

Bridging the Information Gap between Borrowers and Microfinance Lenders

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We use a fixed effect two-stage least squares regression approach on a time series of 82 microfinance institutions (MFIs) in Africa during the period 1997-2008 to understand what drives MFI performance. MFIs with higher debt-to-equity ratios and strong profit margins tend to have stronger financial performance than institutions with low debt-to-equity and weak profit margins. Further, MFI size and expense ratio are inversely related to financial performance. Finally, we find that the older the MFI, the better the financial performance. Our study contributes to the microfinance literature by using a unique sample of non-bank financial institutions across a decade-long time series covering the entirety of the African continent. The results support the asymmetric information theory of microfinance institutions. Overall, our results indicate that it is the financial characteristics rather than MFI structure that determine performance. This may be useful for MFI investors and practitioners.

I. Introduction

In this paper, we investigate the performance and capital structure of microfinance institutions (MFIs) in Africa. Microfinance institutions refer to organizations that provide small-scale loans to impoverished individuals and households throughout the world. These loans are relatively small (up to a few hundred USD) but have the potential to help the recipient become self-sufficient. An MFI can operate as a nonprofit such as a non-government organization (NGO), credit cooperative, non-bank financial institution (NBFI), or as a formal, regulated for-profit bank. Here, we focus on non-bank financial institutions which do intend to make a profit from microfinance lending.

Information asymmetry exists in all borrower-lender relationships, but it is especially severe in a microfinance institution. The MFI has little data to rely on to make lending and interest rate decisions. Borrowers typically have no credit history, are unemployed, and are usually unable to provide collateral. Like other financial institutions, MFIs charge an interest rate on their loans consistent with the risk of the borrower. Therefore, loan rates on microloans can exceed 10 percent per month due to the high risk and uncertainty of the borrowers' ability to repay the loan. In some cases, interest rates are compounded on a daily basis, which catapults the annualized rate. In terms of loan repayment, MFIs are generally successful. MFIs record loan recovery rates of over 98 percent, which far exceed those at the best managed global banks. Koveos and Randhawa (2004) find that the poorest clients actually are the most likely to pay back the loans. The high loan interest rates and the high loan recovery rates are crucial for the long-term vitality of MFIs.

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It is imperative to the continuation of the MFIs, particularly those not solely supported by government or charity donations, to make a profit on these small investments. Mersland and Strom (2009) suggest that MFIs really have two goals: to reach more clients and to attain financial sustainability. It can be argued that without the second goal being realized, the first can never be achieved.

The second of Merland and Strom's goals, that of sustained financial performance, is the focus of this paper. Specifically, we use a two-stage least squares regression approach on a time series of 82 microfinance institutions in Africa during the period 1997-2008 to understand what drives MFI performance. Our results support the asymmetric information hypothesis of microfinance institutions: Those MFIs that decrease the information asymmetry between the borrower and lender are those that succeed financially. In particular, we find that MFIs with higher debt-to-equity ratios and strong profit margins tend to have stronger financial performance than firms with low debt-to-equity and weak profit margins. Further, MFI size and expense ratio are inversely related to financial performance. Finally, we find that the older the MFI, the better the financial performance. These results are consistent when using OLS regression and a two-stage least squares approach.

II. Background and Examples of MFIs

Traditional banking differs from microfinance both financially and socially. Traditional banking is based on guarantees, reputation, and collateral. Poor and low-income households and individuals (the primary clients of MFIs) possess little, if any, wealth and cannot offer collateral to back loans. They become completely marginalized from the formal financial sector and are rarely able to hold a credit history. Banks deem these groups high-credit risks.

Conversely, many MFIs exist as non-profit organizations that rely on subsidies, grants, and loans of their own. Microfinancing embraces a variety of services that may include savings, credits, insurance, payments and social intermediation. It is used as an instrument for alleviating poverty and improving access to financial services, especially in developing countries. These services are extended to clients who then use the loan to either start a business or maintain and grow a current business. Over time, these loans must be paid back, and those clients who are successful can hope to apply for even larger loans from MFIs. The majority of MFIs have a mandatory savings requirement for personal savings as well as for reinvestment back into the original enterprise. Many offer additional services such as credit counseling and loan repayment strategies.

Koveos and Randhawa (2004) state that the high interest costs of an MFI reflect both the high transaction costs of processing loans and the inherent riskiness of the borrowers. For instance, typical African MFIs during the sample period charged annual rates of 100 percent to 150 percent with some rates reaching 25 percent per month (Buckley, 1996). Typical maturity for a microloan is 6-8 months requiring a lump sum payment (Shipton, 1991). Loans are generally small in nature: around \$100 is standard. Subsequent loans are contingent upon repayment of loans at the individual and group level. Additional loans may grow in size as the microcredit enterprises expand.

Administrative costs at MFIs tend to be extremely high, often reflected in high interest rates charged by MFIs. Deposits as well as loans to the MFI are usually small in size thus affecting operations, efficiency, and the ability of the organization to raise capital. To fill this gap, MFIs

very often rely on subsidies. Fehr and Hishigsuren (2006) report that traditional sources of financing for MFIs may not be sufficient for sustainability in the long run. So as MFIs grow, they also may turn to debt and equity markets to raise capital.

A number of common characteristics appear in recipients of microloans. Increasingly common is the idea of a *women's welfare*-driven MFI that typically lends money and services to women only. One example of this type of institution is (Foundation for International Community Assistance, or FINCA), a microfinance program in Uganda. FINCA lends money to and accepts savings from low-income women organized in groups, each of whom operates a microenterprise.

In addition to MFIs that lend specifically to women, there are organizations that lend based on the degree of poverty. The Small Enterprise Foundation (SEF) in South Africa operates two programs called Micro Credit Programme (MCP) and the Tshomisano Credit Programme (TCP). MCP is the larger of the two programs and includes clients who have access to larger loans. MCP is a program that focuses on the development of microenterprises into larger businesses, and it requires that borrowers have at least six months experience in entrepreneurship before applying for credit. The other program, TCP, although operated by the same MFI foundation, focuses on very rural South African communities, usually those with extreme poverty. TCP clients receive much smaller loans than MCP clients. Increasing research, such as that of Hietalahti and Linden (2006), has shown that those members of TCP receive more training and better benefits than those non-clients who try to operate an enterprise without the aid of MFIs.

While this paper focuses specifically on Africa, it is important to note the existence of microfinance institutions in other areas—in particular, India, which has a long history of MFIs. In the 1940s, the British-controlled government of Madras in South India created programs that resulted in more than nine million poor Indians belonging to credit cooperatives (Sami, 2010). India utilizes two different microfinance models: the Grameen model and Self Help Groups (SHG). African microfinance institutions primarily use the Grameen model; however, it is important to draw a distinction between the two. The Grameen approach targets poor individuals who invest ever-growing loans into their small-scale businesses. This approach was started in the 1970s when the Grameen Bank of Bangladesh was established as one of the first successful microfinance institutions. Although it functioned along the lines of a commercial bank, the bank was prevented from attaining self-sufficiency. It existed primarily through loans funded by grants and concessional loans from the government and aid donors. This led Grameen to maintain a ceiling on the interest rates it charged for microloans at about 20 percent.

The other primary model in India is known as Self Help Groups. SHGs have between 15 and 20 members, and the members participate in all activities of the SHG. According to Sami (2010), members pool savings and lend among themselves with transparency in all financial and non-financial transactions. Banks typically provide the group a loan; and as the group matures, banks tend to lend more. By far the most successful model of microfinance in India is SHG as the increase in SHG clients has led to an overall increase of 11.15 million clients during 2007-2008 (Srinivasan, 2008). Barman, et al. (2009) conclude that the tendency to borrow from moneylenders is greater among MFI clients (Grameen model) since MFIs disburse loans for income generating purposes only. This increases debt levels as well as risk to investors. Alternatively, SHG clients are able to borrow internally for consumption purposes. As previously stated, while both models are successful in India, when considering African MFIs, the focus is on the Grameen model.

To have sustainability, an MFI must deal with a variety of stakeholders effectively. These stakeholders include clients, donors, investors, and managers among others (Koveos and

Randhawa, 2004). For MFI investors, performance is reflected in the profitability of the institution. Therefore, it is imperative for the sustainability of MFIs to gain a better understanding of what drives performance—this is the focus of this paper. Since the information asymmetry between borrower and lender is high in MFIs due to the non-transparent nature of the borrowers, we test whether characteristics that bridge this information gap lead to better financial performance. Better performance should also lead to greater funding opportunities and subsequently greater extension of services provided by the MFI itself.

III. Literature Review

In broad terms, there is a research gap in the finance literature on microfinance institutions; however, several studies analyze various metrics of MFI behavior including performance and capital structure. For instance, Mersland and Strom (2009) analyze the impact of governance variables on MFI performance. They find that performance as measured by return on assets improves when the board is comprised of local as opposed to international directors. They also find a positive relationship between ROA and boards having an internal board auditor and when the MFI CEO is a woman. Further, they find that the number of clients, or loan recipients, increases with CEO/chairman duality. Most governance variables, however, fail to have an impact on the financial and outreach performance of MFIs. This paper is similar in scope to Mersland and Strom (2009) in that we test the information asymmetry hypothesis of microfinance institutions using both financial and governance variables.

Microfinance institutions create an impact on the borrowers to whom they lend and subsequently the areas in which they operate. Morris and Barnes (2005) examine this effect by detailing three microfinance programs in Uganda. Through the use of initial surveys and a follow-up two years later, they find numerous positive impacts on loan recipients and their communities including additional products and services in the area, reduction in inventory costs, and increases in sales volume for businesses.

Further research details differences in microfinance organizations with regard to clientele: Some microfinance institutions screen clients based on certain characteristics. Hietalahti and Linden (2006) analyze two different microcredit programs run by the same institution. One program provides only to women who are highly impoverished, usually unemployed, and have minimal opportunities and experience in running a business. The other program has clients with a better basis for business. These women tend to have more education, the ability to better protect themselves against vulnerability, and the ability to diversify and improve their businesses. The authors report that the second program provides larger loan amounts to its clients but usually at much higher interest rates. The authors find a strong positive correlation between loan size, profits, and time of participation. They also find that successful clients are encouraged to take out larger loans.

The framework of a microfinance institution can ultimately be a deciding factor in its success. If an MFI does not have a strong foundation and good internal assessments, then it cannot operate effectively. Such are the findings of Koveos and Randhawa (2004) who examine MFI structure. The authors state that the manner of their assessment must differ from that of a traditional banking system mainly due to the drastic difference in clientele as well as the social dimensions behind the work. MFIs typically function as a result of grants or government subsidies, especially in the startup years. Over time, different costs are reassessed as to their

effectiveness and overall worth in regard to the performance of the organization. They also report that MFI loan rates are extremely high, much higher than that of a commercial bank—mainly due, again, to the riskiness of an MFI's clients. For this reason, high loan recovery rates become crucial to an MFI's success.

In addition to framework of the MFI, the organization's capital structure can also be integral to its success. The capital structure of a firm is the mix of debt and equity that a firm deems appropriate to operate effectively. Capital structure is found to impact an MFI's performance according to Kyereboah-Coleman (2007). The theory is that high leverage or low equity/asset ratio reduces the agency cost of outside equity and thus increases firm value by compelling managers to act more in the interest of shareholders. This idea is supported by Berger and Udell (2006). MFIs have benefitted from the establishment of mutual funds as part of shareholder structure and the connection of such organizations with capital markets. The presence of debt puts pressure on management to ensure efficiency and profitability and to be able to honor such debt obligations. The paper examines data from 52 MFIs from Ghana to draw conclusions. Ultimately, the paper concludes that highly leveraged MFIs perform better by reaching out to more clientele, by enjoying economies of scale, and by being better able to deal with moral hazard and adverse selection problems. This enhances their ability to deal with risk.

In this paper we seek to integrate the findings of both Kyereboah-Coleman (2007) and Mersland and Strom (2009) in particular. Specifically, we test the information asymmetry hypothesis of microfinance institutions. Information asymmetry between loan applicants (borrowers) and MFIs could potentially lead to self-maximizing behavior. The high interest rates that MFIs must charge borrowers because of the lack of transparency in borrower quality could drive away low-risk borrowers. The borrowers who are successful, however, may have incentive to engage in moral hazard—participating in high-risk, high-return projects at the expense of the lender. Therefore, successful institutions need to dissuade this information asymmetry problem. The MFIs with financial and structural characteristics that help reduce the asymmetric information between borrower and lender should be in a better position to succeed financially.

Our hypothesis is that MFI characteristics that reduce the information asymmetry between borrower and lender should lead to better MFI financial performance. We test the information asymmetry hypothesis of MFIs with the following factors: age of MFI, size, capital structure, and proportion of women borrowers. MFIs that have been in business longer should have more knowledge and expertise than younger MFIs and should therefore know their borrower clientele better thus reducing the need to “guess” the quality of borrowers. Granted, this should be true for any business, not just microcredit institutions. With respect to MFIs, research shows that the longer an MFI exists, the better it performs. Kwon (2010) supports this idea with the finding that older MFIs tend to be more willing to expand their operations than younger MFIs. Further, Ayayi and Sene (2010) also find that as MFIs mature, they increase their likelihood of attaining financial sustainability. Therefore,

H1: Older MFIs should financially outperform younger MFIs.

Similarly, smaller MFIs should be better able to get to know their clientele and region and therefore have less trouble in distinguishing strong from weak borrowers. Large institutions may be too spread out to focus adequately on specific borrowers and areas to alleviate the information asymmetry problem. Therefore,

H2: Smaller MFIs should financially outperform larger MFIs.

Capital structure has been shown to have an impact on MFI performance. Specifically, debt capital, according to Kyereboah-Coleman (2007), encourages MFIs to control risk effectively by dealing with moral hazard and adverse selection. They find that highly-levered MFIs have reduced default rates relative to MFIs with less debt. Therefore,

H3: MFIs with higher levels of debt in the capital structure should financially outperform MFIs with less debt.

Finally, studies have shown that MFIs are more willing to expand their operations when the ratio of women borrowers increases (see, for instance, Kwon, 2010). In a study on rural Chinese microfinance institutions, Bunning (2004) states that women frequently use earnings for education of their children and tend to reinvest earnings to expand and diversify beyond their initial enterprise thus making women more likely to pay off microloans. Papias and Ganesan (2009) find that gender has a positive effect on repayment performance of the borrowers for a sample of rural Rwandan participants in savings and credit cooperative societies. In particular, Rwandan women borrowers, the authors suggest, are more likely to repay loans than their male counterparts. However, Ayayi and Sene (2010) report that it is merely a commonly held notion that women are more industrious and better repayers of microcredit than men. Their results suggest that the percentage of women borrowers does not have a positive impact on the financial sustainability of microlenders. The authors purport this to be the case against their own hypothesis because women's activities when using microcredit tend to be small scale and are intended to generate income simply to attain food self-sufficiency and are therefore not conducive to the accumulation of wealth. Given these two conflicting ideas and results, whether the percentage of women borrowers impacts the financial performance of an MFI remains an empirical question. Nevertheless, we posit that information asymmetry should be reduced when lending to women borrowers as gender has been associated with repayment, and thus the opaqueness of the borrower's quality should be reduced. Therefore,

H4: MFIs with higher proportion of women borrowers should financially outperform MFIs with smaller women borrower ratios.

Here, our goal is to analyze the factors that tend to dictate MFI performance. Our hypothesis, in general, is that MFI characteristics that reduce the information asymmetry between borrower and lender should lead to better MFI financial performance. We use MFI data from the entire continent of Africa over an 11-year time series, which differs from previous research that tends to focus on one particular country or year. We also use a fixed effects approach with our time series data and OLS as well as 2SLS regression. Our variables of interest include leverage, which is also determined by its own set of factors, and several financial performance variables and MFI characteristics.

IV. Data

We start by collecting data from The MIX Market (www.mixmarket.org), an online resource created by a non-profit organization called The Microfinance Information Exchange, Inc. (MIX).

MIX provides objective and detailed financial and social performance information as well as analysis on microfinance providers. They also provide business information from market facilitators and leading donors and investors in microfinance.

Our data is concentrated in the continent of Africa and focuses solely on non-bank financial institutions. Our sample spans 11 years (1997 – 2008) and consists of 82 MFIs which geographically represent the entirety of the continent. The majority of observations came from the year 2006 which had 67 different MFIs in business and also the year 2007 which had the second largest sample of 57 MFIs. Both financial and non-financial data are analyzed. The main variables to evaluate the information asymmetry hypothesis include age of MFI, total assets (to measure size), the debt-to-equity ratio, and the percentage of women borrowers. We also control for MFI structure using the following variables: cost per borrower, expense ratio, loan loss reserves, and profit margin.

Table 1 reports descriptive statistics for the sample of MFIs between 1997 and 2008 with a total sample size of 206. Based on these results, we found that the average age of the MFIs is approximately 8 years with the longest established MFI at 32 years. In addition to age, number of MFI personnel was also analyzed. The average number of employees is 190 with a range from 6 employees up to 2,363. The standard deviation of this data is 339 employees, which indicates a great deal of variability in the number of personnel that MFIs employ. In the MFIs analyzed, the average number of borrowers is 39,893. The average cost per borrower is \$120, and values range from \$.50 to \$3,527. The cost per borrower is equal to operating expense divided by the number of active borrowers. We also analyze the percentage of women who are active borrowers at the MFI. The average number of women borrowers is 57 percent, and some MFIs are made up entirely of women borrowers.

Average MFI total equity is \$3,150,777; but with a standard deviation of over \$5.6 million, there is variability. Further, the total of all equity accounts ranges from \$239 to over \$37 million. This wide range of distribution indicates that while some MFIs have stable equity, others are not as fortunate. Average assets in the sample are over \$9.7 million with a standard deviation of over \$21 million. This variability indicates the size variety of MFIs existing in Africa. Additionally, we found that the average operating profit margin of the MFIs is negative. This indicates that the average MFI is losing money on each sale and cannot pay its overhead costs with revenues. While this is acceptable for the short-term, it is not sustainable for an MFI to keep a negative operating profit margin.

Table 2 reports the Pearson correlation coefficients for the sample of MFIs between 1997 and 2008 for a sample of variables. We find a negative correlation between ROA and cost per borrower; that is, as the return on assets increases, the operating costs per active borrower decrease. Further, there is also a strong negative correlation between ROA and the total expense ratio meaning that as ROA increases, the ratio between operating costs to assets decreases. We find both of these correlations significant at the 1 percent level. We also find that there is a marginally strong positive correlation between loan-loss reserve and portfolio risk. This suggests that as the reserve to cover losses increases, so too does the number of loans outstanding. This is significant at the 1 percent level. We also find a positive correlation between MFI age and total assets; that is, the older the MFI, the more assets it tends to own. This correlation is significant at the 1 percent level.

We find that some of the results fall in line with expectations of the MFI organizational structure. There is a very strong positive correlation between number of borrowers and number of personnel; that is, as the number of borrowers increases, the MFI must employ a larger

number of staff. This correlation is significant at the 1 percent level. Additional variables that positively affect MFI size are the organization's total assets displaying a strong correlation (significant at the 1% level), ROA (significant at the 1% level), and MFI age (significant at the 5% level). Other variables that have a negative correlation with number of personnel are total expense ratio, percentage of women borrowers, and portfolio risk, which are significant at the 1 percent, 5 percent and 5 percent levels respectively.

Table 1. Descriptive Statistics

	Mean	Median	Std. dev.	Min	Max	n
No personnel	190.4757	87.5000	339.4270	6	2,363	206
No borrowers	39,893.4100	11,399.5000	86,199.1700	146	597,723	206
Gross loan	6,724,567.8600	1,605,879.0000	15,544,949.7600	945	118,782,985	206
Total equity	3,150,777.7300	1,192,491.0000	5,629,792.2400	239	37,336,582	206
Deposit-loans ratio	0.2530	0.0655	0.7212	0	8.8145	206
Profit margin	-3.9476	0.0229	54.2879	-779.2754	0.8299	206
Cost per borrower	119.5811	56.7500	276.3249	0.5	3,527.2	206
Portfolio risk	0.0761	0.0403	0.0995	0	0.6484	206
Pct women	0.5780	0.5890	0.2534	0.0050	1	206
Total assets	9,758,438.9700	2,418,232.0000	21,195,303.1800	1433	171,252,542	206
Total expense ratio	0.3179	0.2442	0.2402	0.0273	1.4117	206
MFI age (years)	8.0534	7.0000	6.2697	-3	32	206
Loan loss reserve	0.0579	0.0289	0.0883	0	0.8092	206
Debt-to-equity ratio	4.8845	1.4043	36.9668	0	531.1362	206
ROA	-0.0337	0.0049	0.1543	-0.0018	0.3119	206
ROE	-0.0659	0.0111	0.4116	-3.0018	1.3303	206

This table reports the descriptive statistics for the sample of MFIs between 1997 and 2008. *No personnel* indicates the number of personnel at the MFI while *No borrowers* is the number of borrowers. *Gross loan* is the total loan amount at the MFI. *Total equity* is the total of all equity accounts. *Deposit-loans ratio* is total deposits relative to the loan portfolio. *Profit margin* is the MFI's net operating income divided by financial revenue. *Cost per borrower* is equal to operating expense/ number of active borrowers. *Portfolio risk* is the value of all loans outstanding that have one or more installments of principal past due more than 30 days. *Pct women* indicates the number of active borrowers who are women divided by the number of active borrowers. *Total assets* is equal to the MFI's total assets. *Total expense ratio* is equal to (financial expense + impairment loss + operating expense) divided by assets. *MFI age* is the age of the MFI in years. *Loan loss reserve* is the reserve against the MFI's total loans on the balance sheet representing the amount thought to be adequate to cover estimated losses in the loan portfolio. The *debt-to-equity ratio* is the ratio of the MFI's liabilities relative to total equity. *ROA* is the MFI's return on assets while *ROE* is the return on equity ratio. All values are in USD.

Table 2. Correlation Matrix

	No personnel	No borrowers	Portfolio risk	Pct women	Total assets	Total expense ratio	MFI age	Debt-to- equity ratio	ROA
No personnel	1.0000	0.9468***	-0.1383**	-0.1526**	0.8412***	-0.2595***	0.1439**	-0.0252	0.1846***
No borrowers		1.0000	-0.1264*	-0.1422**	0.0473***	-0.2903***	0.1522**	-0.0191	0.1817***
Portfolio risk			1.0000	-0.0375	-0.1326**	0.1961***	0.0253	0.0337	0.0081
Pct women				1.0000	-0.1310*	0.2771***	0.0279	-0.0845	-0.1249*
Total assets					1.0000	-0.2658***	0.2267***	-0.0224	0.1842***
Total expense ratio						1.0000	-0.1217*	-0.0377	-0.6346***
MFI age							1.0000	-0.0711	-0.2454***
Debt-to- equity ratio								1.0000	0.0253
ROA									1.0000

This table reports the Pearson correlation coefficients for the sample of MFIs between 1997 and 2008. Variables are defined in Table 1. *, **, *** indicates significance at the 10%, 5%, and 1% level, respectively.

V. Methodology and Results

To analyze the information asymmetry hypothesis, we start by using an ordinary least squares approach with MFI fixed effects. We use the following general model:

$$\text{Performance}_i = \alpha + \beta_1(\text{MFI age}) + \beta_2(\log \text{total assets}) + \beta_3(\text{percent women borrowers}) + \beta_4(\text{MFI controls}) + \varepsilon. \quad (1)$$

The percent of women borrowers is used in Model 2 of Table 3 since it is highly correlated with several variables in the model. Capital structure is introduced in a 2SLS regression in Table 4. In Table 3, we present results from the OLS regression. It is clear from these results that it is the financial performance of the MFI that drives performance rather than MFI structure and that two of the four hypotheses are supported. Specifically, the coefficient on MFI age is positive and significant at the 1 percent level indicating that older MFIs outperform newer MFIs. This result supports Hypothesis 1. Further, the log of total assets is significantly negatively related to return on assets at the 1 percent level. This indicates that the large MFIs are actually not performing as well as smaller MFIs, thus lending support for Hypothesis 2. In Model 2 of Table 3, we include the proportion of women borrowers as an independent variable; and we find that the coefficient is not statistically significant. Thus, Hypothesis 4 is not supported. We test Hypothesis 3, that capital structure is related to MFI performance, using a two-stage approach in Table 4. As for the

controls, profit margin is positively related to return on assets; and this is significant at the 5 percent level in both Models 1 and 2. Understandably, as the expense ratio increases, return on assets decreases. Both models have an overall R-square of around 74 percent indicating a good fit.

Next, we use a two-stage least squares approach to further test the information asymmetry hypothesis and include capital structure in identifying significant determinants of MFI performance. In the first stage, debt-to-equity ratio is used as the dependent variable. This follows Kyereboah-Coleman (2007) who analyzes the effect of leverage on MFI performance. The first stage model follows:

$$\text{Debt-to-equity}_t = \alpha + \beta_1(\log \text{ total assets}) + \beta_2(\text{total expense ratio}) + \beta_3(\text{MFI age}) + \varepsilon \quad (2)$$

The results from the first stage regression are used in the second stage regression in a model similar to that presented in Table 3. We present the results of the 2SLS regression in Table 4. Here, in both Models 1 and 2, we find a positive relationship between debt-to-equity and MFI performance; that is, as the proportion of debt in the capital structure increases, ROA also increases. This is consistent with Kyereboah-Coleman (2007) and supports Hypothesis 3. MFI size is also an important determinant of ROA. The results suggest that as the MFI's size increases, performance tends to decrease. The coefficients on the log (total assets) in both models are negative and significant at the 1 percent level. However, the age of the MFI has a direct impact on MFI performance. This variable is positive and statistically significant at the 1 percent level. Thus, we find continued support for both Hypotheses 1 and 2. We continue to see no relationship between percent of women borrowers and MFI return on assets. There is a positive relationship between profit margin and ROA in both models. The coefficient on total expense ratio is also inversely related to MFI ROA; as the expense ratio increases, ROA decreases. In Model 2 we find the number of personnel is not a significant determinant of MFI performance. Overall the models appear to be a good fit with F-statistics significant at the 1 percent level and adjusted R-squares above 75 percent.

These results lend support to the information asymmetry hypothesis of MFIs. Specifically, characteristics that tend to reduce the information asymmetry between the borrower and lender (MFI) lead to better financial performance. Further, it appears that the financial structure of the MFI is important for MFI performance rather than characteristics of the MFI itself. Specifically, of the five characteristic variables, only the age of the MFI is a significant predictor of return on assets while four out of five financial proxies are important determinants of performance.

Since a survivorship bias may exist, we do a robustness check on the data. Although we cannot know for certain why some MFIs cease to exist in the data, one possibility is that these institutions failed, and therefore data are no longer collected by MIX. Granted, other reasons for the MFI not existing in the dataset could be that the bank closed its operations for reasons other than failure or that the MIX Market dataset no longer included the particular bank in their sample. We explore the possibility that these MFIs did not survive, and therefore we wanted to identify any distinguishing characteristics of these MFIs versus the rest of the population. Therefore, we flagged all observations that were the "last year" the MFI appeared in the dataset. We removed those banks whose last year was 2007 since this was the last year of data collection (only three observations are from 2008 due to the timing of our collection) and it is likely that many if not all of these MFIs still exist. This resulted in only 18 observations. We performed t-tests on the descriptive statistics described in Table 1 between this "last observation" sample and the remaining 188 MFIs. The results are reported in Appendix.

Table 3. Determinants of MFI Performance Using OLS

	Model 1	Model 2
MFI age	0.0301 (6.41)***	0.0316 (6.83)***
Log total assets	-0.0568 (-4.98)***	-0.0616 (-5.50)***
Pct women		-0.0339 (-0.52)
Profit margin	0.0003 (2.31)**	0.0003 (2.41)***
Cost per borrower	-0.0002 (-1.51)	
Portfolio risk	0.1507 (1.26)	
Total expense ratio	-0.6239 (-9.55)***	-0.6572 (-10.31)***
Loan loss reserve	0.0508 (0.46)	0.0971 (0.91)
Intercept	0.9124 (5.56)***	1.0352 (6.41)***
N	206	206
F	9.08***	8.97***
Adj. R-sq.	0.7472	0.7421

This table reports the coefficients and t-statistics (in parentheses) for two models using ROA as the dependent variable for the sample of MFIs between 1997 and 2008. Variables are defined in Table 1. Each model uses MFI fixed effects (those results not reported). Notations *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

Overall, the MFIs that cease to exist in the dataset are smaller than the remaining sample of institutions. They have fewer personnel and a lower number of borrowers than the rest of the sample as well as having fewer total assets on the balance sheet. However, these differences are not statistically significant. What may be influencing these MFIs to exit the sample is the much higher debt-to-equity ratio these institutions carry relative to the surviving MFIs in the sample. The exiting sample has an average debt-to-equity ratio of 32 relative to 2.3 for the remaining sample. So although increases in debt may help an MFI grow, too much debt may push an MFI to bankruptcy. The difference is significant at the 1 percent level. Further, these banks have a higher loan loss reserve relative to the remaining sample of MFIs, and portfolio risk is also higher. These factors are not statistically significantly different however. Looking at performance, it seems that the exiting MFIs actually have stronger financial performance overall

relative to the surviving MFIs. Return on equity and ROA are both statistically significantly higher for exiting versus surviving MFI observations. It is this result that may lend support to the idea that institutions leaving the sample are not necessarily financially distressed but exit for other reasons. Further, it supports the earlier conclusion that higher debt ratios in MFIs lead to stronger financial performance as measured by profitability.

Table 4. Determinants of MFI Performance Using 2SLS

	Model 1	Model 2
MFI age	0.0297 (6.40)***	0.0309 (6.25)***
Log total assets	-0.0587 (-5.19)***	-0.0573 (-4.94)***
Debt-to-equity ratio	0.0068 (2.07)**	0.0070 (1.98)**
Pct women		0.0160 (0.23)
Profit margin	0.0004 (2.54)**	0.0004 (2.52)**
Cost per borrower	-0.0002 (-1.62)	-0.0002 (-1.61)
Portfolio risk	0.1685 (1.42)	0.1522 (1.26)
Total expense ratio	-0.6311 (-9.77)***	-0.6309 (-9.71)***
Loan loss reserve	0.0363 (0.33)	0.0394 (0.36)
No personnel		-0.0001 (-0.77)
Intercept	0.9468 (5.81)***	0.9123 (5.27)***
N	205	205
F	9.24***	8.91***
Adj. R-sq.	0.7534	0.7507

This table reports the coefficients and t-statistics (in parentheses) for two models using ROA as the dependent variable for the sample of MFIs between 1997 and 2008. Debt-to-equity ratio is used as the first stage dependent variable. Variables are defined in Table 1. Each model uses MFI fixed effects (those results not reported). Notations *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively.

VI. Summary and Conclusions

In this paper, we address a burgeoning topic in the financial world—that of microfinance institutions and their performance. These institutions, while performing a great service in the developing world, are now starting to be known for their investment opportunity as the payback on loans is exceedingly high at many MFIs. Because of this, some MFIs operate as for-profit financial institutions. In this paper, we develop two approaches to test which factors contribute to overall MFI performance as indicated by the ROA. Specifically, we test the information asymmetry hypothesis to see whether factors that reduce information asymmetry between borrower and lender lead to better financial performance. We ask whether it is the structure of the MFI itself or purely its financial characteristics that drive good performance (or a combination of the two). Our results clearly suggest that it is the former that drives MFI performance; that is, the financial characteristics seem to determine how well an MFI performs. How the MFI is structured is not as important. Further, and most importantly, the results provide support for the information asymmetry hypothesis. Here, we use a time series fixed effects approach using over ten years of data spanning the entire continent of Africa to address these important issues.

MFIs with more debt and higher profit margins tend to have stronger performance from a financial perspective than MFIs with less leverage and low profit margin. However, our robustness check also demonstrates that too much debt may push a small MFI to exit the sample in some capacity. The size of the MFI is inversely related to MFI performance. Further, MFI age is directly related to MFI performance—older MFIs tend to outperform newer MFIs. The percent of women borrowers, however, does not appear to be related to MFI performance.

These results have important implications to MFIs as both non- and for-profit organizations must work to create strong performance in order to continue to provide microloans to members of the community in need. Further, for institutions and individuals looking to invest in MFIs, knowing the factors that contribute to strong performance may be valuable information.

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Appendix

Survivorship Bias Robustness Check

	Means		Difference Surviving - Exiting	T-test	
	Surviving MFIs	Exiting MFIs		t-stat	P-value
No personnel	192.55	168.83	23.715	0.28	0.7778
No borrowers	41,000	27,716	13,284	0.62	0.5335
Gross loan	6,850,000	5,450,000	4,400,000	0.36	0.7165
Total equity	3,180,000	2,810,000	370,000	0.26	0.7916
Deposit-loans ratio	0.246	0.326	-0.08	-0.45	0.6532
Profit margin	-4.337	0.120	-4.457	-0.33	0.7402
Cost per borrower	121.54	99.1	22.442	0.33	0.7429
Portfolio risk	0.073	0.1081	0.1704	-1.43	0.1538
Pct women	0.5837	0.5184	0.0654	1.05	0.2971
Total assets	9,990,000	7,360,000	2,630,000	0.50	0.6165
Total expense ratio	0.3188	0.3088	0.01	0.17	0.8663
MFI age	8.075	7.83	0.241	0.16	0.8766
Loan loss reserve	0.0574	0.0647	-0.007	-0.34	0.7376
Debt-to-equity ratio	2.2659	32.234	-29.97	-3.37	0.0009
ROA	-0.040	0.035	0.075	-1.99	0.0481
ROE	-0.082	0.1009	-0.183	-1.81	0.0719

This table reports the t-test results for the sample of MFIs between 1997 and 2007 divided into two groups: Exiting MFIs (18 observations) which are the last observations noted for MFIs in the sample before 2007, and Surviving MFIs (188 observations) which includes all remaining MFIs. *No personnel* indicates the number of personnel at the MFI while *No borrowers* is the number of borrowers. *Gross loan* is the total loan amount at the MFI. *Total equity* is the total of all equity accounts. *Deposit-loans ratio* is total deposits relative to the loan portfolio. *Profit margin* is the MFI's net operating income divided by financial revenue. *Cost per borrower* is equal to operating expense/ number of active borrowers. *Portfolio risk* is the value of all loans outstanding that have one or more installments of principal past due more than 30 days. *Pct women* indicates the number of active borrowers who are women divided by the number of active borrowers. *Total assets* is equal to the MFI's total assets. *Total expense ratio* is equal to the total of financial expense + impairment loss + operating expense divided by assets. *MFI age* is the age of the MFI in years. *Loan loss reserve* is the reserve against the MFI's total loans on the balance sheet representing the amount thought to be adequate to cover estimated losses in the loan portfolio. The *debt-to-equity ratio* is the ratio of the MFI's liabilities relative to total equity. *ROA* is the MFI's return on assets while *ROE* is the return on equity ratio. All values are in USD.