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The Effects of Capital Structure on the Performance and Sustainability of Microfinance Institutions: Empirical Evidence from South Asian Countries

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Abstract

In the wake of ongoing trend of commercialization in the microfinance sector for improving performance and sustainability, microfinance institutions (MFIs) nowadays tend to reduce their dependence on non-commercial funding. This study investigates the effects of this shift in capital structure on the performance and sustainability of these socially oriented financial intermediaries operating in South Asian countries. This study employs panel regression and two-stage least squares regression on data from 311 Microfinance Institutions (MFIs) spanning the years 2003 to 2016, demonstrating that increased reliance on grants is associated with both diminished performance and reduced sustainability of MFIs. Conversely, deposit funding improves MFI's performance and sustainability by curbing default rate and raising capability to serve high-income borrowers. The findings of the paper have implications for ongoing shift from concessional funding to commercial funding in the MFI industry and the choice of appropriate capital mix to enhance both performance and sustainability.

Keywords: Capital Structure, Social Performance, Microfinance Institutions, Grants, Default Rate.
JEL Classification: G32, G210

1. Introduction

The capital structure of lending institutions is an important issue nowadays because the advent of diverse and innovative forms of capital has made the capital structure decision complicated. Besides, the urge for the bailout funding or government donations by globally-leading lending institutions after the initiation of financial crisis in 2008 raises the question of appropriateness of their capital structure (Bogan, 2012). Furthermore, the lending institutions like Microfinance Institutions (MFIs), which were largely dependent on grants in the past, are now shifting their reliance to deposits and equity from concessional loans and grants (Farrington & Julie, 2002). If outperforming MFIs are more likely to use the commercial funding and less likely to use the concessional funding, the shift of

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their capital mix toward commercial funding can be justified. It is pivotal to seek the answer to the question –which form of financing out of debt, equity, and grant funding is mostly used by outperforming and highly sustainable MFIs?

Since the publication of seminal paper 'The cost of capital, corporate finance, and the theory of investment' in 1958 by Modigliani and Miller, several empirical studies have been conducted on optimum capital structure. Based on some restrictive conditions, they argue that changes in capital structure have no consequence on the value of firm. Though (Hamada, 1969; Stiglitz, 1974) support the conclusions drawn by Modigliani and Miller (1958), several studies document the linkage between change in capital structure and value of firm (Harris & Raviv, 1991; Jensen & Meckling, 1976; Masulis, 1983; Williams, 1987). These papers identify several factors such as: tax advantages (Masulis, 1983), agency cost (Jensen & Meckling, 1976; Williams, 1987), bankruptcy cost (Jensen & Meckling, 1976), and corporate control (Harris & Raviv, 1991; Kim & Stulz, 1988) etc. through which changes in capital structure cause the changes in value and performance of firm.

Though a number of theorems prove that choice of capital structure by a firm has consequences and effects on its performance and sustainability, most of these are not directly applicable to lending institutions because of the differences in fundamental operations and associated accounting differences (Cohen, 2003). Corporate firms and lending institutions including MFIs are markedly different in terms of their operations, revenue model, regulatory environment, systematic risk measurement, and risk management objectives etc. (Bogan, 2012). Moreover, the usage of noncommercial funding such as – grants, add up another layer of complications to the capital structure issue of microfinance institutions. For these distinctiveness of lending institutions, the idea of optimum capital structure is not as obvious for lending intuitions as it is for corporate institutions. Does the reduction of concessional lending and grants in capital structure reduce the propensity of moral hazard of MFI managers and result in superior performance of MFIs – has become a weighty question nowadays. This study attempts to shed light on these issues by examining the role of capital structure on the performance and sustainability of MFIs.

The issue of optimum capital structure and performance is one of the most visited research topics in corporate finance (Bogan, 2012; Nha et al., 2016). This study is distinctive from existing literature on capital structure of MFIs operating in South Asian countries for several reasons. First, it investigates the individual component of capital structure instead of solely relying on debt-to-equity ratio to measure capital structure. Second, existing literature commonly measure performance of MFIs in terms of financial performance indicators, though social performance indicators are more appropriate to measure the true performance of social objective-oriented MFIs. Outreach, operational self-sufficiency, return on assets, and default rate are commonly used measure of performance for MFIs (Kyereboah-Coleman, 2007; Bogan, 2012; Duguma & Han, 2018; Parvin et al., 2020; Dabi et al., 2023;). Outreach which is measured by number of active borrowers, is considered as social performance measure (Bassem, 2012). Third, average loan balance to GNI per capita, one of the key social performance variables for MFIs has not been used in capital structure and performance literature on MFIs. Probably this is the first attempt to recognize the average loan balance to GNI per capita as the social performance indicator in capital structure studies on MFIs. In this study, performance is measured in terms of both average loan balance to GNI per capita and outreach along with the conventional performance and sustainability indicators (Bassem, 2012).

The main purpose of the study is to examine the influence of varied forms of commercial and non-commercial capital on differences in performance and sustainability measures of microfinance institutions. Forms of capital which drive superior financial and social performance, bring self-sufficiency, and ensure more sustainability also to be assessed.

I use borrowings, deposits, grants, share capital relative to assets as capital structure measures. Besides, financial performance is measured using default rate, operational self-sufficiency, return on assets while social performance is measured using outreach and average loan balance/GDP per capita. This study shows that MFIs which relies more on concessional funding namely grants are likely to experience deteriorating financial performance and sustainability: higher default rate, lower operational self-sufficiency, and lower return on assets. In

contrary, MFIs which banks on deposits and share capital are more likely to earn superior financial performance: lower default rate and higher return on assets. In terms of social performance and sustainability measure, the results find evidence that reliance on deposits and share capital reduces the capability of MFIs to serve a greater number of borrowers. However, reliance on deposits enhances the capability of MFIs to serve borrowers with greater average loan balance which would fulfill the borrowing need of borrowers more prudently.

Though this paper attempts to provide an empirical analysis through studying MFIs operating in South Asian countries, the findings from this paper could be relevant for other financial institutions operating in different parts of the world. This study is based on MFIs, but the lessons learned from this study can be applied to the knowledge of optimal capital structure for other type of lending institutions (Booth et al., 2001; Bogan, 2012). Findings from this research would suggest whether modification of capital structure of MFIs by reducing dependence on noncommercial funding is a worth decision.

The remaining sections are structured as follows: Section-2 provides overview of microfinance sub-sector in South Asia and Section-3 surveys the literature on MFIs' capital structure and derives hypothesis regarding the linkage between type of capital and performance, respectively. Sections-4 and 5 describe the data and the econometric analysis, respectively. The study concludes with Section-6.

2. Microfinance Sub-sector in South Asia

Microfinance exemplifies as an evolving and dynamic system in the world that has shown its capability to adjust to various socio-cultural settings and respond to the changing and varied needs of the poor. South Asia can justifiably claim the intellectual property right of the idea of microfinance in its modern form. 'Microfinance revolution' has seriously challenged many traditional assumptions about poverty reduction strategies by developing innovative ways of reaching credit to the poor. Moreover, microfinance has added momentum in financial markets. Microfinance programs have rapidly increased their outreach

across the South Asian countries under various institutional arrangements over the last three decades.

Instead of its role in providing social security or safety nets to the poor, microfinance is often surrounded by subjects of intense public debates regarding - determination of interest rate in the microfinance market, establishment of financial viability of the microfinance programs, evaluation of microfinance programs by financial self-reliance and commercial viability, effectiveness of microfinance in helping the poor, and accessibility of MFIs to subsidized funds from the government and foreign donors etc. The two separate roles of microfinance recognized by policy makers are to channel funds to the poor as an innovative banking operation and to help poverty alleviation.

Microfinance started in South Asian countries at different points of time and pattern of evolution of microfinance has not been uniform. MFIs in this region have some common features and some differences with respect to models and approaches. South Asia leads the global outreach of MFIs, accounting for about two-thirds of global borrowers (60%) (Microfinance Barometer, 2018). Development in financial sector is expected to promote growth and reduce poverty by allowing the entrepreneur to have greater access to capital. As formal banking system is not adept in supporting very poor class of people, microfinance works in tandem with formal financial system to enhance the economic growth of this region. Even after growth of institutional loan facilities like MFIs, in many parts of South Asia, informal moneylenders persist as source of credits at the time of need. The failure of the commercial banking sector to reach the rural people as well as discouraging performance of commercial bankers in rural area encouraged MFIs to serve the unserved borrowers who have demand for microcredit.

Some MFIs are heavily leveraged while some MFIs are moderately leveraged. In South Asia region, on an average MFIs fund 57.53% of their assets from borrowings and 15.24% from the voluntary savings deposits kept by the members of MFIs.

3. MFI Performance and Capital Structure

MFIs provide financial services to the marginalized people in the society. The people, who are not usually eligible to take services from conventional banking system, are the target customers of MFIs. Microcredit, one financial product of MFIs, enables these poor people to initiate an income generating activity. Though MFIs initially began their operation just by disbursing microcredit, nowadays they provide services like small credit, savings, and insurance services etc. Microfinance industry is dominated by non-government organizations (NGOs) across the world; however, commercial banks, rural banks, nonbank financial intermediaries, and credit unions also operate in this financial sub-sector. No requirement of collateral from borrower – creates the main differentiating line between conventional banking and MFIs. But to protect itself from the loss arising from credit event, MFI's average lending rate is always higher than the average lending rate of conventional commercial bank, however, the rate is lower than the rate charged by usurious moneylenders in society. MFIs were introduced with a view to eradicating poverty from the society by providing collateral free tiny credit to extremely poor people for investment purposes, however, in later time some opportunistic entities started to enter this industry for making profitable lending business. These opportunistic lending institutions term their tiny credit as microcredit but charge interest rate which is significantly higher than the average rate of leading MFIs in this world. This kind of shift is recognized as the root of abuse and other problems in the microfinance sector. "Commercialization has been a terrible wrong turn for microfinance, and it indicates a worrying "mission drift" in the motivation of those lending to the poor. Poverty should be eradicated, not seen as a money-making opportunity" (Yunus, 2011).

It is estimated that globally 139 million low-income and underserved clients receive financial services from MFIs and loan portfolio is growing at 15.6% rate (Microfinance Barometer, 2018). Though MFIs have been able to reach to a significant number of unbanked people, still 2 billion adults lack access to the transaction account of formal financial system (Riley & Kulathunga, 2017). High operating cost and fund constraints are often cited as reasons for inability of MFIs

to serve the demand for microcredit. In addition, high interest rates on loans are likely to reduce the demand for financial services because rising interest rates erode the surpluses generated by the customers (Dehejia et al., 2012). Donor agencies, development partners, and local government often take initiatives to ensure the sustainability of MFIs by enabling them to have more outreach. However, due to institutional structural differences of MFIs from the conventional lending institutions, the funding structure issue of MFIs is also recognized as complex issue. Once dependent on funds provided by public development agencies and private foundations, MFIs nowadays look for alternative sources of funding which will not only enable them to mobilize funds efficiently but also to ensure the sustainability of their operations. In this regard, this paper seeks to examine the consequences of transformation of capital structure of MFIs on performance and sustainability of these semi-formal financial institutions.

Different theories describe what type of fund is used by an MFI in different stages. The propositions regarding funding structure can be discussed under two broad theories: life cycle theory and profit incentive theory.

A. Life Cycle Theory

The life cycle model, which is applied to explore growth and development of MFIs, is also used as a tool to compare financing patterns at various stages of an MFI's to that of 'typical' business predicted by the lifecycle model (Bogan, 2012). This theory describes the pattern of different capital instruments required in each stage of life of enterprises. According to this framework, MFIs begin their operation by taking non-commercial equity i.e., grants and subsidized loans from development agencies and donors with a social mission of eradicating poverty from societies.

Life cycle framework asserts the fact that when MFIs evolve one stage to another stage, funding pattern changes. This evolution of MFIs is also known as 'NGO transformation' as most of the MFIs initiate their primary operation in the form of NGO (Helms, 2006). Though donor grants, concessional loans, and equity from sponsors/owners enable MFIs to launch their operation, when MFIs

reach at maturity stage, commercial sources of funding from banks, development agencies, and government become available. Larger MFIs issue stocks or bonds in final stage to mobilize funding from financial markets.

Hoque, Chishty and Halloway (2011); Bogan (2012); Abrar and Javaid (2016) provide empirical evidence on life cycle theory of institutional framework. Bogan (2012) find significant relationship between life cycle stage variable- age and both operational self-sufficiency and financial stability of MFIs. However, this study argues that other economic and financial variables have more explanatory power compared to life cycle model to explain the variation of capital structure of MFIs. In contrary, expectation of life-cycle theory is reasoned by Hoque, Chishty and Halloway (2011) for decline of grants and concessional loans to matured MFIs. Besides, Farrington and Julie, 2002) note increase in competition, leverage, public deposits, and reliance on commercial funding in MFI industry.

Although life cycle model is often cited as dominant explanation for evolution of capital structure of MFIs, existing literature identified some other critical variables which are shaping this change in funding pattern. These factors include legal and regulatory factors. Mature regulatory environment is considered as one of the influencing factors which cause the variation in funding patterns of MFIs across different nationals and regions (Hoque et al., 2011). In Latin America, number of specialized and supervised MFIs is growing because it is easy for these types of MFIs to mobilize market funding easily. In contrary, MFIs in Middle East, North Africa, and Central Asia and Eastern Europe are heavily reliant on donated equity and borrowing because most of MFIs in these regions are operating as NGOs and these NGOs are not strictly regulated which are the core reasons for their inability to attract market funding (Bogan, 2012; Tchakoute Tchuigoua, 2015). However, to support future business expansion amid the robust economic growth, leading MFIs of India have raised sizeable equity funding recently.

B. Profit-Incentive Theory

Profit incentive theory encourages commercialization of MFIs by arguing that use of commercial funding sources enables MFIs to achieve both profitability and the mission of solving poverty problem in society (Bogan, 2012). Commercial funding is different from non-commercial funding because commercial fund providers expect positive return relative to the risk. In addition, commercial funding is more desirable than non-commercial funding from the perspective of ensuring good governance, more capital and better outreach in MFIs. Fund constraints of donors can limit the ability of MFIs to serve demand for financial services by unbanked people. Client-maximizing MFIs stresses the need for commercialization to mobilize more money to enhance outreach and to reduce reliance on donor's fund. In addition, commercially funded MFIs are found to be more sustainable compared to MFIs dependent on subsidized fund because these MFIs work in a way to enhance revenue and curtail expenses so that adequate operating profit can be generated to make up the cost of commercial funds. (Bogan, 2012) find meaningful empirical evidence that MFIs dependent on more grants are less self-sufficient and stress the fact that MFIs should rely less on non-commercial fund (e.g., grants, soft loans, and other type of donor funds).

Although grants consist of a major funding source for many MFIs in the world, the proportion of grants in capital structure has been declining over the years. In contrary, the proportion of commercial funding (e.g., commercial loans, private equity investment) in capital structure has been growing over time. Moreover, the external pressure on MFIs to reduce dependency on concessional funding has got momentum. Donors are nowadays advised to let their grant receiving MFIs to graduate to quasi-commercial investors like private investors by encouraging them to develop their own linkage with domestic capital market (Helms, 2006). MFIs which are transforming to regulated institutions nowadays get direct investment from leading investment companies in the world. In addition, these companies provide strategic support to MFIs to raise commercial funds from financial market. One of the prominent examples of such companies is the ACCION Gateway Fund, LLC. Eight MFIs operating in Latin America and

the Caribbean regions have received US$5.0 million funding from this leading investment firm. These types of companies work to bring independency to MFIs from dependency on donor's fund. However, commercialization of funding of MFIs is now cited as the reason which will endanger the whole mission of MFIs. If MFIs could take deposits by refurbishing the existing law, these would have adequate funding to meet the demand for loan by borrowers. Hence, we can summarize our hypotheses as follows:

Hypothesis 1: Capital structure has significant effects on performance and sustainability of microfinance institutions.

Hypothesis 2: Microfinance institutions which rely more on commercial sources of funding perform better in terms of performance and sustainability compared to the microfinance institutions which rely on noncommercial sources of funding.

4. Data

Microfinance Information Exchange (The Mix Market) is the main source of data of all variables used in this study. For this empirical study on capital structure of MFIs, I use unbalanced panel data of MFIs from the year of 2003 to year of 2016. Individual MFIs data are from the data stored in Mix Market database (www.themix.org/mixmarket.org). Besides, country macroeconomic variables (GDP growth and Inflation) are from the World Development Indicators compiled by World Bank. The sample MFIs have total assets value over $0.13 million and number of active borrowers more than 380. They have minimum disclosure index of 3 on Mix Market which indicates that MFIs disclose general information, outreach, impact and financial data. Based on the convenience sampling, total 311 MFIs are included in the sample. These MFIs collectively represent a major portion of the MFIs serving in South Asian countries. As sample is filtered based on the availability of the data, no bias is involved in selecting the MFIs. According to Mix Market data as of 2019, total 233 institutions fully or partially render microfinancing services in South Asia which include Bank, credit union, financial institutions, cooperatives, and NGOs.

This paper concentrates on performance in terms of outreach, default rate, efficiency, profitability, and average loan balance to GNI per capita. Table I in

appendix offers the definitions of variables. There is significant amount of variation in institutions type which provide micro financial services. I did not focus on either smallest or largest MFIs in selecting sample. Hence, a commendable amount of variation can be observed with respect to assets size and number of active borrowers. Table 1 provides descriptive statistics and Table 2 illustrates the summary statistics of the selected sample. These summary statistics have been broken down by the countries of the South Asian region and several facts can be identified from the country differences (see Figures-1 to 4).

Afghanistan has the highest percentage of unsustainable MFIs which is evidenced by lowest percentage of sustainable MFIs (22.62%), highest percentage of average default rate (2.69%), second highest percentage of portfolio at risk (8.47%), and lowest average return on assets (-16.21%) among the seven South Asian countries.

Table 1: Microfinance Institutions: Descriptive Statistics

	Percentage of Sample
Charter type	
Bank	10.65
Credit Union / Cooperative	4.79
NBFI	31.13
NGO	47.56
Other	2.73
Rural Bank	3.14
Country	
Afghanistan	6.94
Bangladesh	16.27
Bhutan	0.25
India	47.65
Nepal	8.92
Pakistan	15.94
Sri Lanka	4.05
Life cycle stage	
Mature	70.19
New	9.50
Young	20.31
Accepts deposits	50.12
Grants funding	53.76
Negative equity	4.62

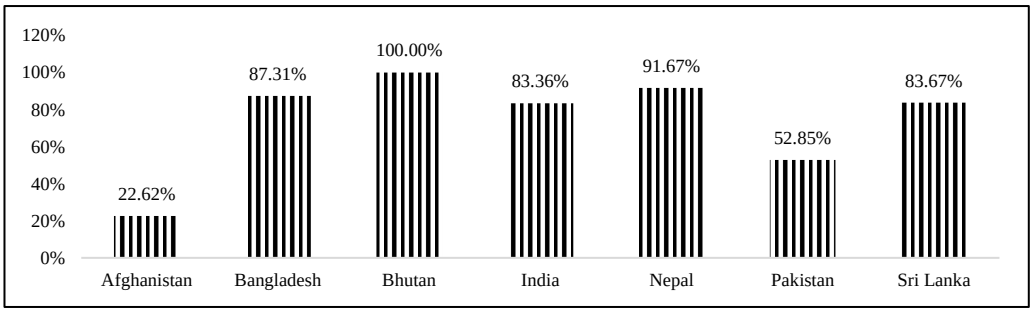
Table 2: Descriptive Statistics of Key Indicators of MFIs in the South Asian Countries

Variable	Observations	Mean Value	Median Value	St. Dev.	Minimum	Maximum
Borrowings relative to assets	1211	0.57	0.62	0.31	0.00	4.75
Deposits relative to assets	1211	0.14	0.00	0.20	0.00	0.93
Grants relative to assets	1211	0.10	0.00	0.36	0.00	8.96
Share capital relative to assets	1211	0.20	0.16	0.26	-4.31	1.00
Retained earnings relative to assets	1211	-0.06	0.03	1.43	-46.56	0.61
Portfolio at risk > 30 days	1211	0.06	0.02	0.26	0.00	7.11
Yield on gross loan portfolio	1211	0.24	0.23	0.10	-1.33	1.31
Active borrowers (000s)	1211	301	51	922	0	7,290
Assets (US$000)	1211	63,483	10,036	219,765	133	2,810,000
Default rate	1211	0.01	0.00	0.06	-0.04	1.33
Operational self sufficiency	1211	1.11	1.11	0.38	-0.12	6.67
Return on assets	1211	-0.01	0.02	0.12	-1.45	0.31
Average loan balance relative to GNI per capita	1211	0.26	0.15	0.37	0.00	3.56

Return on assets = (Net operating income, less taxes)/ (average assets).
Portfolio at risk ratio = (Portfolio at risk greater than 30 days)/ (gross loan portfolio). Represents the portion of loans greater than 30 days past due, including the value of all renegotiated loans (restructured, rescheduled, refinanced and any other revised loans) compared to gross loan portfolio.

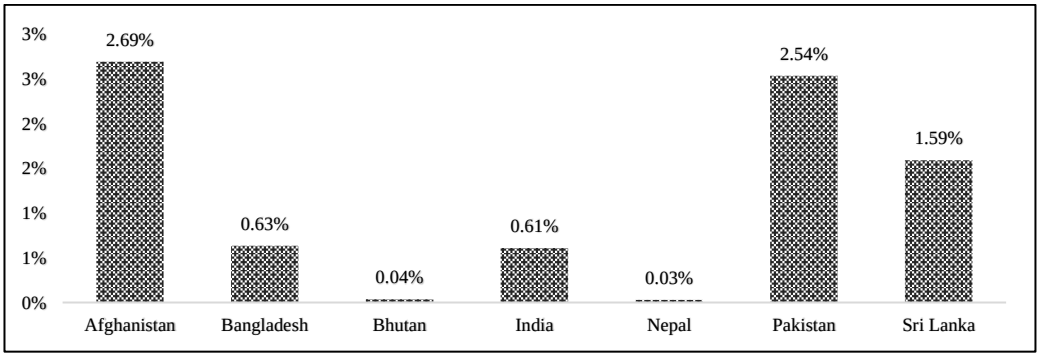
Though Bhutan has the highest percentage of sustainable MFIs and highest profitability (3.98%), the sample size represented by MFIs in Bhutan is only 0.25%. Except Bhutan, Nepal has the lowest percentage of unsustainable MFIs (8.33%), the lowest average default rate (0.03%), the lowest portfolio at risk (3.77%), and MFIs of Bangladesh have the highest return on assets (3.21%). With respect to capital structure, it can be observed that MFIs of Afghanistan have the highest dependency on borrowings and grants, MFIs of Nepal have the highest dependency on deposits and MFIs of Sri Lanka have the highest dependency on equity capital to finance the assets of MFIs.

Figure 1: Operationally Sustainable Microfinance Institutions (MFIs) in Percentage (%).



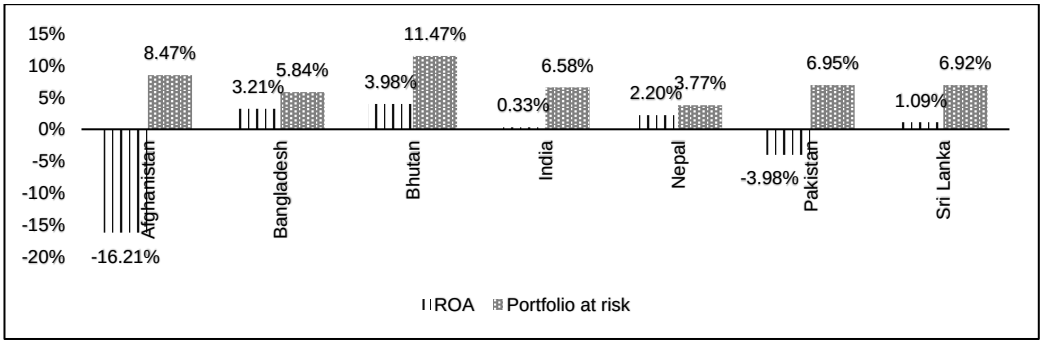
Country-wise proportion of operationally sustainable MFIs relative to total number of MFIs in operation in South Asian countries. Bhutan has the highest % of sustainable MFIs and Afghanistan has the lowest % of sustainable MFIs.

Figure 2: Average Default Ratio of Microfinance Institutions (MFIs) in Percentage (%).



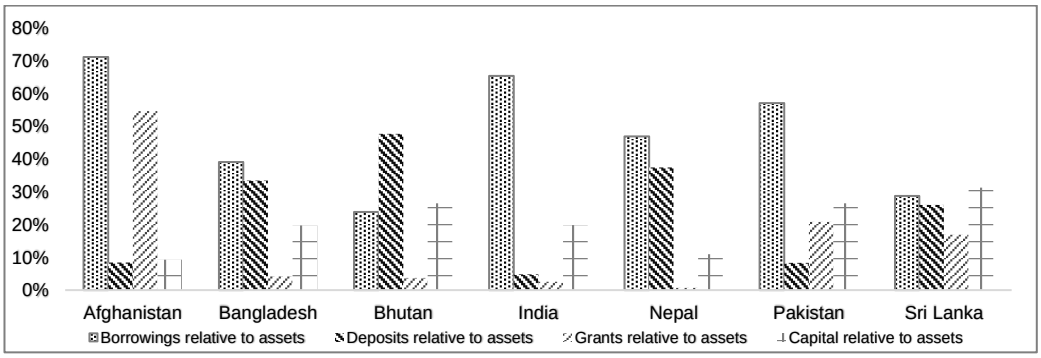
Country-wise proportion of written-off loans net of recoveries relative to average gross loan portfolio of MFIs of South Asian countries. MFIs of Bhutan have the lowest percentage of default loan ratio and MFIs of Afghanistan have the highest percentage of default loan ratio.

Figure 3: Profitability and Risk of Microfinance Institutions (MFIs) in Percentage (%).



Country-wise average profitability in terms of return on assets and average risk in terms of portfolio at risk for 30 days, of MFIs of South Asian countries. MFIs of Bhutan have the highest average profitability and highest average percentage of loan portfolio at risk. MFIs of Afghanistan perform poorly in terms of return on assets and portfolio at risk.

Figure 4: Funding Sources of Microfinance Institutions (MFIs) in Percentage (%).



Country-wise average funding from borrowings, deposits, grants, and equity capital relative to total assets of MFIs of South Asian countries. MFIs of Bhutan

have the lowest reliance on borrowings and MFIs of Afghanistan have the highest reliance on borrowings relative to assets. MFIs of Afghanistan also use the highest percentage of grants while MFIs of Nepal use the lowest percentage of grants relative to assets.

To analyze the relationship between life cycle and performance, I divide the sample into three groups: new, young, and mature stage. Stage in the life cycles is measured by the number of years for which MFI has been operating. This grouping helps to test the life cycle theory of MFI financing. For each of this group – life stage, dummy is created. I follow the standard definition for life stages of MFIs: new (0-4 years), young (5-8 years), and mature (over 8 years) - followed by mix market. With these definitions, 70.19% of the sample is mature, 20.31% of the sample is young, and 9.50% of the sample is new MFIs. From the regression results depicted in table 3, it can be observed that life cycle variables are related to performance variables: outreach, operational self-sufficiency and return on assets. However, performance variables: default rate and average loan balance relative to GDP per capita are not significantly related to life cycle variables. Nevertheless, the OLS models have limited explanatory power evidenced from the low R^2.

Table 3: Life Cycle Theory Models

Dependent Variable	Outreach	Default rate	Operational self sufficiency	Return on assets	Average loan balance/ GNI per capita
Young Stage Dummy	0.6884*** (0.1773)	0.0050 (0.0043)	0.1156** (0.0510)	0.0878 (0.0291)***	-0.0639 (0.0681)
Mature Stage Dummy	1.2820*** (0.2294)	0.0018 (0.0034)	0.2221 (0.0563)***	0.1107 (0.0308)***	-0.1036 (0.0850)
Intercept	9.8185*** (0.1754)	0.0082 (0.0024)***	0.9269 (0.0537)***	-0.1039 (0.0307)***	0.3410 (0.0940)***
R-squared	0.0518	0.0007	0.0352	0.0677	0.0074
Log likelihood	-2401.56	1762.37	-534.014	851.9304	-510.2552
Observations	1211	1211	1211	1211	1211
Test of probability	F(2,310) = 16 [0.0000]	F(2,310) = 0.66 [0.5185]	F(2,310) = 8.65 [0.0002]	F(2,310) = 7.46 [0.0007]	F(2,310) = 0.78 [0.4584]

Note: Standard errors in parentheses. P-values in square bracket; Significant at the ***1% level, **5% level, *10% level.

The results reflect that age is significantly associated with outreach, operational self-sufficiency and return on assets. However, when other independent variables are added to the simple regression model of outreach, the life cycle stage variables become insignificant. In other two cases, i.e., operational self-sufficiency and return on assets regression, life cycle stage variables are still significant after adding other independent variables.

5. Econometric Analysis

A. Capital Structure and Financial Performance

Default Rate, Operational Self-Sufficiency, and Return on Assets.

Default rate is one of the key financial metrics to measure the success and sustainability of MFIs. I analyze the effects of change in capital structure on the default rate of MFIs using equation (1). Though equation (1) is a Panel OLS regression model which are captured in both version A and B, version C and version D reflect the fixed effect regression and random effect regression, respectively. Fixed effect regression controls structural differences of MFIs that may influence the default rateoutreach and random effect regression controls the correlations between explanatory variables and unobservable individual MFI effect. Note that out of panel OLS regression models A and B, version A does not control for country and macroeconomic variables whereas version B included these variables.

$$Default\ rate_i = \beta_0 + \sum_{j=1}^{4} \beta_j X + \sum_{k=5}^{19} \beta_k Y + \sum_{t=20}^{24} \beta_l Z + \varepsilon_i \qquad (1)$$

where X specifies the MFI capital structure variables, Y captures the MFI characteristic variables, and Z indicates the country specific macroeconomic indicators. The results of equation (1) are summarized in Table-4.

Table 4: Key Coefficients of Default Rate Regression

Dependent Variable	A		B		C		D	
Default rate	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Borrowings to assets	-0.0272	0.0291	-0.0298	0.0289	-0.0302	0.0379	-0.0298	0.0271
Deposits to assets	-0.0489*	0.0278	-0.0498*	0.0287	-0.0328	0.0370	-0.0498	0.0310
Grants to assets	0.0246**	0.0123	0.0098	0.0117	-0.0087	0.0179	0.0098	0.0122
Share capital to assets	-0.0273	0.0281	-0.0373	0.0284	-0.0454	0.0490	-0.0373	0.0327
Log of assets	0.0014	0.0011	0.0009	0.0011	-0.0072	0.0050	0.0009	0.0011
Portfolio at risk > 30 days	0.0128	0.0117	0.0121	0.0108	0.0113	0.0138	0.0121	0.0122
Yield on gross loan portfolio	-0.1727	0.1383	-0.2086	0.1459	-0.3776**	0.1939	-0.2086	0.1465
Accept deposits	0.0044	0.0038	0.0053	0.0042	-0.0024	0.0114	0.0053	0.0039
Bank dummy	0.0012	0.0038	-0.0054	0.0035	0.0000		-0.0054	0.0044
NGO dummy	0.0024	0.0047	-0.0021	0.0037	0.0000		-0.0021	0.0046
Young Stage Dummy	-0.0015	0.0074	-0.0021	0.0069	0.0103	0.0086	-0.0021	0.0070
Mature Stage Dummy	-0.0069	0.0092	-0.0059	0.0080	0.0104	0.0108	-0.0059	0.0082
MFI country GDP growth			0.0290	0.1086	0.0648	0.1232	0.0290	0.0990
MFI country inflation			-0.0664*	0.0362	-0.0622	0.0385	-0.0664*	0.0348
Constant	0.0550	0.0437	0.0855	0.0547	0.2404*	0.1292	0.0855	0.0569
Country control variables	No		Yes		Yes		Yes	
Macroeconomic indicator control variables	No		Yes		Yes		Yes	
Observations	1,211		1,211		1,211		1,211	
R^2	0.1369		0.1820		0.0860		0.1820	

Note: Significant at the ***1% level, **5% level, and * 10% level

The results show that deposits to assets is negatively related to the default rate which implies that MFIs relying on deposits for funding are likely to curve down the default rate of borrowers. It can be inferred that management of MFIs are more prudent to disburse the loanable funds to borrowers because good credit management will enable them to make the interest payment to depositors promptly. Borrowings, the key component of leverage, also show the negative relationship with the default rate. Though this relationship supports the fact mentioned above, it is not statistically significant. MFIs with high leverage put essential measures to reduce the default rate for improving profitability and capability to honor debt obligations (Kyereboah-Coleman, 2007). However, high leverage increases the likelihood of MFI failure, if it cannot generate adequate cash flows to service the outstanding debt amount. The significance of negative relationship between deposits and default rate disappears when I consider the fixed effect regression and random effect regression in version C and D which are more robust relative to OLS regression.

Grants as a percentage of assets is positively associated with the default rate and this relationship is statistically significant in version A. From this result, it can be inferred that source of funding is important in determining default of MFI loans. Grants, which works as a donation, does not come with repayment obligation, and makes MFI management less concerned about prompt disbursement and management of loans. Hence, the default rate rises for the MFIs which rely mostly on in-kind donations. Probably this reason works as an impetus to reduce the dependency of MFIs on subsidized or grant funding in recent years. In addition, yield on gross loan portfolio, an indicator of lending interest rate of MFI, is negatively related to the default rate in version C, which indicates that MFIs with high lending rate are less likely to incur loan default. Often high lending rate of MFIs is justified with the argument of reducing the likelihood of loan default by the poorer borrowers. This negative relationship supports this argument. Moreover, the inflation is negatively related to the loan default of MFIs in version B and D and the relationship is significant. It can be asserted that high inflation reduces the real value of money which makes it convenient for borrower to clear the loan installment promptly and thereby reduces the default probability. Instead of the empirical relationship presented above, the overall explanatory

power of the equation to explain the performance of MFI in terms of default rate is not quite good.

Operational self-sufficiency, one of the key performance indicators of MFI, measures MFI's ability to make up the financial expense, impairment losses on loans and operating expenses by operating revenue. I analyze the effect of capital structure variables on MFI's ability to be operationally sustainable using equation (2). Like before equation (2) is a Panel OLS regression model of which results are presented in version A and B. In addition, fixed effect regression and random effect regression are covered in version C and D, respectively.

$$Operational\ self-sufficiency_i = \beta_0 + \sum_{j=1}^{4} \beta_j X + \sum_{k=5}^{19} \beta_k Y + \sum_{t=20}^{24} \beta_l Z + \varepsilon_i \qquad (2)$$

where X specifies the MFI capital structure variables, Y captures the MFI characteristic variables, and Z indicates the country specific macroeconomic indicators. Table 5 shows the regression results of equation (2). Log of assets is positively related to the operational self-sufficiency. It can be inferred that large MFIs, in terms of assets size, are likely to enhance their self-sufficiency be extending microfinance services to large number of clients. Large portfolio of borrowers enables MFIs to extract enough revenue to meet up the required expenses for operating and financial purposes. As MFIs are specialized for lending micro loan, the only way to increase the loan portfolio size is to disburse the micro loans to large number of eligible borrowers.

Table 5: Key Coefficients of Operational Self Sufficiency Regression

Dependent Variable	**A**		**B**		**C**		**D**	
Operational Self Sufficiency	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
Borrowings to assets	-0.1798*	0.1023	-0.1583	0.1025	-0.2147*	0.1214	-0.1836*	0.1106
Deposits to assets	0.0546	0.1216	0.0282	0.1217	-0.2085	0.1463	-0.0225	0.1304
Grants to assets	-0.2104**	0.1080	-0.1053	0.0966	-0.0436	0.0860	-0.0616	0.0900
Share capital to assets	0.0555	0.1256	0.1324	0.1169	-0.0205	0.1526	0.0683	0.1361
Log of assets	0.0363***	0.0060	0.0431***	0.0069	0.0731***	0.0150	0.0517***	0.0087
Portfolio at risk > 30 days	-0.1810*	0.1062	-0.1651*	0.0959	-0.1628	0.1027	-0.1602*	0.0977
Yield on gross loan portfolio	0.1573	0.1080	0.4697***	0.1589	0.5241**	0.2347	0.4670***	0.1768
Accept deposits	0.0276	0.0289	0.0400	0.0296	0.1051***	0.0306	0.0561*	0.0292
Bank dummy	-0.1115***	0.0304	-0.1002***	0.0315	0.0000		-0.1182**	0.0538
NGO dummy	0.0192	0.0204	0.0516**	0.0214	0.0000		0.0416	0.0336
Young Stage Dummy	0.1014**	0.1023	0.0832**	0.0388	0.0881**	0.0368	0.0943***	0.0370
Mature Stage Dummy	0.1584***	0.1216	0.1044***	0.0375	0.0898*	0.0552	0.0966**	0.0441
MFI country GDP growth			0.4596	0.4007	0.4841	0.4169	0.3982	0.3991
MFI country inflation			-0.6810***	0.2279	-0.4730**	0.2011	-0.5892***	0.2036
Constant	0.4535***	0.1479	0.2980*	0.1762	-0.1639	0.2744	0.2173	0.2207
Country control variables	No		Yes		Yes		Yes	
Macroeconomic indicator control variables	No		Yes		Yes		Yes	
Observations	1,211		1,211		1,211		1,211	
R^2	0.1975		0.2602		0.1232		0.2554	

Note: Significant at the ***1% level, **5% level, and * 10% level

Borrowings relative to assets is significant and negatively related to operational self-sufficiency in version A, C, and D. In addition, grants as percentage of assets is negatively related to the operational self-sufficiency. These findings affirm the hypothesis that source of funding does matter to the achievement of performance (Bogan, 2012). As MFIs work for marginalized people in the society, donors and international financial institutions often provide MFIs with significant amount of grants and concessional loans. However, MFIs reliant on grants funding are less likely to achieve operational self-sufficiency which can be inferred from the above findings. Portfolio at risk is significant and negatively related to the operational self-sufficiency in version A, B, and D. Yield on gross loan portfolio is significant and positively related to the operational self-sufficiency in version B, C, and D. The MFIs which accept deposits are more self-sufficient compared to the MFIs which do not accept deposits. This inference can be made based on the significant and positive relationship of deposits dummy and operational self-sufficiency. Furthermore, while the bank dummy variable is significant and negative with respect to the relationship with operational self-sufficiency, the NGO dummy variable is significant and positive with respect to the relationship with operational self-sufficiency. It indicates that bank-based MFIs are less likely to be self-sufficient relative to the NGO based MFI. Life cycle stage of the MFIs is also important in assessing the self-sufficiency of MFIs which is revealed from the significance of life cycle indicator. Though country GDP growth is not significant in any versions of the regression, inflation causes a major challenge to the self-sufficiency of MFIs for which these financial institutions should be adequately cautious during high inflationary environment.

I also analyze the effects of capital structures on the financial performance of MFI in terms of return on assets using equation (3). The regression results of equation (3) are presented in Table 6 where version A and B reflect the result of panel OLS regression, and version C and version D reflect the fixed effect regression and random effect regression.

$$Return\ on\ assets_i = \beta_0 + \sum_{j=1}^{4} \beta_j X + \sum_{k=5}^{19} \beta_k Y + \sum_{t=20}^{24} \beta_l Z + \varepsilon_i \qquad (3)$$

where X captures the MFI capital structure variables, Y includes the MFI characteristic variables, and Z covers the country specific macroeconomic indicators. It can be observed that borrowings as a percentage of assets and deposits as a percentage of assets are significant and negatively related to the return on assets in version C which indicates that dependence on leverage is associated with dilution of profitability. In contrary, share capital relative to assets is significant and positively related to return on assets in version A, B, and D which provides evidence that MFIs dependent on share capital are likely to achieve more profitability compared to highly levered MFIs. Moreover, grants are significantly related to the profitability and the relationship is negative which is affirms the existing literature (Bogan, 2012). This relationship can be considered as one of the reasons which discourage donors and international financial institutions to extend concessional funding and grants nowadays. Firm's size measured by log of assets is significantly related to the profitability which indicates that high profitability is associated with large size of MFIs. Portfolio at risk is significant and negatively related to the return on assets in version A and B.

MFIs which accept deposits from client are likely to generate more profits relative to those which do not accept deposits. In addition, the positive and significant NGO dummy variable stresses the fact that NGO led MFIs are more profitable compared to bank or NBFI or credit union led MFIs. Furthermore, life cycle dummy variable is significant with respect to relationship with profitability. Though GDP growth is not significant, inflation causes reduction of profitability of MFIs significantly.

Table 6: Key Coefficients of Return on Assets Regression

Dependent Variable	**A**		**B**		**C**		**D**	
Return on Assets	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
Borrowings to assets	-0.0024	0.0301	0.0098	0.0305	-0.0737**	0.0321	-0.0193	0.0327
Deposits to assets	0.0423	0.0294	0.0446	0.0313	-0.0868*	0.0494	0.0025	0.0358
Grants to assets	-0.0969**	0.0418	-0.0602	0.0397	0.0011	0.0389	-0.0292	0.0400
Share capital to assets	0.1074**	0.0533	0.1351***	0.0513	0.0899	0.0691	0.1253**	0.0619
Log of assets	0.0072***	0.0022	0.0092***	0.0023	0.0274***	0.0069	0.0144***	0.0037
Portfolio at risk > 30 days	-0.0469*	0.0286	-0.0431*	0.0249	-0.0278	0.0201	-0.0366	0.0227
Yield on gross loan portfolio	0.0416	0.1672	0.1408	0.1626	0.3489*	0.1914	0.1983	0.1868
Accept deposits	0.0062	0.0090	0.0119	0.0096	0.0463***	0.0163	0.0250**	0.0105
Bank dummy	-0.0027	0.0092	0.0060	0.0094	0.0000		-0.0048	0.0174
NGO dummy	0.0077	0.0072	0.0181***	0.0071	0.0000		0.0208*	0.0115
Young Stage Dummy	0.0885***	0.0216	0.0844***	0.0202	0.0807***	0.0263	0.0867***	0.0241
Mature Stage Dummy	0.0999***	0.0210	0.0853***	0.0190	0.0782***	0.0316	0.0855***	0.0253
MFI country GDP growth			0.1051	0.1998	0.0064	0.2454	0.0459	0.2112
MFI country inflation			-0.1548**	0.0793	-0.0537	0.0670	-0.1142*	0.0693
Constant	-0.2428***	0.0546	-0.2881***	0.0602	-0.5891***	0.1208	-0.3740***	0.0860
Country control variables	No		Yes		Yes		Yes	
Macroeconomic indicator control variables	No		Yes		Yes		Yes	
Observations	1,211		1,211		1,211		1,211	
R^2	0.2862		0.3474		0.1371		0.3359	

Note: Significant at the ***1% level, **5% level, and * 10% level

B. Capital Structure and Social Performance

Outreach and Average loan balance/GDP per capita.

To examine the association between performance and MFI characteristics, I use the equation (4) which is an OLS regression model. Panel OLS regression model is reflected in version A and B. Version C covers the MFI fixed effect regression and version D covers the random effect regression. The performance variable – outreach is considered in equation (4). The explanatory variables include capital structure (i.e. borrowings relative to assets, deposits relative to assets, grants relative to assets, and capital relative to assets, MFI characteristics variables (i.e. log of assets, portfolio at risk > 30 days, yield on gross loan portfolio, a dummy variable for whether the MFI accepts deposits or not, a dummy variable for whether the MFI is classified as a bank or NGO, a dummy variable for whether the MFI is classified as a new, young or mature, and country-level macroeconomic indicators (i.e. GDP growth and inflation).

$$Outreach_i = \beta_0 + \sum_{j=1}^{4} \beta_j X + \sum_{k=5}^{19} \beta_k Y + \sum_{t=20}^{24} \beta_l Z + \varepsilon_i \qquad (4)$$

where X indicates the MFI capital structure variables, Y indicates the MFI characteristic variables, and Z indicates the country specific macroeconomic indicators. The results of equation (4) are presented in table 9. In each version of the OLS regression: version A and B, we can observe that log of assets is highly significant and positively associated with outreach. This indicates that larger MFIs, as measured by assets, serve a greater number of active borrowers which is associated with distributing micro credit to a large group of borrowers. Alternatively, it can be said that MFIs asset size get bigger, when they can serve large number of borrowers with microcredit. Grants as a percentage of assets is significant and negatively associated with outreach in version A and C. It is negative and significant at 1% level and 5% level in versions A and C, respectively. From this output, we can understand that source of funding does matter in determining performance with respect to outreach. Grants have negative

effect on outreach though it enables young MFIs to continue their operation when commercial sources of funding are not available for them.

Share capital to assets is significant at 5% and 10% level in version C and D, respectively. Additionally, share capital is negatively related to the outreach. It reflects the fact that MFIs with large number of active borrowers use less of share capital to assets to fund their operation. Besides, deposits to assets is significant at 1% significance level in version A and B, and negatively related to outreach. It stresses the fact that MFIs with large number of active borrowers are not reliant on deposits for sourcing their capital.

Yield on gross loan portfolio, an indicator of lending interest rate charged by MFIs, is negatively related to outreach which reestablishes the fact that high lending rate deters the interested borrowers from taking loans. It leads to adding a smaller number of borrowers to client portfolio. Bank dummy variable is significant at 1% significance level in version A and B and negatively related to outreach. In contrary, NGO dummy variable is significant at 1% level and positively related to outreach. It indicates that NGO based MFIs are likely to serve greater number of borrowers compared to Bank based MFIs. However, the significance of NGO dummy variable disappears in other versions. Country level dummy variables are significant in version B and D. Country level macroeconomic variables – GDP growth and inflation are significant where GDP growth is negatively related to outreach and inflation is positively related to outreach, respectively. From the above discussion, it can be observed that number of borrowers served by MFI can be influenced by the form of sources of funding.

Table 7: Key Coefficients of Outreach Regression

Dependent Variable: Outreach	**A**		**B**		**C**		**D**	
	Coefficient	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
Borrowings to assets	0.0094	0.2084	0.1405	0.1632	0.0981	0.1142	0.1582	0.1059
Deposits to assets	-1.0380***	0.2887	-0.9862***	0.2435	0.2525	0.3397	-0.2398	0.2784
Grants to assets	-0.2237***	0.0859	0.1125	0.0833	-0.1055**	0.0491	-0.0490	0.0463
Share capital to assets	-0.3072	0.2344	-0.1724	0.1871	-0.3502**	0.1441	-0.2557*	0.1335
Log of assets	0.9656***	0.0233	0.9356***	0.0204	0.7511***	0.0332	0.8105***	0.0241
Portfolio at risk > 30 days	-0.0731	0.0608	-0.0831	0.0619	0.0152	0.0450	-0.0157	0.0521
Yield on gross loan portfolio	-0.9351***	0.3338	-0.2687	0.2012	-0.1425	0.1603	-0.1450	0.1528
Accept deposits	0.1179	0.0844	0.1158	0.0801	-0.0812	0.1009	-0.0159	0.0876
Bank dummy	-0.5096***	0.1788	-0.3036***	0.1183	0.0000		-0.1024	0.1482
NGO dummy	0.2115***	0.0735	0.0871	0.0708	0.0000		0.0884	0.0843
Young Stage Dummy	-0.0197	0.0864	0.0494	0.0816	0.0805	0.0829	0.0451	0.0789
Mature Stage Dummy	0.0072	0.1054	-0.0410	0.0890	0.1469	0.1033	0.0430	0.0922
MFI country GDP growth			0.2260	0.5719	-0.8571**	0.3871	-0.7570**	0.3803
MFI country inflation			0.8732***	0.3351	0.7902***	0.2945	0.7000**	0.2881
Constant	-4.4560***	0.4115	-5.3801***	0.4145	-1.3790***	0.5206	-2.5038***	0.4074
Country control variables	No		Yes		Yes		Yes	
Macroeconomic indicator control variables	No		Yes		Yes		Yes	
Observations	1,211		1,211		1,211		1,211	
R^2	0.8763		0.9120		0.8417		0.9045	

Note: Significant at the ***1% level, **5% level, and * 10% level

Though it is expected that funding from different sources enable MFIs to expand operation and serve more people, form of funding does matter to determine the performance of MFIs. MFIs which serve greater number of borrowers are not dominantly funded by deposits from depositors, grants from donors and equity from shareholders. Probably these fund providers are not very likely to be more vigilant than the lenders to make sure that loanable funds are disbursed to the more active borrowers. Borrowings, the principal form of debt, are positively related to outreach. However, this relationship is not statistically significant. From both fixed effect and random effect regression it can be observed that equity capital is negatively related to the number of active borrowers which is consistent with the findings of (Bogan, 2012). This significant negative relationship can raise the question of viability of MFI's interest for mobilizing equity funding from financial market in recent days.

Microfinance institutions are socially motivated financial institutions. In addition to analyzing its performance in terms of financial ratios, policymakers often look for indicators which measure the social performance of MFIs. In addition to outreach variable, which indicates the number of active borrowers served by MFIs, the average loan balance relative to GNI per capita measures the poverty level of the client of MFIs. The MicroBanking Bulletin which is bi-annual publication of Microfinance Information eXchange defines that if any MFI's average outstanding loan balance per borrower relative to GNI is less than 20%, that kind of MFI is classified as low end. As they are disbursing small loans, it is expected that they are reaching to poorer people of the society. To analyze the linkage between average loan balance per borrower and the sources of funding I used the equation (5). The regression results of equation (5) are summarized in Table 8 where version A and B demonstrate the result of panel OLS regression, and version C and version D show the fixed effect regression and random effect regression.

Table 8: Key Coefficients of Average Loan Balance/ GNI Per Capita Regression

Dependent Variable	**A**		**B**		**C**		**D**	
Average Loan Balance/ GNI Per Capita	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
Borrowings to assets	-0.0941	0.1337	-0.2132**	0.1011	-0.0843	0.0728	-0.1271	0.0897
Deposits to assets	0.4368**	0.2088	0.3461**	0.1621	-0.2881	0.2266	-0.0318	0.1932
Grants to assets	0.0985***	0.0327	-0.1334***	0.0480	-0.0211	0.0195	-0.0308	0.0203
Share capital to assets	-0.0920	0.1266	-0.1651*	0.0966	-0.0563	0.0757	-0.0855	0.0880
Log of assets	-0.0019	0.0048	0.0033	0.0035	0.0170***	0.0064	0.0132***	0.0050
Portfolio at risk > 30 days	-0.0370**	0.0165	-0.0322***	0.0122	-0.0145	0.0116	-0.0124	0.0102
Yield on gross loan portfolio	0.1631*	0.0993	-0.2592***	0.0694	0.0035	0.0664	-0.0511	0.0522
Accept deposits	0.0177	0.0342	-0.0652***	0.0257	0.0613**	0.0318	0.0364	0.0298
Bank dummy	0.1257**	0.0579	0.0862**	0.0438	0.0000		0.0421	0.0909
NGO dummy	-0.0825***	0.0210	-0.0143	0.0183	0.0000		-0.0618*	0.0326
Young Stage Dummy	-0.0289	0.0578	-0.0570	0.0411	-0.0118	0.0465	-0.0159	0.0467
Mature Stage Dummy	-0.0877*	0.0519	-0.0088	0.0320	-0.0330	0.0514	-0.0263	0.0474
MFI country GDP growth			0.3841	0.7014	0.5980	0.4776	0.6108	0.4879
MFI country inflation			0.0359	0.2823	-0.0523	0.1233	0.0065	0.1433
Constant	0.3350**	0.1569	0.2057	0.1311	0.0404	0.1005	-0.0302	0.0958
Country control variables	No		Yes		Yes		Yes	
Macroeconomic indicator control variables	No		Yes		Yes		Yes	
Observations	1,211		1,211		1,211		1,211	
R^2	0.1464		0.5550		0.0052		0.5035	

Note: Significant at the ***1% level, **5% level, and * 10% level

$$\text{Average loan balance per borrower}_i = \beta_0 + \sum_{j=1}^{4} \beta_j X + \sum_{k=5}^{19} \beta_k Y + \sum_{t=20}^{24} \beta_l Z + \varepsilon_i \qquad (5)$$

where X includes the MFI capital structure variables, Y covers the MFI characteristic variables, and Z incorporates the country specific macroeconomic indicators. In table 8, in both version A and B, we see deposits relative to assets is significant and positively related to the average loan balance per borrower as a percentage of GNI per capita. This indicates that source of funding is important to determine the average loan balance. It can be inferred that MFIs with reliance on deposits fund are more likely to have higher average loan balance per borrower compared to the counterparts who raise fund mostly from sources other than deposits. On the other hand, borrowings, grants, and share capital are significant and negatively related to the average loan balance per borrower in version B which shows the results of panel OLS regression model with both country and macroeconomic control variables. However, in version A, where country and macroeconomic control variables were not included, grants relative to assets is significant and positively related to the average loan balance per borrower as a percentage of GNI per capita. As version B is more robust compared to version A, we can infer that grants dependence of MFIs is inversely related to the average loan balance per borrower of MFI. As average loan balance per borrower relative to GNI per capita indicates the category of the borrowers, from the positive sign of grants in version A, we can infer that grants enhances the MFIs capability to serve more capable borrowers.

Log of assets is positive and significantly related to average loan balance per borrower in both version C and D. It can be understood that lower average loan balance per borrower is associated with small sized MFIs. In addition, portfolio at risk is significant and negatively related to average loan balance per borrower in version A and B which indicates that risky loan portfolio reduces the capability of MFIs to serve with higher loan balance to the borrower. Moreover, yield on gross loan portfolio is significant and negatively related to average loan balance per borrower in version B which can be interpreted as higher yield on gross loan portfolio, an indicator of high lending rate, reduces the likelihood of taking higher

amount of loan by borrower. Though version A is showing positive and significant relationship of yield on gross loan portfolio and average loan balance per borrower, the relationship is significant only at 10% and control variables for macro-economy and country were not included in that version. The bank dummy variable is significant and positive with respect to the relationship with average loan balance per borrower in version A and B while the NGO dummy variable is significant and negative with respect to the relationship with average loan balance per borrower in version A and D. It indicates that banks-based MFIs are likely to have higher capability to serve borrower with higher amount of loan which is desirable as the loanable fund available in bank-based MFIs is expected to be higher. Life cycle dummy variable, country dummy variable, and macroeconomic indicator variables are not significant with respect to the relationship with average loan balance per borrower.

C. MFI Charter Type

Differences in capital structure, portfolio at risk, yield on loan, average loan balance, and outreach etc. can be clearly observed by MFI charter type. Therefore, there is likelihood that endogenous problem can arise from the relationship between outreach, capital structure, and MFI charter type. (NGO, NBFI, Bank, Credit Union, Rural Bank, and other type). Though I control for charter type NGO and Bank in earlier equations with dummy variables, I further concentrate on this issue. Table 10 summarizes selected MFI statistics by charter type. Moreover, I classify the data based on charter type and conduct random effect panel regression with country control variables using each sample. From Table 10, it is observed that borrowings to assets is significant and positively related to the outreach with respect to sample of NGO and credit union type MFI. Share capital is significant and negatively related to outreach with respect to sample of NBFI. However, share capital is positively related to outreach with respect to credit union/cooperative type MFI.

Table 11: Summary Statistics of MFIs By Charter Type

	Average Value					
	NGO	**NBFI**	**Bank**	**Credit Union/ Cooperative**	**Rural Bank**	**Other**
Borrowings to assets	0.57	0.64	0.42	0.38	0.59	0.53
Deposits to assets	0.14	0.05	0.28	0.38	0.28	0.14
Grants to assets	0.12	0.07	0.02	0.06	0.00	0.46
Share capital to assets	0.19	0.22	0.21	0.17	0.09	0.23
Assets (US$000)	50,942.12	45,978.32	226,265.10	4,456.19	13,385.12	7,468.44
Portfolio at risk > 30 days	0.05	0.07	0.10	0.04	0.08	0.06
Yield on gross loan portfolio	0.24	0.24	0.25	0.19	0.20	0.30
Accept deposits (%)	54.34	26.26	71.32	89.66	100.00	39.39
Average loan balance per borrower/GNI per capita	0.19	0.18	0.49	0.62	0.42	0.42
Outreach	307.17	232.02	748.45	18.16	42.29	28.38

Though the relationship between grants and outreach is negative with respect to NGO and NBFI subsample, this relationship is not statistically significant. In addition, the relationship between portfolio at risk and outreach is positive with respect to NBFI subsample and negative with respect to bank subsample. Yield on gross loan portfolio impacts the outreach of credit union positively. Furthermore, while deposit accepting NGO and credit union-based MFIs can serve a greater number of borrowers, deposit accepting NBFI based MFIs are not reaching to a greater number of borrowers.

Table 12: Outreach Random Effect Regression by Charter Type

Dependent Variable Outreach	NGO		NBFI		Bank		Credit Union/ Cooperative	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Borrowings to assets	0.2538*	0.1506	-0.1325	0.1500	0.5459	0.3946	0.7045***	0.1934
Deposits to assets	0.4100	0.4885	-0.4127	0.4291	-0.3259	0.5191	0.1390	0.8436
Grants to assets	-0.0654	0.0743	-0.2259	0.1846	2.8756	2.0748	1.0182	0.7897
Share capital to assets	-0.1257	0.1795	-0.4696**	0.2284	-0.8299	0.6340	0.9788*	0.5240
Log of assets	0.7449***	0.0379	0.8243***	0.0294	0.9240***	0.0453	0.6706***	0.0729
Portfolio at risk > 30 days	-0.0599	0.2776	0.1308**	0.0553	-0.1940***	0.0413	-0.2709	1.1736
Yield on gross loan portfolio	-0.1610	0.1740	0.0662	0.3293	-0.2730	0.5001	0.1227*	0.0736
Accept deposits	0.1975*	0.1174	-0.2373**	0.1178	0.1201	0.1970	0.3831***	0.1446
Young Stage Dummy	-0.1142	0.0847	-0.0527	0.0713	0.2046	0.2020	0.1431	0.1355
Mature Stage Dummy	-0.0890	0.1082	-0.1054	0.0962	0.1728	0.2074	0.4119*	0.2444
MFI country GDP growth	-0.8794	0.6505	0.1089	0.5722	-1.5959*	0.9457	0.6781	1.1935
MFI country inflation	0.1861	0.3721	0.6888*	0.3758	2.3949**	1.0888	-0.8431	0.7070
Constant	-1.9536***	0.6300	-2.2560***	0.4723	0.0000		0.0000	
Country control variables	Yes		Yes		Yes		Yes	
Macroeconomic indicator control variables	Yes		Yes		Yes		Yes	
Observations	576		377		129		1,211	
R^2	0.9099		0.9139		0.9607		0.8421	

Note: Significant at the ***1% level, **5% level, and * 10% level

Instrumental variables two-stage least square regression.

From Table-7, it can be observed that grants relative to assets and outreach have a clear relationship. However, the causal relationship between these two variables is not analyzed. If grants to assets and outreach are jointly influences by any unobserved variables, instrumental variables (IV) two-stage least square regression can help us to decompose the simultaneity circle. With similar approach, the causality between share capital to assets and outreach can also be examined.

While correlation results demonstrate that macroeconomic indicators have very week or no relationship with outreach, the regression results between outreach and macroeconomic indicators also have very poor explanatory power. However, it can be inferred that macroeconomic indicators like GDP growth and inflation affect the investment flow as well as flows to the financial institutions in the form of deposits or grants or equity investments. Based on the previous study (Bogan, 2012) and my intuition, I find that GDP growth lagged variable and inflation lagged variable to be appropriate instruments for grants relative to assets and share capital relative to assets. Taking lagged GDP growth and lagged inflation as instruments for grants to assets and share capital to assets, I perform a two-stage least-square regression of which results are presented in appendix. From second stage, it can be observed that grants relative to assets is negative and associated p-value is 0.07 which indicate that greater percentage of grants relative to assets in capital structure of MFIs reduces the ability to server greater number of active borrowers – outreach.

6. Conclusion

This systematic study aims at analyzing the relationship between different forms of funding and overall financial and social performance of MFIs. This study is an attempt to explore the linkage between capital structure, and performance and sustainability measures of socially oriented financial institutions – Microfinance Institutions.

Life cycle model is one of the most popular models to establish the relationship between capital structure and performance measures. However, I

find that it has very little explanatory power when I tested with the data. In contrary, I find some other MFI characteristic and macroeconomic variables which are likely to be closely associated with MFI performance and sustainability. This study documents that capital structure components are significantly associated with both performance and sustainability measures. In addition to capital structure, some specific characteristic variables of MFIs also influence the attainment of good performance and achievement of sustainability. Assets size of MFIs has significant effect on both financial and social performance, but it does not influence the default rate of MFIs. However, grants as a percentage of assets is significant and positively associated with default rate and it is negatively associated with outreach. The instrumental variables analysis also confirms the inference that grants reduce the ability of MFIs to serve greater number of borrowers. However, the positive relationship between average loan balance per borrower and grants indicate the MFIs can serve high end category borrowers. These findings may explain the reasons why donors are putting pressures on MFI management to reduce dependency on donations and to increase dependency on more commercial source of funding. As grants do not come up with repayment obligation, it does not encourage MFIs to reduce default rate and increase profitability and outreach which causes degradation of operational sustainability of MFIs. Furthermore, MFIs with high reliance on share capital are likely to achieve higher return on assets.

Though it is particularly challenging for commercial fund led Microfinance Institutions to pursue dual goals of achieving financial sustainability and social development goals, it is not impossible if they can undertake following activities. Firstly, diversify income sources by providing wide array of financial services i.e., savings accounts, insurance, remittance, and digital payment services (Morduch, 1999). Secondly, implement a balanced interest rate structure by employing efficient operational practices and leveraging technology (Rosenberg et al., 2009). Third, maintain a strong client relationship which can enhance repayment rates and reduce default risk (Hermes & Lensink, 2011). Finally, establish strong risk management frameworks which will help in identifying, assessing, and mitigating risks associated with lending (Cull et al., 2009) .

The reliability and validity of the findings from this study could be enhanced if I could address following constraints of this study. First, it would be more appropriate to measure social performance of MFIs based on environmental, social, and governance (ESG) factors in addition to the measures i.e., outreach and average loan balance to GDP per capita. Second, since reporting to the MIX market is voluntary, there is a chance only successful MFIs are included, which might create concern for survivorship bias in sample. Third, inclusion of a country-wise analysis of performance and sustainability would provide a comparative scenario across South Asian countries. Finally, potentially endogenous relationship could be tested using the instrumental variables (IV) two-stage least square regression on all performance and sustainability indicators instead of only outreach.

The findings from the paper have specific policy implications for microfinance institutions which are exploring opportunities to increase reliance on commercial funding keeping the goal of social development intact. Donors, government, and monetary regulatory authority are likely to extend grants funding to MFIs in the form of bailout funding on regular basis or during financial crisis. However, they should be concerned of the potential negative effects of grants on performance and sustainability of these semi-formal financial institutions.

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Appendix

Table I: Description of the Variables

Objectives	Variable	Operational definition	Unit
Performance and sustainability of MFIs	Outreach	Number of active borrowers of MFI	ln (Number of people)
	Default rate	Total written off loans net of recoveries relative to the average gross loan portfolio	Percentage
	Operational Self-sufficiency	Operating incomes divided by total of financial expense, impairment losses on loans and operating expenses	Percentage
	Return on assets	Net operating income (less of taxes) compared to average assets	Percentage
	Average loan balance	Average loan balance per borrower compared to local GNI per capita	Percentage
Capital structure as well as financing pattern	Borrowings	Total borrowings divided total assets	Percentage
	Deposits	Total deposits divided total assets	Percentage
	Grants	Total accumulated donated equity divided total assets	Percentage
	Share capital	Total equity compared to assets.	Percentage
Other influencing factors	Firm size	Natural logarithm of total assets value	ln (USD)
	Risk level	Portion of loans greater than 30 days past due divided by gross loan portfolio	Percentage
	Gross yield	Total financial revenue divided by average gross loan portfolio	Percentage

Table II: Instrumental Variables Two-stage Least-Squares Regression

Dependent Variable Outreach	**First Stage**				**Second Stage**	
	Coefficient	**Std. Error**	**Coefficient**	**Std. Error**	**Coefficient**	**Std. Error**
Grants to assets					-2.6133*	1.4502
Share capital to assets					0.6842	10.3987
Borrowings to assets	0.5908***	0.0514	-0.8692***	0.0174	2.3690	9.5196
Deposits to assets	0.5998***	0.1226	-0.7651***	0.0416	1.4551	8.5182
Log of assets	-0.0463***	0.0092	-0.0036	0.0031	0.8321***	0.0655
Portfolio at risk > 30 days	0.4386***	0.1172	-0.0830**	0.0398	0.9224	1.3632
Yield on gross loan portfolio	0.0835	0.1354	-0.0230	0.0459	-0.5020	0.5419
Accept deposits	-0.1145***	0.0408	-0.0311**	0.0138	-0.1474	0.2885
Bank dummy	0.0812	0.0596	-0.0039	0.0202	-0.2694	0.2377
NGO dummy	0.0795**	0.0347	-0.0210*	0.0118	0.4064	0.3200
Young Stage Dummy	-0.0147	0.0571	0.0000	0.0194	-0.1018	0.2972
Mature Stage Dummy	-0.0282	0.0585	0.0210*	0.0199	-0.1592	0.5594
MFI country GDP growth	3.7274***	0.5024	0.0496***	0.1705	8.5917	8.5781
MFI country inflation	-0.0195	0.2917	-0.4278	0.0990	0.1911	1.1692
MFI country GDP growth-*lagged*	-0.2764	0.5184	0.0849	0.1759		
MFI country inflation-*lagged*	0.7369**	0.3129	0.0790	0.1061		
Constant	0.1309	0.1768	0.8622***	0.0600	-4.5722	9.0451
Observations	698		698		698	
Wald Chi Square	329		2910		1279.92	

Note: Significant at the ***1% level, **5% level, and * 10% level