

OPTIMAL REGULATORY REGIME FOR TRANSFORMATION OF MICROFINANCE INSTITUTIONS (MFIs) IN AFRICA

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Abstract

Microfinance has been accepted as a viable approach of reaching the poor with financial services, and has been linked with growth of micro and small businesses. However, a critical factor constraining the capacity of microfinance institutions in Africa is the inability of many of these institutions to transform to regulated institutions. Using probit regression model on a panel data of African MFIs, the study assessed the optimal policy regime for the transformation of these institutions. Findings revealed that the transformation probability of African MFIs is significantly increased by their level of maturity, scale of lending operation and their level of financial sustainability. The simulated result further showed that optimal transformation of the unregulated small MFIs could be achieved by policy that concomitantly increase financial sustainability and the scale of lending operation of these institutions by a 10% margin from their current positions. Overall, two major policy implications can be inferred. First, there is the need for a continent-wide regulatory environment which recognizes different institutional models of MFI under laws; and secondly, there is need for more funding assistance to these MFIs for scale expansion and financial sustainability improvement while recognizing their varied financial need, strength and weaknesses at different stages of their development.

Key words: Microfinance, Probit model; maturity; scale of operation; financial sustainability; optimal regulatory regime.

1.0. Introduction

With about 300million people living on less than a dollar per day, Africa is home to some of the lowest per capital income countries in the World (UNEP FI, 2009). The lack of financial services to support economic activities of the poor people has been identified as one of the major factors promoting poverty in the region (IFC, 2013). Consequently, in many African countries there exists limited capacity of people to adopt intensive technologies, restricted productivity, inhibited incomes, low domestic savings with increases in productivity prevented (Vincent, 2005). This situation has also led to the inability of entrepreneurs in the continent to engage in neither new business ventures, inhibited economic growth, and often, the sources and consequences of entrepreneurial activities are neither financially nor environmentally sustainable.

Microfinance has been accepted as a viable approach to reaching the poor with financial services, and has been linked with growth of micro and small businesses (Littlefield, Morduch & Hashemi., 2003; Omino, 2005). Microfinance serves as a means to empower the poor, and provides a valuable tool to assist the economic development process because they can provide microloans to the poor people in an efficient and financially sustainable. Micro-lending, micro-savings, and other financial services to poor people are effective ways microfinance institutions help the poor people to help themselves build income and assets, manage risk, and work their way out of poverty. However, commercial microfinance in Africa is significantly less prominent trend than in Asia and Latin America (UNEP Financial Initiative, 2009). As an indicator, Africa attracts a relatively low share of foreign quasi-commercial investment for microfinance – 7% for example compared to 28% for Latin America and the Caribbean (CGAP, 2004).

A critical factor that further constrains the capacity of microfinance institutions in Africa is the inability of many of these institutions to intermediate deposits (Erica, 2009; Robinson 2004; UNEP FI, 2009). Deposit mobilization enables microfinance institution to better serve the poor, reduce their total cost of funding, as well as decrease their dependence on often unpredictable cross-border sources of funding. At the centre of low performance and deposit mobilization crisis is the lack of appropriate regulatory regime for microfinance in Africa. For instance, a recent survey of funding issues by CGAP identified regulatory barriers, after funding, as the greatest challenge to the growth of MFIs. Much of these concerns are on the lack of suitable deposit regulatory regime for offering savings (de Sousa-Shields and Frankiewicz, 2004). Study by Mix and CGAP (2011) further observed that the low intermediation performance and sluggish progress toward reaching scale among many MFIs in Sub Saharan Africa could be attributed to the restriction by government regulations on many of the highly productive and efficient MFIs.

The question that emerges is that of how can microfinance regulation in Africa be appropriately applied to effectively accommodate most MFIs in this region for improved financial access? This study answers this question and provides insight into the optimal regulatory regime needed for transformation of the unregistered MFIs. The rest of the study has been structured as follows. Section 2.0 describes the risk and regulation in the microfinance sector. The statistical framework underpinning econometric analysis in this work as well as description of the data used were presented in section 3.0. Section 4.0 presents the findings as well as the discussion while section 5.0 concludes on the findings.

2.0: Risk and Regulation in Microfinance Industry: A Review of Literature

2.1: Risk Faced By Microfinance Institutions

Risk in micro-financing refers to the possibility of adverse event occurring and its potential for negative implications to the MFI (GTZ, 2000). Microfinance institutions are exposed to a lot of risks which limit their performances and improve their failure probabilities. Risk faced by MFIs could come from the direction of ownership and governance, credit, liquidity, operation and management, interest rate instability, exchange rate risk (Campion, 2000; Littlefield & Rosenberg, 2004; Ledgerwood and White, 2006).

According to Ledgerwood and White (2006), Hannig & Katimbo-Mugwanya (1999), most MFIs are exposed to credit risk as their portfolios tend to be more volatile than portfolios of financial institutions that use traditional lending technologies. MFIs' use of collateral substitutes and reputation based repayment incentives, their low contract enforcement capabilities combined with homogeneity in geographical proximity and market segments create considerable credit risk for these institutions. The group lending mechanism of risk diffusion used by many MFIs suffers from such disadvantages as domino effect or risk of contagion if one of the members is unable to meet repayments (Armendáriz and Morduch, 2000; Churchill, 1999). The drawback of dynamic incentive program is that competition and increasing mobility of borrowers diminishes the power

of this mechanism against moral hazard since borrowers will have the opportunity to take a loan elsewhere (Morduch, 1999). The danger in progressive lending is related to the 'finite repeated games' problem, if the relationship has a clear end, the customer will have an incentive to default in the final period.

Subjective judgment associated has its weaknesses as risk assessment instrument. First, subjective judgment assessment requires a fair amount of time per applicant and is expensive for the lender. According to Babu and Singh (2007), evaluating the loan proposal and defining the terms for each particular client may be very costly to the MFI resulting in reduced profitability. Second, as written within the credit scoring literature (Hand, 1998; Lewis, 1992), judgmental approach lacks of quantification of credit risk. Moreover, borrowers' characteristics are analyzed in this approach sequentially rather than in combination thereby ignoring their correlation (Ibtissem and Bour, 2013).

Literature on risk in micro-financing further observes that despite the growth in importance of many other types of risks in the business (liquidity, interest, foreign exchange, etc), several MFIs are yet to fully recognize the critical role of risk management for the successful implementation of their growth plans. Study by Fernando (2008), for example, revealed the lack of comprehensive risk management systems among most MFIs- their efforts being largely on management of certain types of risk but not the overall risk of the institution in a systematic manner. This study further observed the lack of interest of most MFIs in managing credit risk evidenced not only in the lack of reliable, accurate, and timely data on many MFIs' loan collection rates and portfolio quality but also in the absence of systematic efforts to analyze their loan portfolios from a credit risk management point of view; an awfully low risk coverage ratios even among experienced MFIs; and, a sharp imbalance between MFIs' growth plans and the level of attention given to the risk management demands generated by those growth plans.

2.2: Formal Institution and Microfinance Regulation Theories

The root of financial regulation theory is in the theory of the new institutional economics. Beginning with the premise that institutions matter (North, 1990; Williamson, 2000), the institutional environment refers to the set of fundamental political, social, and legal ground rules that establishes the basis for production, exchange, and distribution (Davis and North, 1971) and defines the conditions under which business occurs (North, 1990). Institutions are the humanly devised rules of the game, both formal and informal norms of behavior. Formal institutions are explicitly created, usually by law and government (North, 1990) and include the formal written rules, regulations, laws and contracts that represent the choices made by a society to give structure to its relations with others. Implicit in the theoretical tenets of this theory is that formal institutions lessen uncertainty. They spell out in written form what is acceptable and what is not and thus promote more cost-efficient transactions to take place.

Extant literature portrays several merits of formal institutions. For example, Rodrik (2003) and Djankov *et al* (2002) noted that property rights and contract enforcement rules, for instance, are “market creating” and disputes resolving institutions, without which exchange cannot occur. Therefore, societies with weak institutions not only grow more slowly in the long run, but experience greater volatility (Acemoglu, Johnson, Robinson and Thaicharoen, 2003; IMF, 2003). The implication is that where corruption and appropriation of private property are common, the potential returns on investments are reduced and possibly eliminated altogether.

Hall and Jones (1999) further argued that formal institutions influence the balance of diversionary (rent-seeking) and productive activities in society. Property rights and contract enforcement improve the environment for economic activity by reducing the transactions costs faced by firms. To this extent, Coase (1960) suggests that institutions matter when there are transaction costs. Since transaction costs, that include all the costs of doing business, are ubiquitous, institutions always matter.

Frances (2004) further explained that property rights provide protection of assets held by an individual or firm against expropriation by others. They ensure the firm maintains control over the returns to the assets it has invested in. Economic institutions that allow property rights to be secured enable people to keep the returns on their investment. Without reliable property rights enforcement, firms will tend to be small scale, to use low capital technology, and to have short-term horizons (Aron 2000). If property rights are improperly defined or left ambiguous and unenforced, resources will be wasted as people try to capture or defend their claims to resources (Saleh 2004). Institutions that enforce contracts provide assurance to firms when they are negotiating an exchange that their interests are protected, should the agreement not be fulfilled. Contract enforcement addresses some of the uncertainty inherent in open market transactions. Sophisticated contracts can facilitate complex transactions, involving multiple parties, covering long time periods and requiring interrelated projects and deliveries (Saleh 2004). Without effective enforcement, potentially valuable exchange might be forgone (Frances, 2004).

As a derivative of formal institutions, microfinance regulation refers to the set of rules governing financial operations of operators in the microfinance sector. Supervision, on the other hand, ensures compliance with those rules (Ledgerwood and White, 2006). Prudential regulation governs the financial soundness of licensed intermediaries to prevent financial system instability and losses to small, unsophisticated depositors. Therefore, prudential regulation aims to reduce the risk that depository institutions will fail (Porteous, Collins and Abrams, 2010). Regulation ensure financial stability by requiring licensed institutions to adhere to prescribed standards of capital adequacy and risk management; and through creating the capacity to supervise the regulated institutions, and ensure compliance. Non-prudential regulation, on the other hand, focuses on anything other than protecting depositors' safety and the soundness of the financial sector as a whole (CGAP, 2003).

According to Ledgerwood and White (2006); Felipe (2011), regulating microfinance has several advantages. This line of reasoning argued that regulated institutions have access to a greater and more diversified funding base; clients are offered a greater array of financial services (savings, micro insurance, remittances); regulation provides a better framework for risk management, corporate governance and the reinforcement of internal controls; formalization allows the MFIs to attain a greater leverage and thus to intermediate more resources to grow the portfolio; with rapid portfolio growth, MFIs will be able to reap economies of scale, consolidate their sustainability and attain a massive outreach; transformation tends to reduce the financial costs of the MFI, which gains access to lower cost funds; a transformed MFI will have more success attracting external investors, facilitating thus growth. Porteous *et al* (2010) further noted that savings mobilization by regulated institutions is attractive to MFIs for two main reasons. First, it can help an institution to achieve long-term viability by providing a stable source of relatively low-cost funds. Second, it can drive large-scale outreach by broadening both the product array and the client base. The overall, depositors are assumed not to be in a position to monitor the risks taken by a financial institution and to take appropriate corrective action (Diamond, 1984; Staschen, 1999). Regulation, therefore, protects customers' deposits from unsound lending practices. Depositors derive implicit benefit depositing their funds in safe, regulated institutions than unregulated ones. In turn, regulated MFIs accumulate deposits and lend at lower rates than the unregulated ones and by so doing enjoys viability, financial soundness and wider client base than the unregulated MFIs. Furthermore, because MFIs can often have considerable local market power which can result in monopolistic lending practices leading to usurious interest rates and expensive fees, regulation also protect microfinance borrowers (Ledgerwood and White, 2006). Moreover, regulation and supervision may promote the development of the microfinance industry, attracting greater borrowing and more deposits from the public. Overall, microfinance regulation serves to ensure financial soundness of the MFIs, reducing their chances of failure and reinforcing the public's trust on these institutions.

However, microfinance transformation is not without its costs. Study by Meagher (2002) observes that microfinance institutions often face cost of inappropriate regulation. Felipe (2011), on the other hand, discussed that transformation process of MFIs is bedeviled with costs of regulatory compliance; the cost to MFI of allocating extensive time and critical resources to the transformation process; and the cost of experimenting with the issues of cultural change as they convert into a more commercial driven entity.

3.0: Econometric Framework and Data

3.1: Discrete Choice Model

Discrete choice model or random utility model (RUM) as is often called is the workhorse for modeling choice behaviors. RUM begins with a structural model which describes utility of consumers from a choice in terms of the characteristics of the choice alternative and the taste of the entity making the choice. For instance, suppose there exists a binary choice situation in which Y^* is a continuous variable that we do not observe- a latent variable, Y^* is determined such that:

$$Y^* = X\beta + \varepsilon \dots\dots\dots(1)$$

In this formulation, ε is the unobserved utility assumed uncorrelated with X (i.e is exogenous); X is a vector of characteristics of the entity making the choice and characteristics of the choice itself. While we do not observe Y^* , we do observe the discrete choice made by the individual, according to the following rule:

$$Y=1 \text{ if } Y^* >0 \dots\dots\dots(2)$$

$$Y=0 \text{ if } Y^* \leq 0 \dots\dots\dots(3)$$

Though Y^* is not observed, it is often thought of in terms of net utility of making a choice. The individual undertake the cost-benefit and decides to take positive action if the net utility is positive. Thus, it follows that:

$$\begin{aligned}
 \Pr(Y=1 \mid X) &= \Pr(Y^* > 0 \mid X) \\
 &= \Pr(X\beta + \varepsilon > 0 \mid X) \\
 &= \Pr(\varepsilon > -X\beta) \\
 &= 1 - \Lambda(-X\beta), \text{ exploiting symmetry of logistic distribution} \\
 &= \Lambda(X\beta) \dots \dots \dots (4) \\
 &= \frac{\exp(X_i \beta)}{1 + \exp(X_i \beta)} \dots \dots \dots (5)
 \end{aligned}$$

However, if ε is assumed to follow a normal distribution (probit case), then the above steps can be re-written as follows:

$$\begin{aligned}
 \Pr(Y=1 \mid X) &= \Pr(Y^* > 0 \mid X) \\
 &= \Pr(X\beta + e > 0 \mid X) \\
 &= \Pr(e > -X\beta) \\
 &= 1 - N\left(-\frac{X\beta}{\sigma}\right), \text{ exploiting symmetry and integrate} \\
 &= \phi(X\beta) \dots \dots \dots (6)
 \end{aligned}$$

Several formulations of the equations (5) and (6) exist for extensions to the panel data. Following Greene (2003), the variants of binary probit model extension to panel data includes:

- Fixed effects model: $\Pr(y=1) = F(\beta' x_{it} + \alpha_i)$, α_i correlated with x_{it}
- Random effects model: $\Pr(y=1) = F(\beta' x_{it} + \varepsilon_{it} + u_{it} > 0)$, u_i uncorrelated with x_{it}
- Random parameters model: $\Pr(y=1) = F(\beta' x_{it})$

$B_i | i \sim h(\beta_i | i)$ with mean vector β and covariance matrix Σ

Parameters of equations (5) or (6) are estimated through maximum likelihood estimation (MLE).

The ML estimate of β is the particular vector β^{ML} that gives the greatest likelihood of observing the sample (y_1, y_2, \dots, Y_n) conditional on the explanatory variables x . By assumption the probability of observing $Y=1$ is $F(x\beta)$ while the probability of observing $y_i=0$ is $1-F(x\beta)$. It follows that the probability of observing the entire sample is:

$$L(Y | x; \beta) = \prod_{y_i=0} [1 - F(x_i\beta)] \prod_{y_i=1} F(x_i\beta)$$

This can be written as:

$$L(Y | x; \beta) = \prod_{y_i=0} [1 - F(x_i\beta)]^{1-y_i} \prod_{y_i=1} F(x_i\beta)^{y_i}$$

Because when $y=1$, we get $F(x_i\beta)$ and when $y=0$ we get $[1 - F(x_i\beta)]$

The log likelihood for the sample is

$$\ln L(Y | x; \beta) = \sum_{i=1}^N \{y_i \ln F(x_i\beta) + (1 - y_i) \ln [1 - F(x_i\beta)]\}$$

The MLE of β maximises this log likelihood function. If logistic CDF is assumed in (), then we obtain the logit likelihood

$$\ln L(Y | x; \beta) = \sum_{i=1}^N \{y_i \ln \Lambda(x_i\beta) + (1 - y_i) \ln [1 - \Lambda(x_i\beta)]\}$$

$$\ln L(Y | x; \beta) = \sum_{i=1}^N \left\{ y_i \ln \left(\frac{\exp(x_i\beta)}{1 + \exp(x_i\beta)} \right) + (1 - y_i) \ln \left(\frac{1}{1 + \exp(x_i\beta)} \right) \right\}$$

This simplifies to:

$$\ln L(Y | x; \beta) = \sum_{i=1}^N \{y_i [x_i\beta - \ln(1 + \exp(x_i\beta))] - (1 - y_i) \ln(1 + \exp(x_i\beta))\}$$

If on the other hand, F is standard normal, we get Probit estimator with log likelihood function:

$$\ln L(Y | x; \beta) = \sum_{i=1}^N \{y_i \ln \phi(x_i\beta) + (1 - y_i) \ln [1 - \phi(x_i\beta)]\}$$

3.2: Estimated model:

The estimated fixed effect probit model is stated as follows:

$$\begin{aligned} \Pr(y = 1|X) = & \gamma_0 + \beta_1 prst + \beta_2 age + \beta_3 scal + \beta_4 capasst + \beta_5 capasst_NGO \\ & + \beta_6 capasst_CUCOOP + \beta_7 debteq + \beta_8 finexp + \beta_9 finexp_NGO \\ & + \beta_{10} finexp_CUCOOP + \gamma_1 NGO + \gamma_2 RURAL BANK + \gamma_3 CUCOOP + \varepsilon_i \end{aligned}$$

..... (7)

Where: γ_i are fixed effect coefficients associated with the respective MFI type; and, β_i are regression parameters and ε_i is a normally distributed unobserved utility. Other variable and their measurements are as defined in appendix A.

3.3: Data

The data used for the study were panel data on African MFIs and were collected from the website of the Mixmarket (www.mixmarket.org.) The data dated from 1998 to 2010 and consisted of one thousand three hundred and twenty one (1321) observations which were randomly sampled to minimize missing values in relevant variables. The variables used were as defined by the MiX (Microfinance Information Exchange)

4.0: RESULTS AND DISCUSSION

4.1. Results

The estimated probit model of MFIs' transformation probability is summarized in tables 1&2 and figures 1-3 while the result of scenario analysis is presented in table 3& figure 4. Preliminary information on the fitness of the model indicates a good fit of the model to the observed data. Specifically, the likelihood ratio (LR) test which compared the estimated model with the base case model (model without explanatory variables) indicated that the former significantly explained MFIs' transformation probability than the latter. Similarly, the McFadden Pseudo R² index of 0.22 showed that the included explanatory variables explained between 50% and 60% of the variations in the MFIs coming under the financial sector regulation (Hensher et

al.2005). The implication of this is that policy matter to probability of MFI transformation to deposit taking institution.

On MFIs' transformation probability characteristics, findings indicated that this process is significantly determined by MFI's age, its scale of lending operation, the level of financial expenses incurred, and the MFI's model type. More to the point, with a marginal coefficient of 0.03 and 0.07 respectively, increases in age and scale of operation increase the probability of MFI's transformation to a regulated institution. In contrast, increases in financial expenses or decreases in financial sustainability decreases the probability of an MFI transformation to a regulated entity. However, the relative negative effect of financial expenses on NGO-MFIs probability of transformation was smaller indicating that financial expenses of an NGO-MFI type has a relatively lower negative effect on its transformation probability than that of other models of MFIs. This is expected because most African NGOs rely on low cost fund and free grant in their lending operations. On the other hand, the negative effect of financial expenses on transformation possibility was highest for MFIs operating as Co-operative and Credit Union.

Furthermore, the unit fixed effects were different across the observed MFI models. Specifically, Rural Bank and Credit Union & Cooperative models had significant and positive potentials to transform to regulated institutions relative to the excluded Bank and Non Bank Financial Institution-MFI models. In contrast, the marginal fixed effect of NGO-MFI type on transformation probability was the least and significantly negative. This suggests that NGO-MFI model in Africa reluctantly transform. This in other words suggests that the NGO-MFI type favors credit only operation than any other model of microfinance in the continent.

Given the result from the observed data, the MFI observations in the panel were subjected to eight future policy scenarios. This consisted of concomitant improvement in scale of operation and reduction in financial expenses by the same percentage of 5%, 10%, 15%, 20%, 25%, 30%, 35% and 40% respectively in the first to the eighth scenario. Finding from this

analysis (Table 3) indicates that optimum percentage prediction in transformed observations arising from the simulated future policy changes is obtained when financial policies lead to 10% concomitant reduction in financial expenses as well as improvement in MFIs' scale of lending operation.

4.2. Discussion

The result from regression analysis suggests the significance of three mutually reinforcing constraints impeding MFIs' transformation in the Africa, including lack of maturity, small scale of lending operation and low level of financial sustainability. Solution to this problem should necessarily start with regulatory environment which recognizes different institutional models under laws as different as a banking law, a cooperative law, a specific microfinance law, or any other law defining a lower 'tier' of financial institutions" (Staschen 2003)

As regard growth funding policies to overcome these constraints, there are many alternative ways in which the young unregulated MFIs could be funded to become strong, matured and financially sustainable institutions ready for transformation. Sustainable small MFIs' growth could be funded through loans, share capital, or subsidies or free grants from donors (Hoque, Chisty & Halloway, 2011). However, the problem with donors fund and subsidies is that it could make the industry to be volatile as those sources of finance may be limited and are exposed to what happens in the global economy (Cull, Demirguc-Kunt, & Morduch 2009) especially, foreign exchange risk. Furthermore, this approach towards donors may not only hold back these institutions from growing as funding from donors are not only limited, but may also jeopardizes the development of the business since donors might diminish the incentives for MFIs to become more efficient and cut costs (Schreiner & Murdoch, 2001). On the other hand, there are various obstacles for these MFIs if they want to turn to the traditional financial markets for funding at the early stage of their development. Firstly, commercial actors

demand a higher degree of efficiency and ability to cut costs (Campion, 2002). Secondly, as these MFIs are relatively young institutions, they will lack the standardization and accreditation that commercial actors would demand.

As regard savings option, this constitutes a relatively cheap source of capital that is insensitive to market fluctuations. However, prescribing savings mobilization for unregulated MFIs for lending is like a death sentence to depositors the society is willing to protect. Finally, to the extent that funding support must take cognizance of the fact that financial sustainability of an MFI comes with age, reflecting learning by doing and decreases in average costs when an institution with significant fixed/overhead costs expands over time, funding support for these small, unregulated MFIs' growth need to consider their stage of development and therefore the form of support applicable. To this extent, several options may be appropriate including, assistance in the form of a one-time start-up capital injection in form of donor grant; or a start-up loan with graduated and fairly long repayment period which will help cover high initial fixed costs or could be invested to cover to provide a stream of income that reduce net average costs, while the MFI is also encouraged to keep down costs and innovate. In this regard, policy attention may be turned on donors and International Finance Corporation (IFC) who are well known to provide active support in this direction. Guarantees for bank loans and improved regulatory environment could also enable some of these small MFIs to attain low cost for capital. In this instance, support policy could take a cue from the United States where, for example, traditional banks lend to MFIs at a rather low interest rate due to federal initiative called Community Reinvestment Act, which states that banks must participate in the local economical development (Bredberg & Ek, 2011). Overall, these funding supports will be optimal when MFIs' current scale of operation and their financial expenses are concomitantly and respectively increased and reduced by a margin of 10 percent from their current positions.

5.0. Conclusion

Findings in this study points to the significant negative role played by lack of maturity, small scale of lending operation and low level of financial sustainability characteristics on transformation probability of the unregulated African MFIs. Two important policy implications implied by this finding include, first, the need for a continent-wide regulatory environment which recognizes different MFI institutional models under laws as different as a banking law, a cooperative law, a specific microfinance law, or any other law defining a lower ‘tier’ of financial institutions; secondly, the need for more funding assistance to small MFIs in the continent for scale expansion and financial sustainability. The latter will be optimal to transform the unregulated institutions when it concomitantly improves financial sustainability and scale of lending operation of these institutions by a 10% margin from their current positions.

Table 1: Probit Model of Probability of African MFI Transformation to Regulated Institutions

Transformation	Coefficient	Std. Error	Z stat	Sig. level S
<i>constant</i>	0.0129	0.28868	0.04	0.96
<i>Prst</i>	0.20400	0.19650	1.04	0.2992
<i>Age</i>	0.14772**	0.06012	2.46	0.0140
<i>Scal</i>	0.30235***	0.06906	4.38	0.00
<i>capasst</i>	0.30977	0.28923	1.07	0.2842
<i>capasst_NGO</i>	-0.44797	0.32893	-1.36	0.1732
<i>capasst_CUCCOOP</i>	-0.047483	0.31431	-1.51	0.1309
<i>debtteq</i>	-0.00119	0.00150	-0.79	0.4267
<i>finexp</i>	-4.6229**	1.80916	-2.56	-0.0106
<i>finexp_NGO</i>	4.50100**	2.06014	2.18	0.0289
<i>finexp_CUCCOOP</i>	-	439120	-2.25	0.0244
	9.880992**			
<i>NGO</i>	-0.56586**	0.25991	-2.18	0.0295
<i>RURAL BANK</i>	-0.56657*	0.31714	1.79	0.0740
<i>CUCCOOP</i>	1.66245***	0.32691	5.09	0.0000

***, **, * -Significant at 1%, 5%, 10%.

Source: Author's calculation

Table 2: Marginal effects of MFIs' characteristics on Transformation Probability

Transformation	Coefficient	Std. Error	Z stat	Sig. level
<i>Prst</i>	0.04548	0.04413	1.03	0.3027
<i>Age</i>	0.03258**	0.1318	2.47	0.134
<i>Scal</i>	0.0668***	0.01489	4.48	0.000
<i>capasst</i>	0.06832	0.06369	1.07	0.2834
<i>capasst_NGO</i>	-0.09880	0.07233	-1.37	0.1720
<i>capasst_CUCCOOP</i>	-0.09880	0.07233	-1.37	0.1299
<i>debtteq</i>	-0.00026	0.00033	-0.80	0.4264
<i>finexp</i>	-1.01959***	0.39598	-2.57	0.0100
<i>finexp_NGO</i>	0.99270**	0.45194	2.20	0.0281
<i>finexp_CUCCOOP</i>	-2.1792**	0.9609	2.21	0.0239
<i>NGO</i>	-0.13745**	0.06781	2.03	0.0427
<i>RURAL BANK</i>	0.10519**	0.04711	2.23	0.0256
<i>CUCCOOP</i>	0.261560***	0.03426	7.6	0.00

***, **, * -Significant at 1%, 5%, 10%.

Source: Author's calculation

Figure 1. Marginal influence of age on probability of transformation of African MFIs

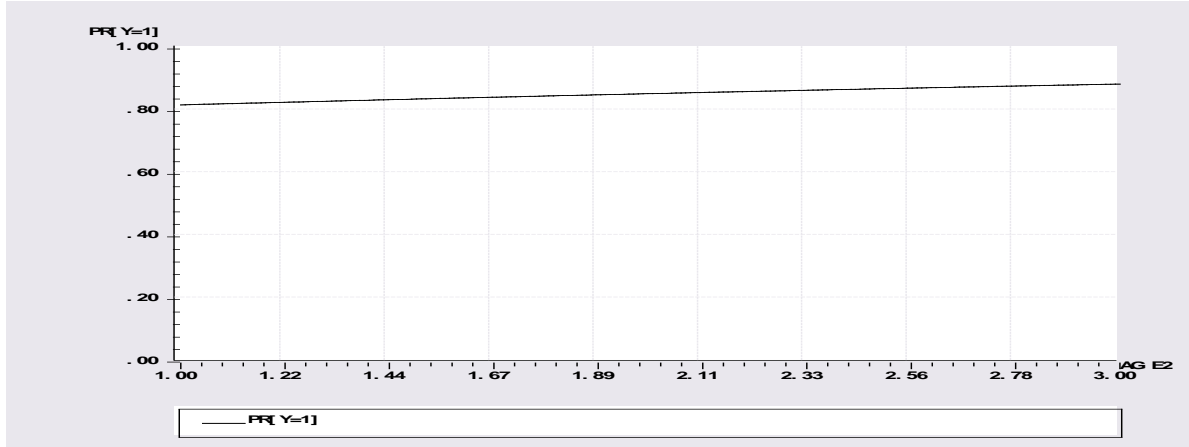


Figure 2: Marginal influence of financial expenses on transformation of African MFIs

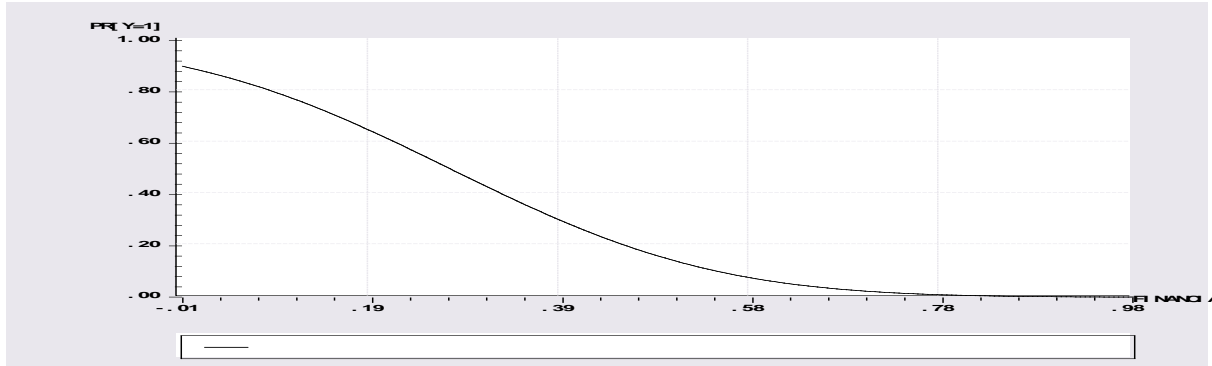


Figure 3. Marginal influence of scale of lending operation on probability of transformation of African MFIs

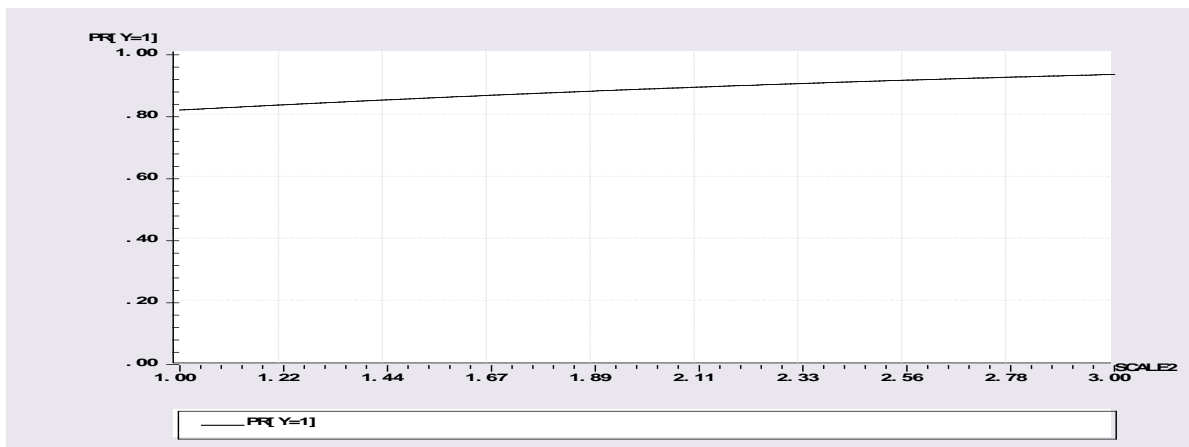
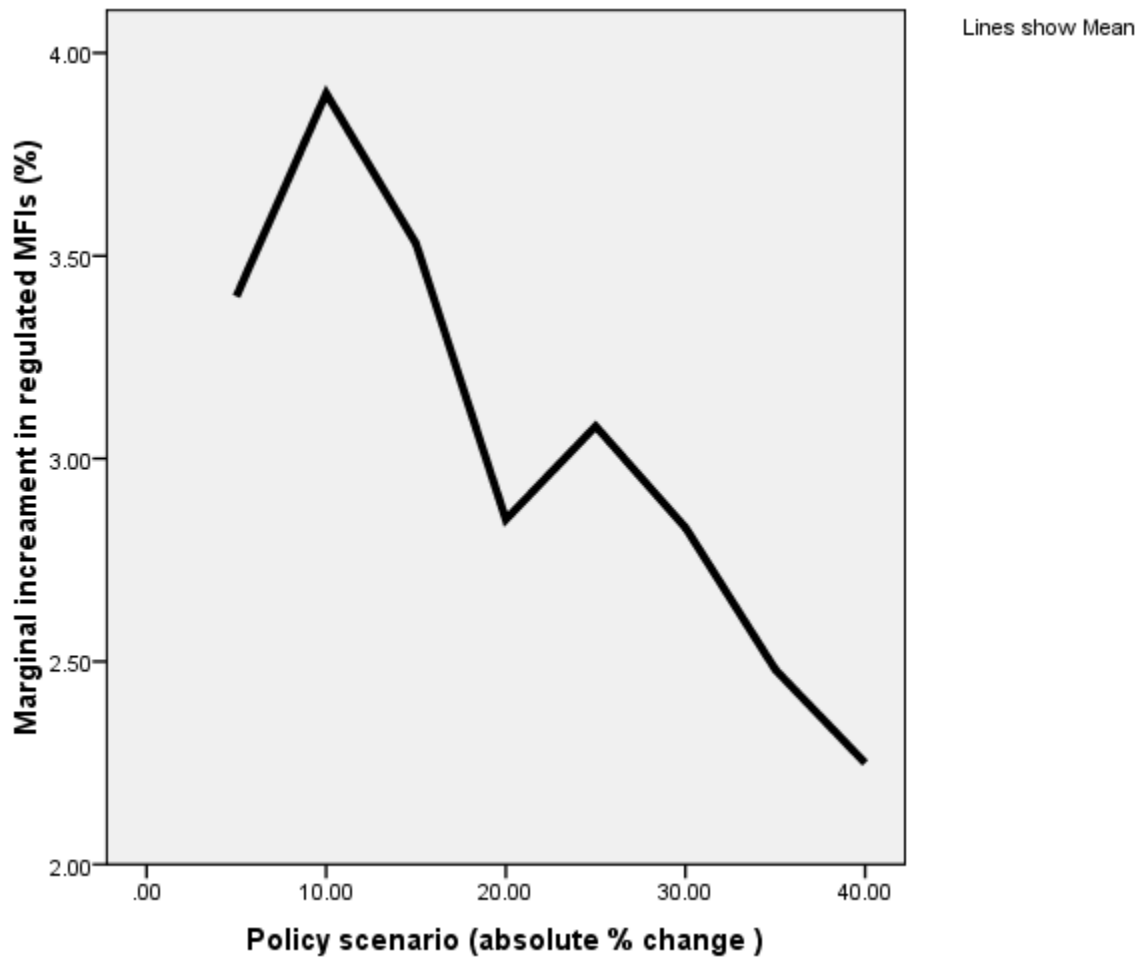


Table 3. Response of African MFI transformation behavior to future change in policies affecting size and financial expenses of MFIs

Scenario	Predicted no of Concomitant No of MFIs Marginal	unregistered MFI in base percent increase in predicted base case on MFI	case scenario	of MFI's size and decrease in financial expenses	transformed from the scenario by policy change	effect of policy transformation (% of the total in the sample)
1	134	5	17	3.40		
2	134	10	39	3.90		
3	134	15	53	3.30		
4	134	20	57	2.85		
5	134	25	77	3.08		
6	134	30	85	2.83		
7	134	35	87	2.48		
8	134	40	90	2.25		

Source: author's calculation

Figure 1: Marginal effect of size and financial expenses policy change on African MFIs' transformation



Source: Author's calculation

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APPENDIX

A

Acronym	Variable	Definition and measurement
<i>NGO</i>	Non governmental organization	A dummy variable that takes value of 1 when NGO, or 0 otherwise
<i>CUCOOP</i>	MFI Credit union and Cooperative society type of MFI	Dummy variable that takes value of 1 when Credit union and cooperative MFI type, or 0 otherwise
<i>RURAL BANK</i>	Rural Bank type of MFI	Dummy variable that takes value of 1 when Rural Bank MFI type, or 0 otherwise
<i>prst</i>	Profit status	A dummy variable that takes value of 1 when registered for profit or 0 otherwise
<i>age</i>	Age	Years operated from inception of the MFI, measured as new if operated for between 1-4years; young, if operated for between 5-8years; and, matured if operated for more than 8 years
<i>scal</i>	Scale	Gross loan portfolio, measured as large when >8millionUSD; medium when between 2-8millionUSD; small when <2million USD
<i>capasst</i>	Capital to asset ratio	Ratio of total equity to total assets
<i>capasst_NGO</i>	Capital to asset ratio of NGO-MFIs	Ratio of total equity to total assets of NGO-MFI
<i>capasst_CUCOOP</i>	Capital to asset ratio of credit union and cooperative society	Ratio of total equity to total assets of credit union and cooperative society MFIs
<i>debttoeq</i>	Debt to total equity ratio	Ratio of liabilities to total equities
<i>finexp</i>	Financial expenses	Expenses on financial liabilities such as interest fee
<i>finexp_NGO</i>	Financial expenses of NGO-MFIs	Expenses on financial liabilities such as interest fee of NGO-MFIs
<i>finexp_CUCOOP</i>	Financial expenses of credit union and cooperative MFIs	Expenses on financial liabilities such as interest fee of credit union and cooperative MFIs
<i>finexp_RURAL BANK</i>	Financial expenses of Rural Bank MFIs	Expenses on financial liabilities such as interest fee of Rural Bank MFIs

Source: adapted from MiXmarket, 2010