gifts have a negative correlation with portfolio quality.

Current research on MFIs' capital structure, financial sustainability, and financial performance is conflicting. Based on their relative benefits, they are focused on the financial structure's determinants to demonstrate how an MFI may finance a firm's operations through debt and equity. Less research is done on MFIs' financial structure and its effect on financial sustainability in Ghana. It is also imperative to examine the effect of microfinance funding arrangements and sustainability.

5. Methodology

5.1. Econometric model

This empirical analysis examines the effect of capital structure on micro-finance institutions' performance and financial sustainability (MFI). Thus, the study implements multiple regression methods to investigate the relationship between the observed performance indicators and a set of explanatory variables. We follow V. L. Bogan (2012) and specify the capital structure—firm performance relationship as follows:

$$Perf_{it} = \beta_0 + \sum_{i=1}^{3} \beta_i X_{it} + \sum_{j=4}^{6} \beta_j Y_{it} + \sum_{k=7}^{8} \beta_k Z_{it} + \in_{it} \quad (1)$$

where Perf represents performance indicators, X represents MFI capital structure variables, Y represents MFI idiosyncratic variables, Z represents country-level macroeconomic indicators, and $\in$ is the error term. The performance indicators include Rerun on Assets (ROA) and operational self-sufficiency. The independent variables include the MFI capital structure variables (debt to asset ratio, debt to equity ratio and equity to asset ratio), MFI characteristic variables (size, business risk and liquidity) and the country-level macroeconomic indicators (real GDP growth and inflation). The variables included in this study are consistent with the literature (for example (V. L. Bogan, 2012; Vătavu, 2015)., A detailed description of all the variables used is contained in Table 1.

This paper further examines the impact of capital structure on the financial sustainability of MFIs. Given that the data on MFI are collected from the MIX Market, the study utilises their definition of financial sustainability. The MIX Market defines financial sustainability as having an operational self-sufficiency level of 110% or more (V. L. Bogan, 2012). Thus, to examine the impact of capital structure on the financial sustainability of MFIs, we specify a probit model[1] in which the dependent variable is the probability that an MFI is financially sustainable, and the independent variables are MFI capital structure variables, MFI idiosyncratic variables and country-level macroeconomic indicators. The probit model is specified as follows:

$$FS_{it} = \beta_0 + \sum_{i=1}^{3} \beta_i X_{it} + \sum_{j=4}^{6} \beta_j Y_{it} + \sum_{k=7}^{8} \beta_k Z_{it} + \in_{it} \quad (2)$$

where financial sustainability (FS) is a dummy variable defined as equal to 1 if the MFI is financially sustainable and zero otherwise. All other variables parameters are as hitherto defined.

We test for possible endogeneity in our sample. In a regression equation, endogeneity problems violate the orthogonality assumption that the covariance between a predictor and the disturbance term equals zero. We evaluate the assumption that one or more of the regressors are endogenous using the Durbin-Wu-Hausman test (augmented regression test) for endogeneity. The test, first

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Table 1. Measurement of study variables

Variable	Notation	Measurement	Expected Sign
Dependent variable			
Return on Asset	ROA	$\frac{Net\ Income}{Average\ Total\ Assets}$	
Operational Self-Sufficiency	OSS	$\frac{Total\ Operating\ Revenue}{Operating\ Cost + Financing\ Cost + Loan\ Loss\ Provision}$	
Independent Variables			
MFI capital structure variables			
Equity to Asset Ratio	EAR	$\frac{Equity}{Assets}$	-/+
Debt to Asset Ratio	DAR	$\frac{Debt}{Asset}$	-/+
Debt to Equity Ratio	DER	$\frac{Debt}{Equity}$	-/+
Control Variables			
MFI characteristic variables			
Firm Size	Size	$ln(Total\ Assets)$	+
Risk	Risk	$\frac{\text{Loan provision amount}}{\text{Total outstanding loans}}$	-/+
Deposit to Loan Ratio (as a measure of liquidity and fund sources)	DELR	$\frac{Deposit}{Loan}$	+
Country-level macroeconomic variables			
Real GDP growth	RGDP	Annual percentage change in Real GDP	+
Inflation	INF	Annual percentage change in Consumer Price Index	-/+

proposed by Durbin (1954), was also separately espoused by Wu (1973) and Hausman (1978). The Durbin-Wu-Hausman test checks for the endogeneity of a variable by comparing ordinary least squares (OLS) estimates to instrumental variable (IV) estimates. The null hypothesis is that the variables are exogeneous and an ordinary least squares estimator of the same equation would yield consistent estimates. A rejection of the null indicates that instrumental variables techniques are required as endogenous regressors' effects on the estimates are meaningful.

We tested for overidentifying restrictions in the 2SLS estimation using the Sargan's (1958) and Basmann's (1960) chi-squared tests. Tests of overidentifying restrictions test whether the instruments are valid and uncorrelated with the error term. The overidentifying restrictions tests also examine whether the equation is misspecified and that one or more of the excluded exogenous variables should be included in the structural equation. Thus, a statistically significant test statistic indicates that the instruments may not be valid. Both test statistics (Table A1, Appendix) are insignificant, thereby indicating that the instruments are valid and the structural model is specified incorrectly.

The null hypothesis of the Durbin and Wu—Hausman tests is that the variable under consideration can be treated as exogenous. We tested for exogeneity of all the endogenous regressors (MFI capital structure variables and MFI characteristic variables) in our model. The test results (Table A1, Appendix) shows that both test statistics are insignificant; thus, there is not sufficient information in the sample to reject the null hypothesis of exogeneity. The test of the exogeneity of the variables indicates that the regressors in our models can be treated as exogenous.

Thus, we proceed to estimate equation (2) via the regular probit regression. The static model in equation (1) is estimated via the fixed effects regression to control for any environmental and corporate differences that may affect MFI performance and sustainability. As a robustness check, we implement the random effects regression to control for potential correlation between the regressors and unobservable individual MFI effects. Fixed effects models look at the relationships

between the explained variable and independent variables as separate entities, assuming each company has unique qualities that influence the correlations between variables. On the other hand, random-effects models suggest a random variation across entities that is unrelated to explanatory variables (Vătavu, 2015).

6. Study variables

The study variables, MFI performance and sustainability measures, capital structure, MFI characteristics and macroeconomic indicators are defined as follows.

7. Data

Secondary data was collected from the MFIs licensed by the Bank of Ghana. As of April 2021, the Bank of Ghana licensed 137 deposit-taking microfinance institutions operating in Ghana. Data for the research was gathered from the annual reports and financial statements of the sampled MFIs ranging from 2000 to 2019, constituting a panel of secondary data (comprising cross-sectional and time-series data). Besides, the datasets from the MIFs reporting on the MIX market were used. The study sampled 51 MFIs from a total population of 137 MFIs licensed by the Bank of Ghana for the study. The 51 MFIs sampled are reporting on the MIX market, and therefore, data accessibility was more reliable and easier to gather. Data on the macroeconomic indicators were gleaned from the IMF's International Financial Statistics.

Table 2 presents the summary statistics of the variables used in the analysis. Return on Assets averaged 10.60 over the study period. This compares favourably to the mean ROA of 2.72 reported by Parvin et al. (2020) for 187 MFIs in Bangladesh over the period 2005–2014. With average operational self-sufficiency of 1.18, the MFIs could be deemed to be operationally sustainable. The MIX Market defines operational sustainability as having 100% or more operational self-sufficiency. On average, the MFIs could also be deemed financially sustainable over the period 2000–2019 as per the definition of MIX Markets. The data shows that the debt to asset ratio averaged 70%, while the equity to asset ratio averaged 75%.

While there is little variation among the MFIs regarding debt to asset ratio, the MFIs are widely apart regarding their equity to asset ratio. The financing mix of the MFIs appears to be tilted towards equity as the mean debt to equity ratio stood at 46%. On average, the deposit to loan ratio of the sampled MFIs stood at 60% over the period 2000–2019. This may suggest that the loan portfolios of the MFIs were largely financed out of deposits. The average loan provision as a ratio of the total loan portfolio stood at 1.08. This may suggest that the MFIs were prepared to undertake considerable risk to improve their earnings. The MFIs appear not to be widely apart in size as the (log of) total asset ranges from a minimum of 4.56 to a maximum of 10.73. The MFIs have operated in an inflationary macroeconomic environment, with the inflation rate averaging

Table 2. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
ROA	10.60	9.90	−8.18	29.65
OSS	1.18	0.47	−4.94	2.36
EAR	0.75	9.58	0.01	33.09
DAR	0.70	0.17	0.17	1.16
DER	0.46	0.20	0.01	0.78
DELR	0.60	0.35	0.03	1.37
Size	8.61	1.12	4.56	10.73
Risk	1.08	1.58	−0.74	26.07
RGDP	6.01	2.64	2.18	14.19
INF	15.02	6.65	7.13	32.91

15.02% over the sample period. Economic growth fluctuated greatly over the period, from a minimum of 2.18% to a maximum of 14.19%.

8. Estimation results

The results of estimating equation (1) are presented in Table 3 (random effects regression) and Table 4 (fixed effects regression). The estimates show that both random and fixed effects regression produce consistent results. The estimates show that the assets log is significant and positively related to return on assets and operational self-sufficiency. This suggests that larger MFIs have increased returns and operational self-sufficiency as measured by assets. The perceived risk of larger institutions is lower than their smaller counterparts. This enables larger institutions to raise capital at a lower cost. Besides, MFIs with large assets are better positioned to provide improved security to the lender. Also, large MFIs are more diversified and less vulnerable to bankruptcy. Ultimately, larger institutions are expected to be comparatively highly profitable and operationally self-sufficient because of greater access to cheaper sources of funds.

The results show that deposit as a ratio to loan is significant and relates negatively to return on assets and operational self-sufficiency. This result is counterintuitive but consistent with the findings of V. L. Bogan (2012). Conventional banking theory predicts a positive relationship between deposits and profitability since an increase in financing improves liquidity and is followed by an increase in profits. The results show that liquidity is critical to the performance and sustainability of MFIs and may suggest that Ghanaian MFIs are faced with low liquidity levels. The risk variable has a significant and positive impact on the performance of MFIs. Bashir et al. (2012) explain that risk adds a greater depth to understanding a bank's risks when it tries to obtain higher returns. When a financial institution takes on greater capital risk, its leverage multiplier and return on assets, ceteris paribus, are higher. However, the risk variable correlates negatively with operational self-sufficiency, though insignificant. This shows the dangers of greater risk and asset quality to the operational sustainability of the MFIs.

Capital structure impacts significantly on returns on assets. Both equity and debt correlate negatively with ROA. However, the capital structure exerts an insignificant impact on the

Table 3. Random effects estimates of the effect of capital structure on the performance and financial sustainability of MFIs

Dependent Variable	ROA		Operational Self Sufficiency	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
EAR	−0.042**	0.020	−0.001	0.001
DAR	−0.314	1.144	0.046	0.084
DER	−3.039**	1.450	0.027	0.102
DELR	−1.676*	0.873	−0.712***	0.061
Size	0.437*	0.265	0.013	0.019
Risk	0.355***	0.121	−0.010	0.009
RGDP	−0.192**	0.075	0.003	0.006
INF	0.004	0.030	0.005**	0.002
Constant	10.222***	2.792	1.202***	0.197
Obs.	1014		1014	
N	51		51	
Wald[p-value]	36.82[0.00]		19.81[0.00]	

Notes: The estimates are via the random effects regression. SE represents standard errors. ***, **, * represent significant at 1%, 5% and 10% value respectively. Estimating the model without the constant or/and control variables leaves the results qualitatively unchanged.

Table 4. Fixed effects estimates of the effect of capital structure on the performance and financial sustainability of MFIs

Dependent Variable	ROA		Operational Self Sufficiency	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
EAR	−0.039**	0.019	−0.001	0.001
DAR	−0.523	1.161	0.058	0.085
DER	−3.501**	1.577	0.019	0.116
DELR	−2.208**	0.961	−0.118**	0.071
Size	0.536*	0.287	0.024	0.021
Risk	0.363***	0.122	−0.012	0.009
RGDP	−0.193**	0.075	0.003	0.006
INF	0.003	0.030	0.005**	0.002
Constant	10.057***	2.892	1.326***	0.213
Obs.	1014		1014	
N	51		51	
F test[p-value]	11.65[0.00]		7.41[0.00]	

Notes: The estimates are via the fixed effects regression. SE represents standard errors. ***, **, * represent significant at 1%, 5% and 10% value respectively. Estimating the model without the constant or/and control variables leaves the results qualitatively unchanged.

operational self-sufficiency of the MFIs. While equity capital relates negatively with operational self-sufficiency, debts correlate positively with operational self-sufficiency. The evidence shows that while the source capital may not matter for improving the returns of MFIs, their operational self-sufficiency is dependent on the type of capital. The capital structure and operational self-sufficiency relationship emphasise the importance of financial considerations in corporate investments. The relationship between equity capital and performance contrasts with the signalling theory but is consistent with the agency cost theory. The agency cost theory predicts a decrease in financial performance when increased equity. The agency theory suggests that debt serves as a disciplining device to prevent managers from wasting free cash flows. The bankruptcy costs argument supports the inverse relation between debt ratios and ROA, while the disciplining role of debt and tax deductibility benefits explain the positive correlation between debt ratios and operational self-sustainability. The findings emphasise Jensen (1986)'s assertion that firms can only maximise their value by matching debt costs with their benefits.

GDP growth is included to control for cyclical output effects. Favourable macroeconomic conditions are expected to have a positive influence on bank profitability. But in times of economic slack and recession, the credit quality deteriorates, default increases, and bank return decreases (Flamini et al., 2009; Shi et al., 2021). The estimates show that GDP growth has a significant and negative impact on return on assets. The evidence may suggest that economic progress has been sluggish, and the macroeconomic environment in the country has been poor. We account for the macroeconomic risk by controlling for inflation. The results show that inflation exerts a significant and positive effect operational self-sufficiency of MFIs. This may indicate that the MFIs considerably anticipate inflation changes. Flamini et al. (2009) explain that the extent to which inflation affects bank profitability depends on whether future inflation movements are fully anticipated. Thus, the ability of the MFIs to accurately anticipate and forecast inflation is equally important. Surprise inflation could raise costs due to imperfect interest rate adjustment, while an inflation rate that is fully anticipated is expected to raise bank profits as banks can appropriately adjust interest rates.

Table 5. Effects of capital structure on the financial sustainability of MFIs (Probit regression estimates)

Variable	1	2	3	4
EAR	0.005 (0.007)	0.004 (0.007)	0.003 (0.008)	0.003 (0.007)
DAR	−0.156 (0.279)	−0.161 (0.278)	0.026 (0.238)	0.137 (0.222)
DER	0.011 (0.348)	0.011 (0.344)	0.191 (0.329)	0.314 (0.311)
DELR	−0.501** (0.212)	−0.479** (0.211)	−0.417** (0.204)	−0.337** (0.198)
Size	0.055 (0.037)	0.067** (0.033)		
Risk	−0.039 (0.031)	−0.040 (0.031)		
RGDP	−0.009 (0.019)		−0.001 (0.017)	
INF	0.011 (0.008)		0.015** (0.007)	
Obs.	1014	1014	1014	1014
N	51	51	51	51
Wald[p-value]	12.75[0.00]	9.03[0.00]	9.32[0.00]	3.77[0.00]

Notes: The estimates are obtained via probit regression. Column 1 reports the results for the model, including MFI capital structure variables, MFI characteristic variables and country-level macroeconomic indicators. Column 2 shows the estimates when the country level macroeconomic indicators are excluded, while column 3 shows the estimates when MFI characteristic variables are excluded. Column contains the estimates without the control variables. Standard errors are in the parentheses. ***, **, * represent significant at 1%, 5% and 10% value respectively.

The probit model results (Table 5) are consistent with the random effects and fixed effects regressions and show that size is positively related to financial sustainability. Also, the deposit ratio correlates negatively with the financial sustainability of MFIs. Again, this is counterintuitive but betrays the rather low levels of liquidity within the ranks of MFIs in Ghana. Inflation is positively related to financial sustainability and shows that inflation is fully anticipated and factored into the interest rates charged by the MFIs. Capital structure variables exert an insignificant impact on the financial sustainability of MFIs. This may lay some credence to the so-called irrelevance argument by Modigliani and Miller (1958). The Modigliani and Miller theorem provides the theoretical basis for the approach to deemphasise the importance of financial considerations in corporate investments (Ahiadorme et al., 2018).

9. Conclusion

Financial and economic variables can explain the performance and sustainability of MFIs. This study examines how capital structure affects the profitability, self-sufficiency, and financial sustainability of MFIs. The empirical analysis involves 51 MFIs in Ghana. Results of this research find that capital structure is relevant to the profit performance of MFIs. Various factors other than capital structure variables seem to be associated with the performance of MFIs.

This study finds strong empirical support for the notion that asset size is significantly and positively related to returns on assets, self-sufficiency, and financial sustainability. Large MFIs are more diversified, less vulnerable to bankruptcy, and more likely to be highly profitable and operationally self-sufficient. Deposit as a ratio of loans is negatively and significantly related to returns on assets, operational self-sufficiency, and financial sustainability. This result is counterintuitive but lays credence to the low level of liquidity among MFIs in Ghana. The finding emphasises the importance of liquidity to the profitability, self-sufficiency, and financial sustainability of MFIs.

Capital structure variables are strongly associated with profitability but exert insignificant impacts on operational self-sufficiency and financial instability of MFIs. Both equity capital and debt reduce the profitability capacity of MFIs. This may suggest that highly leveraged institutions are prone to distress, bankruptcy costs and other inefficiencies that negatively impact their profit credentials. The financial crisis of 2007–2008 has shown that highly leveraged financial institutions are at the risk of distress and potential insolvency, even with a small decrease in asset value. While debt financing may offer tax deductibility benefits and may be cheaper than equity, it may undermine the profit incentives of MFIs with already weaker profit positions. Low-capitalised MFIs have more debt in their capital structure and are deemed riskier by investors, which raises the cost of issuing equity. The negative relationship between equity capital and profitability raises questions about how MFIs harness local equity capital. This presents an avenue for further research.

The macroeconomic environment also matters to the profitability, self-sufficiency, and sustainability of MFIs. Economic slack and recession worsen liquidity as credit quality deteriorates and the risk of default increases. Inflation surprises also tend to undermine the correct pricing of credits with its attendant impact on profitability and self-sufficiency. Thus, a fully anticipated inflation ensures interest rate adjustments and improved profit positions.

The findings provide some useful insights that could have policy implications for MFIs. While improving the financing and liquidity of MFIs is critical, it is not guaranteed that profitability, self-sufficiency, and financial sustainability will improve. The ability of the institutions to improve security and lessen the risk is critical in ensuring profit efficiency and self-sufficiency. Increased funding to MFIs with poor asset quality and greater risk could generate potential negative effects. Also, the ability of MFIs to anticipate macroeconomic risks, including inflation and factoring same into their pricing and decisions, is important in enhancing their profitability, self-sufficiency, and financial sustainability. The investment climate remains important in the financial performance and sustainability of MFIs. Thus, a relatively stable macroeconomic environment is essential to enhancing the financial performance and sustainability of MFIs.

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Disclosure statement
No potential conflict of interest was reported by the author(s).

Citation information
Cite this article as: Capital structure, financial performance and sustainability of Microfinance Institutions (MFIs) in Ghana, Rowland Seyram Koku Dabi, Nugraha, Disman & Maya Sari, *Cogent Economics & Finance* (2023), 11: 2230013.

Note
1. Probit performs relatively better in the case of both random and fixed effects effects models with moderate or large sample sizes (Hahn & Soyer, 2005)

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Appendix

Table A1. Test of endogeneity

Dependent Variable	ROA		Operational Self Sufficiency		Financial Sustainability	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
EAR	−0.041	0.039	0.003	0.003	−0.001	0.002
DAR	0.197	1.928	−0.058	0.134	0.004	0.015
DER	−0.694	1.225	0.140	0.085	0.002	0.009
DELR	0.401	0.710	0.034	0.049	−0.003	0.005
Size	−0.062	0.224	0.010	0.016	−0.003*	0.002
Risk	0.582**	0.267	0.006	0.018	0.002	0.002
RGDP	−0.193**	0.093	0.002	0.006	0.003	0.007
INF	0.002	0.039	0.005*	0.003	−0.001	0.003
Constant	11.577***	2.819	0.951***	0.196	0.076***	0.022
Tests of endogeneity—HO: Variables are exogenous						
Test	**Test Statistic**	**p-value**	**Test Statistic**	**p-value**	**Test Statistic**	**p-value**
Durbin	9.17	0.16	3.38	0.76	3.85	0.69
Wu-Hausman	1.52	0.17	0.56	0.77	0.63	0.70
Tests of overidentifying restrictions						
Test	**Test Statistic**	**p-value**	**Test Statistic**	**p-value**	**Test Statistic**	**p-value**
Sargan	0.23	0.89	1.21	0.55	0.61	0.74
Basmann	0.23	0.89	1.19	0.55	0.60	0.74

Notes: The estimates are via the instrumental variables 2SLS regression. SE represents standard errors. ***, **,* represent significant at 1%, 5% and 10% value respectively. The instruments include the first lag of the regressors.