

An Assessment of the Financial Sustainability of Microfinance Institutions

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Abstract

The poor in the developing countries are constrained by savings and the absence of credit access from formal financial institutions to establish small scale enterprises as they are perceived to be un-bankable. Since the late 1980 Micro-Finance Institutions have mushroomed with the primary aim of resolving the problem of access to credit by the poor. However, extending financial credit to them is challenging given their financial strength, businesses, locations, abilities, social obligations and mindset. This study attempts to look into Micro-Finance Institutions' performance from the financial sustainability angle in East Africa with secondary data sources from the Micro finance information exchange for the period 2012 – 2017. The study finds that financial sustainability of these institutions is enhanced on one hand and hindered on the other by several factors. It identifies outreach and profitability as enhancing factors while capital structure, efficiency and portfolio quality as hindering ones. Specifically, it noted that number of active borrowers, deposit to GNP per capita, profit margin, real yield on portfolio on one hand and debt to equity, donations, personnel expenses to loan portfolio, loan loss rate and portfolio at risk more than 30 days on the other as enhancing and hindering financial sustainability respectively.

JEL Classification: G2, G20, G21, G23, G28, G33

Key words: Microfinance Institutions, Outreach, Sustainability, Financial Self-Sufficiency, Return On Assets, Return On Equity, Profitability

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Introduction

The Micro-finance Industryⁱ is one of the major development tools in poverty alleviation. Several studies carried on poverty in developing countries have cited different causes of poverty. Some have rightly argued that the poor do not have easy access to credit for financing working capital as well as investment in their small businesses (Jean-Luc, 2006). It is widely recognized that economic progress relies heavily on access to financial services (Chowdhury et al., 2005). Experience in many countries has established that Micro Finance Institutionsⁱⁱ (MFIs) have tremendous potential to fill the gap left by formal financial institutions (Barham et al. 1996). Micro Finance is, therefore, increasingly being taken as a magic bullet to alleviate poverty and implement financial inclusion strategiesⁱⁱⁱ. Policy makers in the developing countries have become euphoric about the potential of micro finance in poverty reduction and thereby channeling development aid to tackle the acute poverty issue through them. Given the primary role of MFIs in poverty reduction and generally in the development of the economy, up-to-date information about the performance of this industry is very essential not only to the MFIs managers but also to the numerous stakeholders such as the governments, donors, relevant associations and other financial authorities. In the parlance of the finance industry, the performance of MFIs is almost synonymous to their financial sustainability, which is the nonprofit equivalent of profitability. It refers to the ability of a Micro financing program to generate surplus funds, enough to support an ever expanding but finite number of beneficiaries on a permanent basis. Thus, financial sustainability is the principal focus of Micro-finance industry at present; however, this focus has certain drawbacks. It is often suspected that too much focus on financial sustainability will divert MFIs' attention and resources away from their core objective of poverty alleviation. This reservation is based on several factors. The poor tend to be concentrated in hard-to-reach rural areas and characterized by weak and fragmented markets for goods and services and limited non-farm activities. Most often, the poor served by MFIs have no physical collateral thereby implying high credit risk, similarly some poor lack prior business skills. Likewise, the poor are generally engaged in agriculture sector, which is open to natural hazards that are difficult to predict, prevent and ward off. They often demand numerous small loans whose unit transaction cost is high on average (Paxton and Cuevas 1998; Conning 1999; Hulme and Mosley 1996; Zeller and Meyer 2002). Most poor inhabit in rural areas which are widely dispersed, and this leads to pushing up monitoring, delegation and other administrative expenses of the MFIs' (Conning 1999). The difficulty is to

handle clients without collateral; therefore, potential screening is necessary which in turn leads to high monitoring and enforcement costs (Goodman 2000). This compels finance institutions to increase their dependence on donors (Kereta 2007). In short, delivering financial services to the poor is comparatively costly and difficult, and is fraught with risk, none of which bodes well for long-term financial sustainability. Hence the belief that financial sustainability and depth of outreach are inherently contrasting objectives makes sense.

It is reasonable to believe that these fears, factors and operational circumstances pose great challenges to the financial sustainability of MFIs, given the absence of well-structured risk mitigation tools in the developing world. As pointed out by Jonathan (2001), adequate earnings are required to enable a financial institution to maintain solvency, survive, and grow steadily in a competitive environment. There is need for an in depth inquiry to establish as to how MFIs are enduring under such difficult circumstances. We choose four countries in East Africa (*Tanzania, Kenya, Uganda and Rwanda*) for the purpose of evaluating the performance and to understand the financial sustainability of MFIs. These countries lie within the Sub Sahara - a region with the highest poverty incidence in the world (Sumner 2010, 12).

1.1 Statement of the Problem

Providing financial services to masses is risky and uncertain in general, however the intensity magnifies while dealing with the poorest of the poor. Most of the poor have no adequate collaterals to guarantee their loans as most of them depend on subsistence agriculture; they also have no business skills. Further, the poor are mostly dispersed in far flung rural areas and demand numerous small loans for different purposes. These factors increase the monitoring and transaction costs of MFIs. In addition, the business environment in the developing world is punctuated by poor governance and complicated legal systems; loose enforcement of rules and regulations; wide spread corruption and outdated technology and underdeveloped infrastructure. The prevalence of these problems creates more challenges for Micro finance institutions to run their businesses effectively and efficiently and to reach the doors of the needy.

2. Literature Review

2.1 An overview of Financial Sustainability in Micro-Financing

There is much semantic confusion surrounding the word 'sustainability'. It has been a subject of fascination not only to policy makers, but also to social scientists, academicians, and development practitioners alike. Sustainability seems to be a context with varying definitions by various

authors. Navajas et al. (2000) defined it as ‘the ability to reach goals in the short run without harming the ability to reach goals in the long run’. Edgcomb and Cawley (1994) consider it as ‘the ability of an organization to sustain the flow of valued benefits and services to its members or clients over time’. Edgcomb and Cawley (1994) further redefine it as ‘the ability of a financial institution to meet 100 percent auto financing’. Brinkerhoff (1991) defines sustainability as ‘the ability of a program to produce outputs that are valued sufficiently by beneficiaries and other stakeholders that the program receives enough resources and inputs to continue production’.

The landscape for micro financing has been reshaped in recent years. First, competition among MFIs has increased, forcing them to lower both interest rates and costs and to offer more financial products as a way of remaining financially sustainable. Secondly, commercial banks have joined the micro finance industry, worsening the competition for clients and increasing its impact on the operations. Thirdly, commercial banks and investors such as Citigroup and Deutsche Bank have increasingly become interested in funding MFIs. Such commercial players have raised the need for MFIs to be financially viable. Fourthly, new banking technologies such as charge cards, Automatic Teller Machines (ATM), cellular phone, branchless banking and the internet have rapidly entered the micro finance industry bringing down costs and improving the delivery methodology. Finally, countries have simultaneously liberalized their financial markets and introduced new rules, regulations and standards to help improve the stability of the financial industry.

The assessment of MFIs has traditionally been conducted under the framework of sustainability and outreach (Yaron 1994). Outreach focuses on social performance while sustainability focuses on financial performance. There is an apparent tension between achieving financial sustainability and achieving outreach to the poorest segments. This has generated a hefty debate between those who emphasize the dominance of financial sustainability goal (Institutionalists) and those who emphasize the dominance of outreach (Welfarists). (Conning 1999; Woller et al. 1999). The study of Morduch (2000) refers to this division as the “*micro finance schism*”. Institutionalists are concerned with financial sustainability, and appear to be having the upper hand. They defend their argument on the premises that only financially sustainable MFIs can survive in a harsh business environment without the aid of external donors (Adams and Von Pischke 1992). The Welfarists on the other hand argue that MFIs’ primary objective is to help the poor out of poverty first; and financial sustainability consideration should be a secondary issue (Hulme and Mosley 1996). Their

emphasis is on the depth of outreach and they are quite explicit in their focus on immediately improving the well-being of participants.

The literature on this issue is not extensive and is largely anecdotal. One of the few academically solid studies is provided by Cull and Morduch (2007). This specifically investigated the trade-off between the depth of outreach and profitability of financial institutions. The results indicate that MFIs that provides individual loans performs better in terms of profitability, but the fraction of poor borrowers and female borrowers in the loan portfolio is lower than for institutions that mainly provides group loans. It further suggests that individual-based MFIs increasingly focus on wealthier clients – a process termed as mission drift – whereas this was less so for the group-based MFIs. Thus, this study provides evidence for a trade-off between sustainability and outreach and stresses the importance of institutional design in determining the existence and size of such a trade-off. Using a larger database of 435 MFIs for the period 1997-2007, Hermes et al. (2011) find similar trade-off between sustainability and outreach. This study uses cost efficiency of MFIs as a proxy for sustainability while the depth of outreach is measured through average loan and saving balances, and the percentage of women borrowers. This study used stochastic frontier analysis to measure the efficiency of MFIs. The result of this study is robustly significant even after taking into account a long list of control variables. The study found a strong negative relationship between efficiency and outreach.

There is controversy on the linkage between financial sustainability and outreach to the poor. According to (Christen 1995; Otero and Rhyne 1994), outreach and financial sustainability are complimentary; this is because as the number of clients increase, MFIs enjoy economies of scale and hence reduce costs which help them to be financially sustainable. Hulme and Mosley (1996) on the contrary argued that such a complementary role does not exist by arguing that higher outreach means higher transaction cost in order to get information about creditworthiness of clients.

Kai (2009), examined the empirical relationship between competition and wide outreach and its impact on financial self-sufficiency. The findings reveal that intense competition worsens the wide outreach and drops the poorest borrowers from the microfinance lending portfolio. However, this study confirmed that competition does not worsen financial self-sufficiency and hence does not raise subsidy dependence. Intense financial regulations also diverts attention away from outreach (Hardy et al. 2003) and (Marulanda and Otero 2005). Hartarska and Nadolnyak (2007) found no evidence to show that regulated MFIs perform better in terms of either

sustainability of outreach as compared to non-regulated markets. However, Makame and Murinde (2006) found evidence for a negative relationship between regulation and outreach.

There has been limited scholarly research detailing the funding processes, sources and terms for MFIs. de Sousa-Shields and Frankiewicz (2004) trace funding processes, sources and terms to the institutional life cycle theory. Kyereboah-Coleman (2007) examined the impact of capital structure on the performance of microfinance institutions, using a panel database from 1995 to 2004 employing a fixed and random effect estimation techniques. The conclusions were that most institutions employ high leverage and finance their operations with long-term as against short-term debt. Secondly, highly leveraged microfinance institutions perform better by reaching out to more clientele, enjoy scale economies, and thus are better able to deal with moral hazard and adverse selection, enhancing their ability to deal with risk.

Studies addressing the trade-off between portfolio quality and financial performance or sustainability of micro-finance institutions are very limited. High quality credit portfolio, coupled with the application of sufficiently high interest rates that allowed reasonable profit and sound management were instrumental to the financial sustainability of these institutions. Ayayi and Sene (2010). Wenner (1995) investigated the quality in microfinance portfolios using repayment rate but without directly linking it to financial sustainability. His study indicated that repayment performance of groups improved when groups had written (formal) rules stating how members should behave. Another variable that was found to determine repayment was the location of groups: if groups were located in remote areas this reduced their possibilities for access to alternative sources of credit, which stimulated them to ensure group repayment as much as possible in order to have future access to loans.

The linkage between financial sustainability, profitability and efficiency has not been much pronounced in empirical research to date. Part of the problem could be the obvious strong theoretical relationship between them. The more profitable an institution is, the more financially sustainable it would be. An insight into the relationship between financial sustainability and profitability in MFIs can be linked to the work of Smith (1998). The study used interest rates and fees as proxy for profitability, to investigate sustainability of MFIs in Bolivia. The conclusions were that low interest rates and fees were an impediment to their continued financial survival. In a nutshell, the above review shows that there is only limited empirical evidence on the compatibility or trade - off between financial sustainability

and the factors to be assessed in the model. In some cases, it is indirect while in others, it is completely lacking thus opening room for further research on these contentious issues. From a policy making perspective, knowledge of the tradeoff between financial sustainability and outreach and the lack of solid evidence on the existence of a trade-off, leaves wide the room for expanding our knowledge on this relationship.

3. Data and Methodology

3.1 Data Considerations and Sources

The main objective of this study is to assess the financial sustainability of MFIs in East Africa. For this purpose, we have extracted the annual relevant data of MFIs operating in East Africa over the period 2012 to 2017, from the Micro Finance Information Exchange Inc ⁱⁱⁱ . The details of the data samples can be found in Table 2.

Table 2: Data Sample per Country and Type of MFI

Data Sample per country			Data Sample per type of MFI		
Country	No of MFIs	Percentage	Type	Number	Data
Kenya	9	34.62	Banks	4	15.38
Rwanda	4	15.38	Cooperative	3	11.54
Uganda	8	30.77	NBFI	12	46.15
Tanzania	5	19.23	NGO	7	26.92

Source: From survey

3.2 Model Specification

We have modeled financial sustainability in our study based on three variables;

Financial self-sufficiency (FSS)

Return on Assets (ROA) and

Return on Equity (ROE)

$$FSS = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon \dots \dots \dots \text{ (Model I)}$$

$$ROA = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon \dots \dots \dots \text{ (Model II)}$$

$$ROE = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon \dots \dots \dots \text{ (Model III)}$$

X_1 = Outreach, where outreach = Number of active borrowers or Deposit size to GNP per Capita.

X_2 = Capital Structure, where capital structure = Debt to equity ratio or Donations and grants ratio.

X_3 = Profitability, where profitability = Profit margins ratio or Real yield on portfolio ratio.

X_4 = Efficiency, where efficiency = Personnel expense ratio.

X_5 = Portfolio quality, where portfolio quality = Loan loss rate or Portfolio at risk more than 30 days.

3.3 Bayesian Estimation Model for Financial Sustainability of MFIs

Classical estimators assume parameters of the model to be fixed, ignoring possible variability in the parameters. Bayesian models have the merit to incorporate the prior knowledge in the model. In addition, the Bayesian estimation technique has an edge over the Classical which doggedly cling to theory even when the results conflict or contradicts with the established theories (Greene 2003). Bayesian econometricians formulate the theory, assemble existing evidence on the theory, form beliefs based on existing evidence, gather evidence, combine beliefs with new evidence and revise beliefs regarding the theory.

3.4 Description of the Bayesian Estimation Procedure

Suppose we have matrix of independent variable X and dependent variable Y . The relationship between the two is described by model:

$$Y = X \beta + \varepsilon$$

Where β is the vector of parameters and ε is the vector of random error, then the Maximum Likelihood (ML) estimate of β is given by

$$\hat{\beta} = (Y' X)^{-1} X' Y$$

Under the standard assumptions $\hat{\beta}$ has the following density

$$\hat{\beta} \sim N(\beta, \hat{\sigma}^2 (X' X)^{-1})$$

Where

$$\hat{\sigma}^2 = \frac{-(Y - X\hat{\beta})'(Y - X\hat{\beta})}{(T - K)}$$

The Bayesian estimation procedure assumes β to be randomly described by the density

$$\beta \sim N(\mu, \Omega)$$

μ and Ω are called priors because they represent our prior knowledge about the parameters.

The posterior model estimate is the weighted average of the prior and data mean and is given by

$$\hat{\beta}_B = E(\beta | \hat{\beta}) = (\sigma^2 (X' X)^{-1} + \Omega)^{-1} [\sigma^2 (X' X)^{-1} \hat{\beta} + \Omega \mu]$$

And the posterior variance is given by,

$$\text{Var}(\beta | \hat{\beta}) = \left(\frac{1}{\sigma^2} X'X + \Omega^{-1} \right)^{-1}$$

$\frac{1}{\sigma^2} X'X$ is the inverse of the variance of the data density called the precision of data density and Ω^{-1} is the precision of the priors. The variance of posterior is

$$V(\hat{\beta}_{\text{BAYES}}) = \left(\frac{1}{\sigma^2} X'X + \Omega^{-1} \right)^{-1}$$

So that posterior precision is $\left(\frac{1}{\sigma^2} X'X + \Omega^{-1} \right)^{-1}$

This is the sum of the prior and the DATA precision. Therefore, the Bayesian estimator is more precise than the DATA and the prior.

3.5 Empirical Estimation Techniques

We use the Bayesian estimation procedure to estimate the parameters in models for this study. The Bayesian analysis has several advantages over the classical in small samples. Bayesian model have some advantages as described by Berger (1985). For example, contrary to classical estimation, the Bayesian analysis assumes the estimated parameter to be random with some prior density. This property makes Bayesian estimation suitable for panel. It also provides a natural way of combining prior beliefs and information with data. In the panel data models, the average of individual parameter estimates^{iv} can be used as prior. Bayesian estimates are more precise than the classical estimates. This means that the standard errors of Bayesian estimates are small which are helpful in getting more reliable inference. Bayesian estimates provide reliable results for small samples. Due to these desirable properties, Bayesian models are recommended for panel data by various authors including (Hsiao et al. 1998; Koop 1999).

The Bayesian estimates are weighted average of classical estimates and the prior information. Let $\hat{\beta}$ be the classical estimate of parameters, this is to say $\hat{\beta} = (X'X)^{-1} X'Y$ assume $\hat{\beta} \sim N(\mu, \Omega)$ this means $\hat{\beta}$ is itself random normal with prior mean μ and prior variance Ω . In this case Bayesian estimates will be:

$$\hat{\beta}_{\text{BAYES}} = E(\beta | \hat{\beta}) \text{ and } V(\hat{\beta}_{\text{BAYES}}).$$

Where;

$$\hat{\beta}_{\text{BAYES}} = E(\beta | \hat{\beta}) = (\sigma^2 (X'X)^{-1} + \Omega)^{-1} [\sigma^2 (X'X)^{-1} \hat{\beta} + \Omega \mu] \quad 1$$

$$V(\hat{\beta}_{BAYES}) = \left(\frac{1}{\sigma^2} X'X + \Omega^{-1}\right)^{-1} \quad 2$$

The study used empirical Bayesian approach to estimate priors following Carrington and Zaman (1994), Carter and Rolph (1974), and Efron and Morris (1972).

3.6 Empirical Bayes Design used in Analysis

The Empirical Bayesian Estimation procedure is going to utilize Bayesian equations 4 and 5. There were some parameters in those equations that were not readily available given the data base to enable us to generate the required regression results. Two options were available in overcoming this:

Firstly, to estimate those parameters separately and thereafter insert them into the two equations required a prior utilization of the following methodology in estimates;

It begins by estimating $\hat{\beta}$ in the following manner $\hat{\beta} = (X'X)^{-1} X'Y$ where X is a matrix of the regressors and Y is the matrix of the dependent variable.

It is reasonable to assume that the MFI's actual financial sustainability performance is random with some average performance so that it can be estimated by using MFI's average over the years. The MFI's average performances were recognized as a reasonable option to estimate priors. The estimation of the priors therefore, can be arrived at as follows;

$$\bar{Y}_i = \frac{1}{N_i} \sum Y_{it} \text{ and } \bar{X}_i = \frac{1}{N_i} \sum X_{it}$$

Where 'i' is the *i*th MFI, 'N_i' is the number of data points available for *i*th and t is the time index.

$$\bar{Y} = \begin{pmatrix} \bar{Y}_1 \\ \bar{Y}_2 \\ \vdots \\ \bar{Y}_n \end{pmatrix} \quad \bar{X} = \begin{pmatrix} \bar{X}_1 \\ \bar{X}_2 \\ \vdots \\ \bar{X}_n \end{pmatrix}$$

Then,

$\mu = (\bar{X}'\bar{X})^{-1} \bar{X}'\bar{Y}$, and $\Omega = \sigma^2 (\bar{X}'\bar{X})^{-1}$ are the priors to be used in our model. After assembling all the parameters, this is to say, priors, posterior and the Empirical Bayesian estimates are described by Equations 1 and 2. Secondly, analysts can ease the process by creating a short cut involving programming using any programming language and thereafter use any

estimation software like Strata, Ox-metrics and MATLAB. In the current study, we used the short route via MATLAB (See Appendix at the end).

4. Empirical Findings

The Bayesian Regression results focusing on the assessment of financial sustainability of microfinance institutions modeled on financial self-sufficiency, return on assets and return on equity and based on the models shown as Equations (1 and 2).

4.1 Model-1: Financial Self-Sufficiency (as dependent variable)

The regression results of the model using financial self-sufficiency as proxy for financial sustainability are presented in Table 3.

Table 3: Results of Modeling Financial Self Sufficiency

Variables	Coefficient	S.E.	t –	P-Value	Significance
CONST	1.082	0.039	27.304	0.00	-
NAB	0.002	0.003	6.767	0.00	***
DS	0.121	0.048	2.500	0.01	**
DER	-0.014	0.004	-3.136	0.00	***
DN	-0.001	0.000	-1.687	0.09	*
PM	0.211	0.016	13.06	0.00	***
RYP	0.262	0.070	3.752	0.00	***
PXP	-0.898	0.131	-6.834	0.00	***
LLR	-0.873	0.439	-1.988	0.05	*
PAR	-0.335	0.230	-1.454	0.15	-
MR	0.786				
F	47.071				

Source: Own Estimations *** 1percent, ** 5 percent, *10 percent

Out of the selected nine variables in the analysis, eight emerged to be significant with expected signs. Five variables are significant at 1 percent, one at 5 percent, and two at 10percent level. The results are discussed below:

The number of active clients and deposit size to GNP are both used as the measure for breadth and scope of outreach respectively and both are significant with positive signs in this discussion. Profit margins and real yield on portfolio represent profitability and both have positive impact on financial sustainability according to the results. Debt to equity ratio and donations to assets ratio are used for measuring capital structure. Both have emerged with negative signs from the results at 1percent and 10percent level of significance respectively. The ratio of personnel expenses to loan portfolio measure efficiency and the relation is negative with high level of significance. Portfolio at risk for more than 30 days carries negative sign but it is insignificant.

4.2 Model-2: Return on Assets (as dependent variable)

The regression results modeled on the return on assets as indicator of financial sustainability are presented in Table 4.

Table 4: Results of Modeling Return on Assets

Var.	Coefficient	SE	t – Stat	P- Value	Significance
CONST	0.084	0.014	5.656	0.00	-
NAB	0.000	0.002	1.602	0.11	-
DS	0.016	0.018	0.907	0.36	-
DER	-0.003	0.001	-2.168	0.03	**
DN	-0.005	0.002	-2.153	0.03	**
PM	0.014	0.006	2.344	0.02	**
RYP	0.140	0.026	5.337	0.00	***
PXP	-0.487	0.049	-9.850	0.00	***
LLR	-0.526	0.167	-3.142	0.00	***
PAR	-0.182	0.087	-2.086	0.04	**
MR	0.568				
F	16.846				

Source: Own Estimations *** 1 percent, ** 5 percent, * 10 percent

Out of the nine explanatory variables used in the study, seven have turned out to be significant, with three variables significant at 1 percent and four at 5 percent level. The signs of all the coefficients are consistent with theory. Number of active clients and deposit size GNP per capita ratio are statistically insignificant, although economically significant as they carry positive signs. Profitability is also significant and positive in this model. Capital structure, portfolio quality and efficiency emerged to be significant with negative signs in this model as well.

4.3 Model-3: Return on Equity (as dependent variable)

The results modeled on Return on Equities used as proxy for the dependent variable (financial sustainability) are presented in Table 5.

Table 5: Results of Modeling Return on Equity

Var.	Coefficient	SE	t– Stat	P – Value	Significance
CONST	0.165	0.076	2.166	0.03	-
NAB	0.002	0.006	2.872	0.00	***
DS	0.353	0.093	3.771	0.00	***
DER	-0.041	0.008	-4.855	0.00	***
DN	0.002	0.001	-1.823	0.07	*
PM	0.012	0.031	0.411	0.68	-
RYP	0.531	0.134	3.945	0.00	***
PXP	-1.075	0.252	-4.259	0.00	***
LLR	-1.952	0.833	-2.343	0.02	**

PAR	-0.302	0.440	-0.686	0.49	-
MR	0.371				
F	7.580				

Source: Own Estimations *** 1percent, ** 5percent, *10percent

Out of total nine explanatory variables, seven have emerged significant, five variables significant at 1 percent and two variables significant at 5 percent and 10percent level respectively. Almost all the variables have the similar signs found in the previous models.

4.4 Summary of Results

In conclusion, Debt-to-Equity ratio, Donations/grants (capital structure proxy measures), Real Yield on Portfolio (a profitability measure), Personnel Expense-to-Loan Portfolio (measure of efficiency), and Loan-Loss rate (portfolio quality measure) emerged to be relevant significant in the analysis across all three models. The Deposit size-to-GNP per capita provides valuable information on models-1 and 3. Profit Margin and Portfolio at Risk for more than 30 days were vital in models-1 and 2 but insignificant in model 3. The results generally appear to be robust as the coefficients are generally significant and carry the expected signs. See the results in summary form in Table 6.

Table 6: Summary of Results, Impact of Determinants

Dependent	Variable	→ FSS		ROA (Model-2)		ROE (Model-3)		
		Sign Expected	Sign Model	Significance	Sign Model	Significance	Sign Model	Significance
Explanatory	Proxy							
Outreach	NAB	+	+	***	+	...	+	***
	DS	+	+	**	+	...	+	***
Capital Structure	DER	-	-	***	-	**	-	***
	DN	-	-	**	-	**	-	*
Profitability	PM	+	+	***	+	**	+	...
	RYP	+	+	***	+	***	+	***
Efficiency	PXP	-	-	***	-	***	-	***
Portfolio	LLR	-	-	**	-	***	-	**
Quality	PAR	-	-	*	-	**	-	...

Source: Own Estimations Significance levels: *** 1 percent, ** 5 percent, *10 percent

5 Discussions of the Results

5.1 Model-1: Financial Self-Sufficiency

Financial self-sufficiency measures the ability of an MFI to raise sufficient revenue that can cover all its costs including the cost of capital.

The models in this study revealed the following determinants of self-sufficiency.

5.1.1 Outreach

The number of active borrowers is statistically significant and has an estimated coefficient of 0.0028, which implies that the total number of active clients is increasing their financial sustainability levels at an average rate of 0.28percent. The results is consistent with the findings of Christen (1995); Otero and Rhyne (1994), who have concluded that outreach and financial sustainability were complementary to each other, since the scale of outreach reduces costs on the average. Possible explanation for the result could be the tradition of group lending in force in the region or mission drift (many rich clients being increasingly served by MFIs globally).

To capture the new trend of deposit-taking by the MFIs in the region, this study has deviated from many of the traditional studies on micro financing that have analyzed credit portfolios only in the scope of outreach, which have used the deposits *size to GNP per capita* in the analysis. As already stated, this innovation was intended to find the role of savings mobilization in the financial performance of these institutions. This proxy variable has the estimated coefficient of 0.1216. In simple terms, the outreach (measured in scope) is responsible for financially sustaining these institutions at an approximate rate of 12.16percent. This result found a favorable bondage between outreach and financial sustainability. The reason is obvious; there is always a trickle-down effect of sufficient deposits more in case of micro financing. The balances on compulsory accounts are used freely by the organizations, while those on voluntary accounts are also used in furthering outreach and hence financial sustainability, although at some cost. Aside from that, there is a tendency of assigning both loan and deposit tasks to same officers, thereby reducing the average costs, henceforth enhancing sustainability.

5.1.2 Capital Structure

The negative sign *debt- to- equity ratio* with a coefficient of - 0.0141 suggests that capital structure with more debt is reducing the speed of Micro finance institutions to become self-sufficient overtime and achieve financial sustainability at an estimated rate of 1.41percent. *Donation to assets* carries negative sign with a coefficient approximated at -0.0011, indicating that capital structure as measured by donations will be hindering the self-sufficiency of MFIs operating and reducing speed towards their financial sustainability at an estimated rate of 0.11percent because external sources have cost associated with them for instance, debt has interest obligations and donations and concessional loans have strings attached to them. These

findings are consistent with those arrived at by Bogan et al. (2007) and Bogan (2008a), which established a negative relation between financial sustainability. The results for debt-to-equity ratio plus donations are consistent with those of Bablis (1999) and (Sharma 2008). Capital structure theories also suggest that that external financing reduce value of the firms.

5.1.3 Profitability

The *profit margin* with its coefficient of 0.2118 implies that it is contributing significantly to the self-sufficiency and playing a positive role in the financial sustainability of the institutions in question on average at 21.18percent. *Likewise, real yield on portfolio* with its coefficient estimates at 0.2629 gives the indication that sustainability of profitability is important towards financial sustainability of the institutions to the extent of 26.29percent. The findings of this study with regards to the role of profitability are consistent with the results of Smith (1998) and Cull and Morduch (2007).

5.1.4 Efficiency

The *personnel expense to loan portfolio ratio* as proxy for efficiency gives an estimated coefficient of -0.8988 and this finding establishes the fact that efficiency has an inverse relationship with financial sustainability. This finding reveals the fact that the costs involved in providing micro credit by these institutions has an inverse impact on sustainability to the extent of 89.88percent. This finding supports the conclusions made by Ledgerwood (1998) in which she noted that personnel expenses contribute about 80percent of operating costs in MFIs.

5.1.5 Portfolio Quality

Loan loss rate ratio as a measure of portfolio quality carries a negative sign with coefficient of -0.8735, which implies that portfolio quality negatively influences the self-sufficiency and financial sustainability of the institutions at an estimated rate of 87.35 percent. The result is an indication of the large losses incurred by these institutions during the period of study. This formed the basis of our research problem. The losses were substantial during the period, but the institutions remained profitable as per the earlier findings, which seems contradicting. Possible explanations are the facts that these losses were offset by the mandatory microfinance insurance funds and the risk premium usually included in calculating the rate of interest. As a prudent measure, all loans disbursed are insured and the insurance policy premium fixed at 2percent is paid for by the clients from their own sources. There is a risk-premium ranging from 1 percent to 2percent added on the estimated lending interest rate as a prudent policy tool. These factors neutralize the adverse impact of loan losses in the study

in a way that makes them achieve self-sufficiency. The *portfolio at risk more than 30 days' ratio* has a coefficient of -0.3357 stating an inverse relation with financial sustainability. This finding implies that Portfolio quality was making the institutions under assessment financially unsustainable at an approximated rate of 33.57percent. The finding is evidence of the presence of delinquency problem in the loan portfolios advanced by the institutions during the period. Delinquency does block the funds that would otherwise be re-invested to generate profits but does not necessary imply losses, since recovery is sometimes in the pipe line and a matter of days, it becomes a big issue if recovery is costly, or when only a portion is recovered or when nothing is recovered at all and hence written off. The write-off in this case is done on the loan loss provision account, which is always created for that purpose. The self-sufficiency and financial sustainability attained by MFIs as evidenced by other factors in the study can be attributed to the eventual success in recovery.

5.2 Model-2: ROE

The ability of an institution to utilize its assets significantly enhances its chances of endurance. Return on assets is therefore an important ingredient in understanding the extent to which MFIs are utilizing their loan portfolio efficiently in generating profits and achieving sustainability levels.

5.2.1 Outreach

The *number of active borrower's ratio* for outreach is statistically insignificant. This implies that breadth of outreach is irrelevant in configuring the level of returns on assets and hence financial sustainability. Same is the case with *deposit size to GNP per capita*. The coefficient for this variable is economically significant by virtue of its positive sign but statistically insignificant. This implies that outreach, as measured by scope has little role in the achievement of financial sustainability of the institutions under study with regards to return on assets. The reasoning could be that deposit mobilization was insufficient during the period and thus had no significant impact on asset returns. Part of the problem is the strict prudent requirement that prohibits NGOs and other institutions not to mobilize deposits from the public like commercial banks. For an MFI to mobilize deposits, it must have sufficient reserves with the Central bank in the country concerned and must have additional security to guarantee client deposits among others. Some of these requirements make it impossible for a reasonable number of institutions to venture into deposit mobilization.

5.2.2 Capital Structure

Debt to equity ratio and *donation to assets ratio* are both significant in the second model. The *debt to equity ratio* has an approximated coefficient

of -0.0037, suggesting an inverse relationship between capital structure and financial sustainability. The finding implies that capital structure is curtailing proper utilization of assets and thus reduces financial sustainability at an estimated rate of 0.37percent. This finding supports the finding in model-1. To have a return on assets significant in achieving financial sustainability, the costs of capital involved with regards to debt-to-equity were small as compared to the ones in model-1 (1.41percent in model-1 versus 0.37percent in model-2).

Donation to assets ratio has an estimated coefficient of -0.0005, which implies that this variable has a negative bearing on financial sustainability of the MFIs. Donations, like any other external source of funding has certain costs associated with it, particularly interest on concessional loans. There is ample evidence that concessional loans were advanced to the institutions, which affected not only their self-sufficiency but also the returns on assets. A reasonable return on assets demands that capital can be raised internally or externally. The significance of donations is an indication that external funding was employed by the MFIs, an observation noted in model-1.

5.2.3 Profitability

Profit margin ratio has an approximated coefficient of 0.0144 in model-2, suggesting that profitability has a positive role in the financial sustainability averaged at 1.44percent. *Real yield on portfolio ratio* has an estimated coefficient of 0.1406 implying that MFIs, which can generate sufficient return on assets, can ensure their financial sustainability at estimated rate of 14.06percent. The higher the profit margin an institution achieves, the higher its return on assets and hence financial sustainability. Findings regarding the role of profitability on financial sustainability as measured by return on assets reinforce the earlier results from model-1.

5.3 Model-3: Return on Equity

Equity is an important factor in the accounts of financial institutions. It determines the pace of growth and direction of performance and henceforth the financial survival or otherwise in the long run.

5.3.1 Outreach

The *number of active client's ratio* is significant which suggests that outreach has been supporting the financial sustainability of MFIs in the region at an estimated rate of 0.23 percent. The positive sign of *deposit size to GNP per capita ratio* implies that the scope of outreach has been helpful towards attainment of financial sustainability. These findings fully support the findings in model-1 and reinforce the role of breadth of outreach in model-2. Best practices in microfinance industry suggest that additional

client base is essential in realizing sufficient returns on equity and thereby in achievement of financial sustainability.

5.3.2 Capital Structure

An inverse relationship is established between financial sustainability and capital structure in model-3. *Debt to equity ratio* and *donation to assets ratio* have their coefficients of -0.0417 and -0.0023 respectively. The findings suggest that capital structure as measured by these proxies negatively affected the financial sustainability of the institutions in question at an estimated rate of 4.17percent as measured by *debt to equity ratio* and 0.23percent and by *donation to assets ratio*. The findings are identical to those established in models-1 and 2 in the current study. It further provides a clue that part of capital structure was generated externally which obliged these institutions to pay for it. In a way, external funding was essential in the attainment of a return on equity and therefore in the processes of achieving financial sustainability.

5.3.3 Profitability

Real yield on portfolio ratio appeared with an estimated coefficient of 0.0023, reflecting the positive role of profitability in the MFIs concerned and hence their financial sustainability in the long run. The result suggests that profitability as measured by real yield on portfolio is relevant in an effort to raise the value of equity. The role played by this variable is similar to the one played by it in models-1 and 2.

Profit margin, though positive as predicted and therefore economically significant, turned out statistically insignificant. Earlier findings in this study have provided a clue regarding the insignificant relation between profit margin and ROE. In all the models, a substantial use of debt funding is evident. According to the trade-off theory of capital structure, more use of debt reduces the value of equity, therefore, the capital structure dominated by debts to such an extent that the value of equity is reduced considerably and thus profit margin gradually vanishes.

5.3.4 Efficiency

Personnel expenses play a prominent role in loan delivery and therefore their proper enumeration is essential in the efficient delivery and hence adding value to the equity base of an institution. However, the cost of personnel should be within manageable brackets for the sake of efficiency and thereby financial sustainability to be enhanced. The very high proportion of -107.54 percent suggests that personnel expenses as a percentage of loan portfolios were growing beyond the red signal, reducing the value of equity and impeding financial sustainability. This result presents

evidence that efficiency has been a problem of the institutions in the East African region.

5.3.5 Portfolio Quality

The *loan loss rate ratio* represents the bad loans that have actually been written off during the period. It implies that whatever provision was made during the period for loan impairment, the said amount has actually been drawn and risk loans settled. Thus, both provisions worked in reducing the returns on equity and in slowing down the process of achieving financial sustainability. *Portfolio at risk for more than 30 days' ratio* had turned insignificant in the model of financial sustainability based on ROE. Though the sign is negative as per theory, the statistical insignificance implies that the volume of delinquent loans remained insufficient in determining ROE. In other words, it has no impact on equity and hence financial sustainability. This result is different from the findings reached to in models-1 and 2.

6. Conclusion

The results from this study are interesting but not surprising. In all the three models, outreach, capital structure, profitability, efficiency and portfolio quality played the predicted roles in influencing the financial sustainability of MFIs in East Africa during the period 2012- 2017. The two proxy measures of outreach for both breadth and scope established a positive role between outreach and financial sustainability in models 1 and 3. No role of outreach was established in model-2. Capital structure as measured by both *debts to equity ratio* and donation ratio established a negative role in influencing financial sustainability across all the three models. The influence of profitability on financial sustainability was established to be positive in models-1 and 2. However, profitability played no significant role in model-3 in determining financial sustainability of MFIs. Negative relationship was established between efficiency and financial sustainability across all the three models in the study as expected. Finally, portfolio quality established a negative relationship with financial sustainability in micro financing. In a nutshell, almost all the Hypotheses claimed could stand empirically testing and the institutions under investigation proved to be financially sustainable in the long run. The major driving forces in this regards are the significant number of active clients and an emerging financial resource mobilization program in the form of deposits, debts and donations that supported their operations. Likewise, the higher interest rates commissions plus other revenues generated ensured their profits. Loan losses, defaults and delinquent remain a challenge in their operations.

7. Suggestions

The suggestions are directed at four players in micro-financing industry; namely the policy makers (governments), the donors, the MFIs and the clients. From a general perspective, MFIs should increase efficiency by controlling operating costs, cost of funds, and the cost of bad debts; they ought to increase outreach, reduce interest and increase services.

7.1 The Policy Makers

The government as policy makers should play a leading role in promoting micro finance industry. From the findings, we recommend the policy makers should develop a friendly environment that encourages small lending, by making borrowing cheaper and processing faster, thereby expanding on breadth and scope of outreach. It should also enhance financial literacy across the poor masses so that they are attracted towards microfinance programs. The formulation of appropriate rules and regulations can also facilitate MFIs to easily mobilize deposits from clients. The attraction of donor financing can also play an instrumental role in poverty eradication. Launching technical assistance programs and developing infrastructure to strengthen the capacity of MFIs will help these institutions to develop appropriate products and improve the quality of portfolios.

7.2 The Donors

To help MFIs achieve financial sustainability while at the same time reach out the poor, donors should provide interest free and concessional loans on a continuous basis to the MFIs to help the poor in terms of financial and social intermediation and at the same time support the on-going micro credit programs that are aimed at reducing the heavy reliance of MFIs on commercial sources at market rates of interests.

7.3 The Micro-Finance Institutions

In order to achieve financial sustainability, the MFIs need to scale up outreach, diversify funding sources, consolidate current profit levels and improve on both efficiency and portfolio quality. With regards to outreach, these institutions should mobilize deposits from clients to diversify their capital structure, make efforts not only to expand their client base but also to diversify their operations. Cheaper sources of funding should be sought and capacity should be developed to attract longer term lower cost funds. To consolidate their profitability and to continue making head ways in profit earnings, a prudent product pricing policy should be maintained and the emphasis should be put on efficiency to properly manage costs during the course of operations. MFIs should develop their understanding about how

clients use funds to better design marketable products. Finally, proper credit policy is important to control loan losses resulting from default and delinquency. Emphasis should be placed on pre-credit screening of potential clients' character and post credit monitoring of clients.

7.4 Micro-Finance Clients

Significant improvements in the lives of the poor are possible as a result of continued access to micro-credit, which can be realized only if financial institutions are sustainable. With this in the minds of MFI clients, they should not default on the loans and payback the installments in time to earn credibility and reputation for the future. Above all, clients should use loans for productive purposes to generate sufficient revenues to enable them to repay the loan and improve their living standards.

8. Direction for further research

Micro finance industry is quickly expanding and the micro credit programs are flourishing. Researchers in this area should expand this line by employing outreach, capital structure, efficiency and portfolio quality as explanatory variables to see how each of these factors reacts with one another. There are many components in each of these variables that can produce different results when used as proxy measure. Attempts should be made to find the impact of productivity and institutional characteristics on the operations of MFIs, and to document their roles in financial sustainability. Future researchers in this direction should also expand on the data set so as to analyze the role of the different types of MFIs such as banks, cooperatives, NGOs and non-bank financial institutions.

Notes and References

- ⁱ According to The Microfinance Gateway, Micro finance industry includes all those institutions providing micro finance services, such as formal financial institutions; semi-formal institutions and informal institutions.
- ⁱⁱ Consultative Group to Assist the Poor (CGAP) defines micro finance institutions as those institutions that provide financial services to poor and low-income households and, their micro-enterprises. In addition to financial services, Ledgerwood (1998) includes social intermediations in its definition.
- ⁱⁱⁱ Micro Finance Information Exchange Inc. popularly known as Market Mix is a non-profit organization based in Washington DC that is committed to providing data on micro financing around the world. It receives data, organizes it and thereafter, it uploads it for commercial purposes.

^{iv} Suppose $\hat{\beta}_i$ is a parameter estimates for the i th cross section and let μ and Ω

be the parameters of prior distribution then $\mu = \frac{1}{n} \sum \hat{\beta}_i$ and

$$\hat{\Omega} = \frac{1}{n} \sum \hat{\beta}_i \hat{\beta}_i'$$

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Annexure 1: Determinants of financial sustainability, their measures and hypotheses

Determinants	Proxy measure	Symbol	Expected Effects on Sustainability
Outreach	Number of active	NAB	Positive
	Deposit size to GDP per capita Ratio	DS	
Capital Structure	Debt to Equity ratio	DER	Negative
	Donations to Assets ratio	DN	Negative
Profitability	Profit Margin Ratio	PM	Positive
	Real Yield portfolio Ratio	RYP	Positive (H:3)
Efficiency	Personnel Expense Ratio	PXP	Negative
Portfolio Quality	Loan- Loss rate Ratio	LLR	Negative
	Portfolio at Risk (> 30	PAR	Negative (H:5)