



## The Impact of Capital Structure on the Profitability of Microfinance Institutions

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### ABSTRACT

*The study focuses on the sources of funding and the relative profitability derived by the microfinance organizations. The study considers three variables, which relate to the profitability (a dependent factor): return-on-assets (ROA), operational-self-sufficiency (OSS), and return-on-equity (ROE). The independent factor (financial sources), on the other hand, employs: deposit-to-asset, net-deposits, and lastly debt-to-equity ratio. Moreover, the control variables specified in this study are that of women borrowers, size regulations, and age. The study utilizes cross-sectional (unbalanced) panel data (2004-10) from about seventy countries around the world, covering up to six regions globally. To bring forth estimations for the models used, the random-effect-model has been employed. The results indicated that deposits enhance the levels of debt in ones' capital-structuring, thereby complementing the firm's overall profitability. Whereas, increased amounts of operating costs and relative risks juts down the profitability. As with the variables of control, the t-test leads us to the conclusion that micro-financiers with more women borrowers enjoy a significantly higher profitability, perhaps due to less default-risk brought about by the regular loan repayments.*

**Keywords:** Return on equity, return on assets, operational self sufficiency, portfolio at risk, micro-finance institutions.

### Introduction

When it comes to the microfinance organizations, sustainability is perhaps the key derivate of profitability itself. Since lower–profitability is a likely factor of failing business operations, and in-turn relative insolvency and negative shocks-absorbance. Moreover, a lack of profitability for the micro-financing businesses is bound to lead to failing financing operations. Furthermore, the success of micro-financiers is primarily dependent upon the environment where they operate in, and whether or not it affirms of: competitive strategies,

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risk management capabilities, efficiency, the relative quality of management, and higher levels of capitalization.

Moreover, the area of micro-financing also brings about many queries essential for research and policy making. Furthermore, the industry of microfinance highly promotes investments of the smaller scale, since it helps generate revenues which otherwise would have remained unrealized. In addition, agency costs in the micro-financing businesses may actually be higher; since micro-financiers need inscribe private information of their borrowers.

Financing always involves a tradeoff between stable-returns and increased-risks and optimization between the two is how shareholder wealth is to be sustainably maximized. Therefore, an optimal financing choice involves a balanced mix of the preferred-stock, common-stock, and bonds. As for example, in a favorable economy, an increase in the debt ratio leads to an increased return on equity. While, during a recession perhaps, a higher debt ratio is highly unsustainable as it compromises the relative stream of earnings. It is since, an increased amount debt requires an increased amount of interest payments to be made by the firm; for which, increasing the profitability, an increased amount of lending to the customer is required, which puts the firm at risk; although debt is considered as first-step-resource for the microfinance businesses. This study not only considers debt financing, although it is the most important source, but also considers other types of debt and their relative characteristics, which differ with relation to debt-suppliers and the subsequent maturity levels..

### **Rationale of the Study**

The research aims to investigate the role of the various micro-financing sources (of capital/debt), and how they influence the profitability of the micro-financing institutions. Therefore, the research looks into whether the life-cycle stages of the financial funds and the relative sources of the financial funds express an association with the firms' profitability.

### **Objective of the Study**

This research aims to:

- Examine the factors of sustainability and their effect on a micro-financing firm's profitability.
- Examine the several indicators given weight when making decisions with regard to the type funding sources employed.
- Analyze, on a global scale, as to how the different combinations of capital-structure affect a micro-financing firm's profitability.

### **Research Questions**

The following research questions w.r.t. the capital structuring will be delved into:

- What affect do increased deposits play in a micro-financing firms profitability.
- Which combination of equity and debt is optimal for an ensured profitability of the micro-financing firms?
- Do varying financial sources affect a microfinance firm's profitability?

Focusing upon the above-mentioned questions, we seek to inquire more about the presumably determining factors (funding sources) of the micro-financing firms' profitability.

## **Significance of the Research**

The study inquires:

- Whether a micro-financing institution's location, status, related regulations, and lending methodologies used also significantly affect the profitability.
- Whether an optimal capital-structure choice does in-fact strongly affect the relative profitability.
- Whether the high leverage-based micro-financing institutions enjoy higher levels of profitability as when compared to the equity-based ones.

## **Literature Review**

Capital structure has long been a topic of intrigue and various theories have come about to bridge the gaps and to offer solutions; yet, with each theory remain some pros and cons. As Abor (2005) notes that insofar the best that we've come close to are the available prescriptions which help us take mid to short-term decisions of capital-structuring.

Moreover, Modigliani and Miller (1958) assert to the contrary and have shown that high leverage translates to better profitability. Ledgerwood (1999) refers to the "micro" in micro-financing as "facilitation" provided to the low-income earners whereby they can save small amounts of money and can subsequently receive interest returns. Furthermore, the empirical studies focusing on the proposition of agency costs are still mixed and contestable (Mersland & Strom, 2007); as most of the agency-costs related studies estimate an MFIs profitability based on the regression-model and the relative equity, debt and capital ratios.

Abor (2005) collected data from both the small and medium scale enterprises of Ghana, the analysis of which established that an increased short-term debt ratio significantly positively impacts the returns-on-equity.

Other studies on profitability and capital structure report that both the short and the long run liability-financing leads to reduced profitability (Chiang, Chan, & Hui, 2002; Caesar & Holmes, 2003; Olivares-Polanco, 2005 and Gleason, Mathur, & Mathur, 2000). With contradictory results from among the previous researches, it becomes apparent that the link between profitability and the relative financing-decision is viable of a research focus.

Meanwhile, deposits-to-assets ratio is comparatively highly relevant for the micro-financing firms which mobilize the deposits. A lower ratio allows the micro-financing firms to fund their assets directly from the deposit-base; while a comparatively larger deposit-collection (as a ratio to the total-assets) brings us with reduced funding-costs, all the while it is presumed that the operation and the financial cost-efficiencies are maintained in the deposit-program. A higher ratio means that more and more funding must have to be external, which is a relatively costly funding source. Micro-financing firms not only utilize deposits as a financing tool; but also, indirectly perhaps, employ deposit-financing since it brings about expenses on the management, which often acts as a burden demanding for better management, resulting in profitability gains (Hollis & Sweetman, 1998).

Similarly, portfolio-to-asset also acts as a measure of credit risk; since debt is regarded as being more risky and less liquid (as when compared to the assets), in a micro-financing firm's capital-structure. Furthermore, the interest rate charged on lending by micro-financing firm's also price their loans highly as they add to it what they describe as "risk premium"; which is basically a cost collected by the MFI-firms due to a relatively larger number of net-defaulters, to compensate for which MFIs deal this credit-risk as added cost and in-turn a larger interest-rate. Thus, MFIs with a comparatively bigger portfolio-to-asset ratio experience a subsequent risk of failure at all times.

On the other hand, a higher portfolio-to-asset ratio also informs us of the MFI has a deeper understanding of the relative strengths of the borrowers (whereby curtailing the

mediation and bad-debt costs) and that the lending function is properly administered at the particular MFI, resulting in an enhanced profitability (Freixas, 2005). Meanwhile, a higher gross-loan-portfolio to total-assets ratio implies increased risk associated with the net interest revenue. However, unlike the retail profit-seeking banks (whose interest-rates primarily comprise of the: costs of funds, bad-debt costs, and administrative costs), the micro-financing loans are subject to exceptionally higher transaction costs (Cull, Demirgüç-Kunt, & Morduch, 2009). Moreover, the micro-financing operations are, to a great extent, dependent on personal contacts, which results in greater transaction cost per loan, since the clients of micro-financing institutions may often reside in inaccessible locations and the execution of loan-deals through the means of personal contacts is time-consuming of a process. Due to the afore-mentioned reasons portfolio-to-asset ratio is expected to hold a significantly positive relationship with profitability.

Furthermore, a broad range of sources of financial-funding provides with: financial flexibility, wider chances of diversification, an encouraged long-term solvency and thus, risk mitigation (Consultative Group to Assist the Poor [CGAP], 2007).

A study consisting of a data-set of 290 MFIs (belonging from 61 countries), points out that most of the micro-financing firms incorporate more of debt-financing in their structures (long term debt in particular). The findings also propose that debt-financing enables the micro-financing firms to better reach a larger number of customers and experience greater economies of scales, allowing MFIs to better cope with moral hazards and tough situations. The findings also conclude that the ratio of total-debt to short-term-debt significantly negatively impacts the ROA, while significantly positively affecting the ROE; strongly suggesting that profitable MFIs rely more on the long-term debt financing (Kyerboah-Coleman, 2007).

As through micro-financing, borrowers can apportion savings in building-up assets, which are then used as security. This helps the borrowers maintain their seasonal consumption, acts as a buffer with regard to shocks and enables them to finance major expenditures. As Ledgerwood (1999) describes voluntary and compulsory savings, stating that voluntary savings are much easier to be adopted as when compared to the compulsory savings, since these are provided by the MFIs to not only the borrowers but also the non-borrowers and are not considered to be an obligation towards the accessing credit services of MFIs.

Furthermore, since savings play an essential part in the economic growth and exploitation, MFIs rely on them all the more so. Savings are the primary source of investment funds, and for the MFIs' customers these primarily lead to: coverage of health-care and educational costs, and inputs purchased for agricultural crops; thus savings are essential to meet these investment needs. The most important question here is perhaps that of whether the savings collected by the MFIs are apportioned relatively equally for both the rural and urban areas. Furthermore, savings mobilization is often a long-term strategic-decision for most of the MFIs out there. Since savings do not relate to the volatility of interest-rates and other external sources, they are perhaps the foremost independent financing source for most of the credit activities of a MFI. Moreover, depositors at MFIs highly value guaranteed access and security of their savings, while an interest rate is the second most attractive feature of making deposits. It is however noted that a borrower's primary concern is a lowest possible interest rate. Therefore, it is apparent that MFIs must work on the factor of trust in order to encourage depositors, and thereby be able to offer lower interest rates; for which it is crucial for the MFIs to adhere to sound, professional, and ethical management.

## **Theoretical Framework**

The research includes three independent variables: deposits-to-assets ratio, debt-to-equity ratio, and portfolio-to-assets ratio. To measure the profitability of the micro-financing firms the considered proxies are that of Return on Assets (ROA), Operational Self Sufficiency (OSS), and Return on Equity (ROE), which act as dependent variables in the study. While the factors of firm-age, firm-size, and portfolio-at-risk by 90 days are taken as control variables. Furthermore, three dummy variables of total deposit receipts, women borrowers and regulations are also included in the study; which take a value of 1 if they are identified as parts of the MFIs, if not, 0. The conceptual framework of this study is as follows:

## **Hypotheses**

The following hypotheses are used to test the relationships as lying between the independent variables and the dependent variables:

**H<sub>1</sub>:** More leveraged micro-financing institutions have larger profitability margins.

**H<sub>2</sub>:** Older micro-financing institutions have larger profitability margins.

**H<sub>3</sub>:** The higher the amounts of deposits taken-in by the MFIs, the greater is their profitability.

**H<sub>4</sub>:** TMFIs with more women borrowers have larger profitability margins.

**H<sub>5</sub>:** Large-scale (size) MFIs have larger profitability margins.

## **Data and Methodology**

The study utilizes an unbalanced panel data of 382 MFIs from across seventy countries around the world. The data ranges from the year 2004 to the year 2010, whereby Microfinance Information Exchange (mix) is the data-source. Five-star MFIs have been taken into account in the present study, since their numbers are periodically audited; as the data has been previously externally audited, it is granted to be reliable.

Furthermore, the micro-financing industry is characterized by a differing production function than that of conventional retail banks or corporate entities. The micro-financing sector is very diverse in terms its industrial organization; whereby MFIs are organized as not-for-profit organizations (NPOs) credit unions, and as banks or non-bank financial institutions. It can therefore be argued that additional factors come into play and impact the profitability of the MFIs, along with the known specifics of banking industry, one example being the measures of outreach. An empirical approach based on the theoretical predictions relevant to the MFIs, might be useful to identify the various instruments of funding and their respective impacts on the firm's profitability.

The following methodology is utilized to complement the current study, whereby the investigation of variables has been developed by Cull, Demirgüç-Kunt, and Morduch(2009):

### **Model 1**

$$OSS_{it} = \alpha + \beta_1 DT_{it} + \beta_2 EAR_{it} + \beta_3 DTA_{it} + \beta_4 DER_{it} + \beta_5 GLPTA_{it} + \beta_6 PAR90_{it} + \beta_7 EFF_{it} + \beta_8 SIZE_{it} + \beta_9 WC_{it} + \beta_{10} AGE_{it} + \varepsilon_{it}$$

### **Model 2**

$$ROE_{it} = \alpha + \beta_1 DT_{it} + \beta_2 EAR_{it} + \beta_3 DTA_{it} + \beta_4 DER_{it} + \beta_5 GLPTA_{it} + \beta_6 PAR90_{it} + \beta_7 EFF_{it} + \beta_8 SIZE_{it} + \beta_9 WC_{it} + \beta_{10} AGE_{it} + \varepsilon_{it}$$

### **Model 3**

$$ROA_{it} = \alpha + \beta_1 DT_{it} + \beta_2 EAR_{it} + \beta_3 DTA_{it} + \beta_4 DER_{it} + \beta_5 GLPTA_{it} + \beta_6 PAR90_{it} + \beta_7 EFF_{it} + \beta_8 SIZE_{it} + \beta_9 WC_{it} + \beta_{10} AGE_{it} + \varepsilon_{it}$$

**Model 4**

$$OSS_{it} = \alpha + \beta_1 DT_{it} + \beta_2 EAR_{it} + \beta_3 DTA_{it} + \beta_4 DER_{it} + \beta_5 GLPTA_{it} + \beta_6 PAR90_{it} + \beta_7 EFF_{it} + \beta_8 SIZE_{it} + \beta_9 WC_{it} + \beta_{10} AGE_{it} + \beta_{11} DT * DER_{it} + \beta_{12} GLPTA * AGE_{it} + \varepsilon_{it}$$

**Model 5**

$$ROE_{it} = \alpha + \beta_1 DT_{it} + \beta_2 EAR_{it} + \beta_3 DTA_{it} + \beta_4 DER_{it} + \beta_5 GLPTA_{it} + \beta_6 PAR90_{it} + \beta_7 EFF_{it} + \beta_8 SIZE_{it} + \beta_9 WC_{it} + \beta_{10} AGE_{it} + \beta_{11} DT * DER_{it} + \beta_{12} GLPTA * AGE_{it} + \varepsilon_{it}$$

**Model 6**

$$ROA_{it} = \alpha + \beta_1 DT_{it} + \beta_2 EAR_{it} + \beta_3 DTA_{it} + \beta_4 DER_{it} + \beta_5 GLPTA_{it} + \beta_6 PAR90_{it} + \beta_7 EFF_{it} + \beta_8 SIZE_{it} + \beta_9 WC_{it} + \beta_{10} AGE_{it} + \beta_{11} DT * DER_{it} + \beta_{12} GLPTA * AGE_{it} + \varepsilon_{it}$$

**Table 1:**

VARIABLE	ABBREVIATIONS	FORMULA	PREDICTED EFFECT
Return on Assets	ROA	$\frac{\text{Net Profit}}{\text{Total Assets}}$	
Return on Equity	ROE	$\frac{\text{Net Profit}}{\text{Total Equity}}$	
Operational Self Sufficiency	OSS	$\frac{\text{Operating Income}}{\text{Operating Expenses} + \text{Financing Cost} + \text{Provision From Loan}}$	
Deposit Taking	DT	Accepts= 1, Otherwise=0	+ve
Portfolio to Assets ratio	PAR	$\frac{\text{Deposit}}{\text{Adjusted Gross Loan Portfolio}}$	+ve
Deposit to Assets ratio	DAR	$\frac{\text{Deposits}}{\text{Total Assets}}$	+ve
Debt to Equity ratio	DER	$\frac{\text{Debt}}{\text{Equity}}$	In Determined
Equity to Assets ratio	EAR	$\frac{\text{Equity}}{\text{Total Assets}}$	+ve
Portfolio at Risk 90 days	PAR > 90 DAYS	$\frac{\text{Loan Portfolio Over Due By 90 Days}}{\text{Adjusted Gross Loan Portfolio}}$	-ve
Efficiency	EFF	$\frac{\text{Adjusted Operating Expenses}}{\text{Adjusted Average Gross Loan Portfolio}}$	-ve
Age	AGE	No of Years of Operations As Microfinance Institution	-ve
Firm Size	SIZE	Log of Total Assets	+ve
Women Borrowers	WB	Percentage of Microfinance Institution Women Clients	+ve
Size of Loan	ALB	$\frac{\text{Average Loan Balance Per Borrower}}{\text{Gini Per Capita}}$	+ve
Regulated	REG	If Regulated=1, Otherwise=0	+ve

**Table 2: Descriptive Statistics**

	OSS	ROA	ROE	EAR	DER	DTAR	WC	GLPTA	EFF	PAR90	ALBPB
<b>Mean</b>	1.004	0.024	0.097	0.299	3.906	0.133	0.517	0.686	0.186	0.024	0.530
<b>Median</b>	1.114	0.017	0.072	0.214	2.01	0	0.53	0.782	0.153	0.006	0.273
<b>Maximum</b>	12.654	3	17.912	11.268	302.56	0.991	3	27.416	6.701	3	9.975
<b>Minimum</b>	0	1.0126	12.861	-1.1398	105.41	0	0	0	0	0	0
<b>Std. Dev.</b>	0.588	0.103	0.731	0.339	12.815	0.237	0.358	0.600	0.221	0.085	0.800
<b>Observations</b>	2672	2652	2650	2668	2651	2642	2655	2670	2650	2651	2672

Descriptive-statistics of the both the dependent and the independent variables are presented in the table above. The results testify that the mean operational-efficiency is at 1.0 %, while the mean ROA is 2.4%. Moreover, the average ROE is found to be 9.7%. Furthermore, the average equity-to-assets ratio is that of 29%. The mean debt-to-equity ratio is 3.9%; deposit-to-total-assets ratio, 13%; average women clients is 52%; gross loan-portfolio to total-assets ratio is 68%, average efficiency is at 18%; average portfolio-at-risk, 2.4%, and mean loan-balance per borrower is at 53%.

**Table 3: Correlation Matrix**

	OSS	ROA	ROE	EAR	DER	DTAR	WC	GLPTA	EFF	PAR90	ALBPB
<b>OSS</b>	1										
<b>ROA</b>	0.310	1									
<b>ROE</b>	0.146	0.241	1								
<b>CAP</b>	0.405	0.121	-0.041	1							
<b>DE</b>	0.052	0.057	0.062	0.172	1						
<b>DTA</b>	0.170	0.015	0.038	0.222	0.107	1					
<b>WC</b>	0.375	0.166	0.062	0.271	0.080	-0.069	1				
<b>GLPTA</b>	0.676	0.100	0.085	0.379	0.143	0.150	0.451	1			
<b>EFF</b>	-0.149	-0.226	-0.156	0.286	0.010	0.008	0.313	0.198	1		
<b>PAR90</b>	-0.022	-0.089	-0.016	-0.011	-0.005	0.088	0.078	0.009	0.017	1	
<b>ALBPB</b>	0.177	-0.006	0.004	0.015	0.014	0.259	-0.076	0.208	-0.051	0.051	1

Here, both the direction and the degree of correlations, as present among the variables, are laid out. Any presence of multi co-linearity is tested by the use of correlation-matrix. Since the results indicate a very low degree of correlation among the variables, presence of any multi co-linearity is negated.

## Results and Discussion

**Table 4: Panel EGLS (Cross section random effect)**

**Dependent Variable: ROA**

Variable	Std. Error	Coefficient	t -Statistic	Prob.
e	0.008795	0.017216	1.957453	0.0504
AGE	0.000378	0.000396	1.046709	0.2953
EFF	0.009118	-0.146564	-16.07385	0
DER	0.000138	0.000266	1-926047	0.0542
DAR	0.01155	0.039867	3.51698	00006
DT	0.006548	0.02536	3.872745	0.0001
REG	0.00633	-0.002176	-0.343679	0.7311
CAP	0.009358	0.048559	5.189307	0
PAR90	0.021449	-0 111656	-5.205555	0
OPA	0.013172	0.027148	2.061093	00394
WB	0.006853	0.094259	13.75528	0
SIZE	0.000727	-0.000224	-0.307414	0.7586
Prob	<b>Observations</b>	0.00000	2651	

### Equation 1

#### Random Effect Model (with controls): ROA (dependent variable)

The equation specifies the ROA as being a dependent variable, which acts as a proxy of profitability. Estimations identify DT as having a significantly positive effect on the ROA; since the t-value is greater than 3. Thereby proving that increased deposits lead to increased profitability. Other factors as that of GLPTA, DAR, and EAR are also found to have significantly positive relationship with the ROA; since the t-value is greater than 2.

The debt-to-equity ratio is also significantly positive at a level of 10 %, which verifies the hypothesis that the more the assets are financed through debt, the more the profitability. It is also identified that the PAR at 90 days, which is a proxy of net-risk, has an overall significantly negative effect on the ROA, since its t-value is more than 5; which verifies our hypothesis that an increased risk leads to decrease in profitability. The estimations also validate our hypothesis of the MFIs profit more from their borrowers of the female gender, since the chances of default are reduced and the loans-reimbursements are made on time. Whereas it is identified that firm-size and regulations do not strongly impact the profitability of the MFIs.



**Table 5: Panel EGLS (Cross section random effect)**

**Dependent Variable : ROE**

**Method: Panel EGLS (Cross section random effect)**

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>T -Statistic</b>	<b>Prob.</b>
C	0.024717	0.057399	0.430609	0.6668
DT	0.083655	0.039513	2.117156	0.0343
AGE	-0.001949	0.002223	-0.876695	0.3807
CAP	-0.164852	0.070177	-2.349081	0.0189
DA	0.029135	0.084379	0.345291	0.7299
DE	0.006654	0.001138	5.845586	0
EFF	-0.640697	0.072828	-8.797425	0
GPA	0.170244	0.099609	1.709123	0.0876
PAR90	-0.201.865	0.170961	-1.180767	0.2378
REGULATED	-0.066399	0.037194	-1.785213	0.0743
WB	0,16767	0,05126	3,270954	0,0011
SIZE	0.006744	0.005491	1.228198	0.2195
<b>Prob{F-statist}</b>	0 .0000	Observations	2651	

**Equation 2**

**Random effect model with controls: dependent variable ROE**

The equation specifies the ROE as being a dependent variable, which acts as a proxy of profitability. Estimations identify DT as having a significantly positive effect on the ROE; since the t-value is greater than 2. Thereby, proving that an increase in the deposits leads to an increase in the firm’s profitability; meanwhile the factors of DAR, EAR, and DER have been found to have an in-significantly positive relationship with the ROE.

It is also identified that the PAR at 90 days, which is a proxy of net-risk, has an overall significantly negative effect on the ROE, since its t-value is greater than 8; which verifies our hypothesis that an increased risk leads to decrease in profitability. The estimations also validate our hypothesis of the MFIs profit more from their borrowers of the female gender, since the chances of default are reduced and the loans-reimbursements are made on time. Whereas it is identified that firm-size and regulations have an overall in-significantly negative impact on the ROE.

**Table 6: Panel EGLS (Cross section random effect)***Dependent Variable: OSS**Method: Panel EGLS (Cross section random effect)*

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>T -Statistic</b>	<b>Prob,</b>
<b>e</b>	0.078348	0.034988	2.239288	0.0252
<b>DT</b>	0.085558	0.025339	3.376497	0.0007
<b>AGE</b>	-0.001858	0.001449	-1.281895	0.2
<b>CAP</b>	0.429569	0.039604	10.84653	0
<b>DA</b>	0.310721	0.048449	6.41334	0
<b>DE</b>	1.88E-05	0.000603	0,031098	0,9752
<b>EFF</b>	-0.15507	0.039431	-3.932673	0.0001
<b>GPA</b>	0.451684	0.055933	8.075379	0 9999
<b>PAR90</b>	-0.227747	0.092748	-2.455553	0.0141
<b>REGULATED</b>	0.004045	0.024126	0.166738	0.8676
<b>WB</b>	0.166547	0.028986	5.745781	0
<b>SIZE</b>	0,034094	0,003088	11.04236	0
<b>P rob{ F-statistic)</b>	0.00000	Observations	2651	

**Equation 3****Random effect model with controls: dependent variable OSS**

The equation no. 3 specifies the Operational Self Sufficiency (OSS) as being a dependent variable, which acts as a proxy of profitability. Estimations identify DT as having a significantly positive effect on the OSS; since the t-value is greater than 3. Thereby, proving that an increase in the deposits leads to an increase in the firm's profitability; meanwhile the factors of DAR, EAR, and GLPTA have been found to have a significantly positive relationship with the OSS. While, the debt-to-equity ratio holds an insignificantly positive relationship with the OSS. Same the case of risk, as default chances are increases the profitability of microfinance institutions starts decreasing. The value of women clients are positive and significantly affect the profitability of microfinance institutions as the t value is greater than 5.

It is also identified that the PAR at 90 days, which is a proxy of net-risk, has an overall significantly negative effect on the ROE, since its t-values are more than 2 and 3; which verifies our hypothesis that a decrease in efficiency leads to an increase in the operating costs, thereby decreasing the profitability (which is also the case with the risks of default). Furthermore, the estimations also validate our hypothesis of the MFIs profit more

from their borrowers of the female gender, whereby the t-value is greater than 5. Moreover, it is identified that firm-size has in-fact a strong impact on a firm’s profitability; whereas industry regulations relate in-significantly negatively with the OSS.

**Results with interaction effects**

To determine the combined effect of the debt-to-equity ratio and the firm-age on the MFIs profitability, deposit-taking is interacted with the debt-to-equity ratio, while firm-age is interacted with the debt-to-total assets ratio. The results identify an association between the net deposits taken and the debt-to-equity ratio. Since deposits are cheaper of a source of funding, an increase in these is identified to positively relate with the MFIs profitability; as since deposits allow the MFIs to better bear the fixed obligations which come along with debt financing while maintaining profitability, at the same time. Thus, increased deposits help the firms to rather optimize their capital-structuring; the results express the following variables as having significantly positive associations with profitability: DT, EFF, DAR, EAR, and WB. Whereas, the following variables have been identified as having in-significant associations with profitability: age, firm-size, REG, GLPTA.

The interaction results of the net deposits taken-in with the debt-to-equity ratio, show that the profitability of the MFIs significantly enhances as more financing options become available. As similarly when the firms become older, they come to diversify their operations by re-employing profits back into the running operations. Whereby, retention of profits back into the firm reduces the reliance on borrowed capital or debt.

**Table 7: Cross section random effect**

**Dependent Variable: ROA**

**Method: (Cross section random effect)**

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
<b>e</b>	0.005397	0.009808	0.550301	0.5822
<b>DT</b>	0.028686	0.0066	4.346501	0
<b>AGE</b>	0.001452	0.000525	2.763467	0.0058
<b>CAP</b>	0.046176	0.009376	4.925074	0
<b>DAR</b>	0.04107.8	0.011618	3.53584	0.0004
<b>DER</b>	0.000738	0.000234	3.153546	0.0016
<b>EFF</b>	-0.145559	0.00912	-15.96074	a
<b>GPA</b>	-0.007224	0.014789	-0.488452	0.6253
<b>PAR90</b>	-0.106172	0.021474	-4.944232	0
<b>REGULATED</b>	-0.003057	0.006312	-0.4184345	0.6282
<b>WB</b>	0.092282	0.006868	13.43703	0
<b>SIZE</b>	0.000153	0.000735	0.208165	0.8351
<b>DT*DE</b>	0.000695	0.000285	2.44377	0.0146
<b>AGE*DE</b>	0.001911	0.000663	2.880812	0.004
<b>P rob(F-statistic)</b>	0.00000	Observations	2651	

**Equation 4****Random Effect Model with interaction effects: ROA (dependent variable)**

The interaction between the factors of net-deposits collected and gearing-ratio and also between age and gearing ratio shows that the impact of deposit-taking, deposit-to-assets ratio, and equity-to-assets ratio, all have an associate positively with the profitability of the MFIs. Although, the following factors associated in-significantly negatively: firm-size, firm-age, industry regulations, gross loan-portfolio to assets ratio, and firm-efficiency. The gearing-ratio and deposit-taking both have a significantly positive impact on the ROA. Whereas, the firm-age and the gearing-ratio both hold a significantly positive association with profitability. This demonstrates that the dependence of older MFIs on debt-financing is minimal, while the retained earnings hold more value in comparison, which in-turn reduces the costs associated with debt. The effect of interaction between the deposit-taking and the debt-to-equity ratio reveals that deposit-taking reduces the debt costs.

**Table 8: Panel EGLS (Cross section random effect)****Dependent Variable: ROE****Method: Panel EGLS (Cross section random effect)**

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob</b>
<b>C</b>	0.018708	0.066413	0.281696	0.7782
<b>DT</b>	0.049962	0.039061	1.279095	0.201
<b>AGE</b>	-0.000461	0.003609	-0.127632	0.8985
<b>CAP</b>	-0.19682	0.069228	-2.843077	0.0045
<b>DAR</b>	0.003362	0.083138	0.040433	0.9678
<b>DER</b>	0.012778	0.001909	6.692473	0
<b>EFF</b>	-0.626187	0.072183	-8.674965	0
<b>GPA</b>	0.199185	0.112062	1.777458	0.0756
<b>PAR90</b>	-0.184963	0.169418	-1.091759	0.275
<b>REGULATED</b>	-0.066069	0.035857	-1.8412579	0.0655
<b>WB</b>	0.166695	0.050398	3.307586	0.001
<b>SIZE</b>	0.008168	0.00546	1.496011	0.1348
<b>DT*DE</b>	0.009381	0.002316	4.05056	0.0001
<b>AGE*DE</b>	0.00277	0.005232	0.52942	0.5966
<b>P rob( F-statistic)</b>	0.00000	Observations	2651	

**Equation 5**

**Random effect model with interaction effects: ROE (dependent variable)**

The return-on-equity (dependent variable) represents profitability. The interaction results of firm-age and gearing-ratio, and also the interaction results of deposit-taking and gearing-ratio lead us to results identifying that the following have a significantly positive impact on the ROA: WB, DT, DER, and DAR. While variables as that of EFF hold a significantly negative impact on the firm’s profitability; whereas control variables as that of firm-size, firm-age, and industry regulations are identified as having in-significantly negative impact on the profitability. Moreover, the combined effect of gearing-ratio along-with the deposit-taking holds a positive impact on the profitability. The interaction between the gearing-ratio and age provides us with in-significant positive correlation with profitability.

**Table 9: Panel EGLS (Cross section random effect)**

**Dependent Variable: OSS.**

**Method: Panel EGLS (Cross section random effect)**

<b>Variable</b>	<b>Co-efficient</b>	<b>Std. Error</b>	<b>t -Statistic</b>	<b>Prob.</b>
C	0.050903	0.0399'04	1.275633	0.2022
DT	0.090073	0.025689	3.506276	0.0005
AGE	0.000487	0.0021.49	0.226377	0.8209
CAP	0.426523	0.039748	10.73055	0
DAR	0.314951	0.048772	6.457627	0
DER	0.000535	0.001022	0.523439	0.6007
EFF	-0.154634	0.039497	-3.915064	0.0001
GPA	0.495354	0.06321.3	7.836215	0
PAR90	-0.217604	0.092969	-2.3406	0.0193
REGULATED	0.002078	0.024254	0.085689	0.9317
WB	0.1629511i	0.029063	5.606814	0
SIZE	0.034863	0.003123	11.16177	0
DT*DE	0.000742	0.001242	0.597211	0.5504
AGE*DE	0.004235	0.002871	1.475292	0.1403
P rob( F-statistic)	0.00000	Observations	2651	

**Equation 6**

**Random effect model with interaction effects: OSS (dependent variable)**

The operational self-sufficiency (a dependent variable) is a proxy of profitability. The results identify the following variables as having significantly positive impact on profitability: DT, DER, DAR, and WB. While the effect of portfolio-at-risk (by 90 days) and firm efficiency hold a significantly negative effect on the Profitability; implying that risk is perhaps the primary factor which dumbs down the profitability. Moreover, the results further indicate that firm-size, firm-age, and industry have minimum negative impact on the OSS; whereas, the combined effect of gearing-ratio, deposit-taking, and age is positive yet in-significant.

## Discussion

For the MFIs, the decision with regard to capital-structuring dictates many points. Since the choice determines what capabilities will the firm enjoy and how do they help the firm have a competitive attribute; it nevertheless influences a firm's capacity of return maximization.

In the present times, MFIs utilize a wide variety of funding sources, these allow the firms to not only be able to diversify its operations but also it also allows the MFIs to better optimize their capital structures; even in the complex environments they operate in, in the modern days (Consultative Group to Assist the Poor [CGAP], 2007).

Since a capital-structuring can be done for the specified purposes of reduction of risks, enhancement of financial flexibility, and prevention of long-term solvency etc. Therefore, its better allowing the MFIs to provide sustainable loans especially to their most under-privileged of customers. The primary purpose of the research was to identify the impact of the various financing-sources on profitability of the MFIs. The Micro-Rate & Inter-American Bank provides us with the Technical Guide of Profitability of the MFIs, which includes four main classes of indicators: portfolio quality, efficiency and productivity, financial management, and profitability. Thereby, to as a measure of profitability this study utilized the factors of: operational self-sufficiency, ROE, ROA. (The factors of portfolio-yield and financial self-sufficiency are not taken into consideration).

Therefore, MFIs face a tradeoff between the financial and the social profitability. Varying factors can be taken into consideration to account for social-profitability, these include: average loan-size, number of rural clients, and net female borrowers (Balkenhol, 2007). Furthermore, it has been noted that MFIs experience increased profitability if the firm's accounts are measured and disclosed onto the concerned parties (Consultative Group to Assist the Poor [CGAP], 2006); thereby, making it essential for the MFIs to present forth truthful status of both their social and financial profitability.

"The Critical Microfinance Triangle" is another tool specifically designed to calculate the profitability of the MFIs, it utilizes the three policy-objectives, which are held by most MFIs, and include: financial sustainability, outreach to the poor, and welfare impact Here, various determinants can be factored in to measure each one of the objectives. It is further specified that the determination of whether a particular MFI could satisfy its goals, also includes taking into consideration the factors of effective management, technological innovations, policies under implementation, and organizational efficiency. Furthermore, an MFI's environmental concerns include quality of the financial and economic infrastructure, the human and social capital of the under-privileged, and the economic policies under implementation (Meyer, 2002).

Moreover, as the hypotheses describe the deposit-taking as something which reduces the costs of funds for the MFIs, which indicated that it is an effective tool of efficiency. The result goes along with the findings of Cull, Demirgüç-Kunt, and Morduch(2011), stating that MFIs ought to focus on the enhancement of deposit-taking since it only leads to increased profitability, but also leads to an increased lending-capacity.

A well financially- managed MFI makes sure to maintain enough firm-liquidity to not only meet the loan-repayment-obligations but also to give-out loans to the borrowers; whereby, long-term-debt to ration, and the cost-of-funds, are the considered indicators of financial management. The results note that the debt-to-equity ratio significantly positively resonates with a MFI's profitability, validating the hypothesis that increased debt-financing enhances the MFIs' profitability. Not only that, but it also benefits the shareholders of the MFIs since more of the earnings remain available to them; the results are according to Abor (2005) study.

The results of this study go contrary to the findings of Hermes and Lensink (2011) that profitability of the MFIs is positively impacted by an increased share of women-borrowers. This is since the women-borrowers turn back in regular payments at the MFI are and less likely to default. According to Micro Rate & Inter-American Development Bank, (2003) the factor that determines the over-due amounts in loan portfolio is that of the quality of loan portfolio itself; whereby, the largest asset of a MFI is its gross-loan-portfolio, making it essential for the MFIs to maintain their portfolio quality. Measuring this risk is quite tough for the MFIs, since the micro-financing loans usually are not tied with any security, due to the inability of the borrowers to provide securities from the money borrowed. This study considered the PAR (at 90 days) as a proxy of risk, which includes all the granted loans by the MFIs, whereby payments are overdue exceeding the 90 days period (out of the total gross-loan portfolio of the MFIs). Since the risk of default faced by the MFIs is represented by the PAR 90 days, the fact that the risk goes contrary to the profitability factor is represented by the negative coefficient of PAR; implying that an increase in the risk-type reduces the profitability of the MFIs.

Productivity refers to the amount of output (in units) and the relative input per unit, while efficiency is the price of the outputs and the relative costs of the inputs; both the factors measure how well the operations are being conducted. Whereby, cost-per-borrower and operating-expenses are considered as the primary indicators of the efficiency and productivity factors.

The measure of efficiency represents the administrative and operational costs of the MFIs, and has a significantly negative relation with profitability. The hypothesis here stands validated by the reduced efficiency of leading to decrease in the profitability by means of increasing operating costs of the MFIs. While the other control variables, which include the factors of – industry-regulations, firm-age, and firm-size, resulted to have an insignificantly negative impact on the profitability of the MFIs; thereby rejecting the hypothesis that increased firm-age and firm-size translate to profitability, as was assumed that large and old MFIs must generate more profitability – the hypothesis being rejected. The overall findings leads us to state that there is no single best financing-source, which enhances the profitability all by itself, and in-order to attract profitability an optimal combination or a optimizing financial-mix must be instigated for maximum profitability and cost effectiveness; all of which goes along the findings of other significant research studies (Abor,2005 and Cull, Demirgüç-Kunt, and Morduch, 2009).

## **Conclusion**

The study focused on the various financial-sources of deposits, equity and debt, and their relation with profitability at the MFIs. The results affirm deposits as being the cheapest financial-source for a MFI. The results further denote that highly levered MFIs enjoy a higher profitability relative to the less levered MFIs. Another observation was also confirmed that MFIs with proportionally more female clientele enjoy higher profits. Moreover, to remain sustainable in the market and operate without any intermittence, it is crucial for the MFIs to remain profitable. Whereby, if a MFI is not profitable, the quality of loan-portfolio depreciates, which further signals a lack of efficiency and low productivity at the firm. Meanwhile, other factors like industry-regulations, firm-age, and firm-size and have an insignificant impact on MFIs' profitability.

## **Policy Implications**

The current research focuses on the various financial-sources and their relative impact on the profitability of the MFIs. This research notes that deposit-taking and leverage financing are

two of the most profitable sources; this information can be utilized by the regulatory bodies and/or policy-makers to devise policies which ease the MFIs' activities of collecting loans and issuing debt thereby enhancing their sustenance and profitability.

### Future Research Directions

The research takes into consideration the deposits (mobilized savings), gross-loan-portfolio to total-assets ratio, deposit-to-assets ratio, and debt-to-equity ratio; whereas for profitability, the OSS, ROE, and ROA have been taken into account. However, since the current research has not taken into account the other factors as that of grants and retained earnings. Therefore, these dimensions could very well be incorporated into the future researches. Moreover, other macro-economic factors as that of the inflation and GDP may also be delved into with relation to the profitability of the MFIs. In addition, this study covers the MFIs from various different countries (where political and economic conditions vary), thus inclusion of various demographic and macro-economic variables as that of the bio-density index, the population density index, and the HDI can help identify the effect of heterogeneity among the varying countries.

### Declarations

#### Competing interests

The authors declare that they have no competing interests.

#### Authors' Contribution

Abrar, A. identified the main research idea, research problem and formulated the research methodology. Whereas, estimations, result interpretations and conclusion was carried out by Abrar, A. and Javaid, A.Y.

### References

- Abor, J. (2005). The effect of capital structure on profitability: an empirical analysis of listed firms in Ghana. *Journal of Risk Finance (Emerald Group Publishing Limited)*, 6(5), 438-445. doi: 10.1108/15265940510633505
- Balkenhol, B. (2007). *Microfinance and public policy: outreach, performance and efficiency*. Geneva: International Labour Office.
- Caesar, G. & Holmes, S. (2003). Capital Structure and Financing of SMEs: Australian Evidence, *Journal of Accounting and Finance*, 43, 123-147.
- Chiang, Y.H., Chan, P.C.A., & Hui, C.M.E., (2002). Capital structure and profitability of the property and construction sectors in Hong Kong. *Journal of Property Investment and Finance*, 20(6), 434-454
- CGAP. (2006, 01 October). Access for All: Building Inclusive Financial Systems. Retrieved from <http://www.cgap.org/publications/person/278>
- CGAP. (2007, 01 August). MFI Capital Structure Decision Making: A Call for Greater Awareness. Retrieved from <http://www.cgap.org/publications/mfi-capital-structure-decision-making-call-greater-awareness>
- Cull, R., Demirgüç-Kunt, A., & Morduch, J. (2011). Does Regulatory Supervision Curtail Microfinance Profitability and Outreach?. *World Development*, 39(6), 949-965.
- Cull, R., Demirgüç-Kunt, A., & Morduch, J. (2009). Microfinance Meets the Market, *Journal of Economic Perspectives*, 23, 167:192
- Freixas, X. (2005). Deconstructing relationship banking, *Investigaciones Economicas*, 29, 3-31.



- Gleason, K. C., Mathur, L. K., & Mathur, I. (2000). The Inter relationship between Culture, Capital Structure, and Performance. Evidence from European Retailers. *Journal of Business Research*, 50, 185-191. doi: 10.1016/s0148-2963(99)00031-4
- Hermes, N., & Lensink, R. (2011). Microfinance: Its impact, Outreach and sustainability. *World Development*, 39(6), 875-1064.
- Hollis, A., & Sweetman, A. (1998). Microcredit: What can we learn from the past? *World Development*, 26(10), 1875–1891. [http://dx.doi.org/10.1016/S0305-750X\(98\)00082-5](http://dx.doi.org/10.1016/S0305-750X(98)00082-5)
- Kyereboah-Coleman, A. (2007). The impact of capital structure on the performance of microfinance institutions. *Journal of Risk Finance (Emerald Group Publishing Limited)*, 8(1), 56-71.
- Ledgerwood, J. (1999). *Microfinance handbook: an institutional and financial perspective*. Washington DC: World Bank.
- Mersland, R.; Strøm, O. 2007. Performance and corporate governance in micro-finance institutions. Retrieved from <http://www.cbr.cam.ac.uk/pdf/microgov.pdf>
- Meyer, R. L. (2002). Track Record of Financial Institutions in Assisting the Poor in Asia. Asian Development Bank Institute, Research Paper 49, ADB Institute.
- Olivares-Polanco, F. (2005). Commercializing Microfinance and Deepening Outreach: Empirical Evidence from Latin America, *Journal of Microfinance* 7, 47-69