Regulation, Outreach and Sustainability of MFIs in SSA: A Multilevel Analysis

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Abstract

This paper brings together issues lingering around regulation in microfinance institutions by examining the effects of regulation and country effect. Using an unbalanced panel data from 2002 to 2012 for 30 countries in Sub-Saharan Africa, and employing multilevel estimation technique, the study reveals that regulation helps to improve the sustainability and breadth of outreach but not depth of outreach. Also country effect plays significant role in MFIs activities. It is imperative for regulatory authorities to devise strategies to strengthen MFIs financial position as well as ensuring enabling environment that will enhance the achievement of microfinance social objectives.

Keywords: Regulation; Microfinance Institutions; Profitability; Outreach; Sustainability

Introduction
The extent of government involvement in the governance of financial intermediation is on the ascendancy and regulation of MFIs exists to ensure that they operate in a sound environment in order not to harm the unbanked poor. From public policy perspective, regulation is underscored by market failure arising from asymmetric information, market power and negative externalities (Freixas & Rochet, 1997). These arguments are most relevant to regulation in microfinance. In view of the burgeoning issues, the present concern of this paper is to examine the effect of regulation on MFIs sustainability and outreach in SSA.

This paper borrows from the empirical literature on non-financial firms and employs multilevel estimation technique to explain the effect of regulation on MFIs outreach and sustainability in Sub-Saharan Africa. The objective of this paper is to examine the effects of regulation on MFIs core objectives; outreach and sustainability. Using the cross-section time-series variation in our sample of MFIs spanning from 30 countries in SSA from 2002 to 2012. To answer the question, the study borrows from empirical works of bank regulation literature that has at length examined literature on bank performance analysis that extensively dealt with issues concerning regulating financial institutions or banks. The intent for this paper is to add to present arguments for and against regulation of microfinance institutions. To date, no study has attempted to empirically use multilevel methodology to evaluate how regulation affect the two objectives of microfinance: sustainability and outreach MFIs in SSA. This article evaluates whether regulating MFIs would best be of immense help for the MFIs while executing their core objectives.

The paper argues that regulation could be of great importance to the MFIs but if done inappropriately could be detrimental. It uncovers empirical evidence consistent with sustainability and outreach of MFIs but reveals a double-edged finding on the outreach of MFIs. Institutions that strive to maintain their core objective have to face some trade-off between serving the poorest of the poor or only the marginal poor. Specifically, the paper establishes the following empirical facts: (1) regulation helps to improve the sustainability and breadth of outreach of MFIs; (2) regulated institutions offer larger loan sizes to the poor and serve fewer women; (3) countries with a high official supervisory power (regulatory quality) have positive outcome on outreach and sustainability and (4) institutions that accept deposits from the poor have better sustainability but such institutions tended to serve the marginal poor. The remaining of the paper is organised as follows: section 2 provides review of literature, section 3 presents the methodology, Section 4 examines data for the study and section 5 presents the results and discussions whiles section 6 concludes with policy recommendations.

Literature Review
The transformation MFI into regulated institutions has been discussed under studies such as the transformation of Bolivian PRODEM into BancoSol (Rhyne, 2001). A study by Arun (2005) and Brau and Woller (2005) on regulation which focused on the experience of individual countries or group of countries with MFI regulation. The point of agreement between value research and of microfinance practitioners is that deposit-taking institutions should be subject to prudential regulation, while those that do not collect deposits from the public but operate with private donations instead, should not (Chaves & Gonzalez-Vega, 1994). Cull et al (2009) in their paper draw an important distinction between prudential and non-prudential regulation. According to the distinction, regulation is prudential when it is aimed specifically at protecting the financial system as a whole as well as protecting the safety of small deposits in individual institutions. In Bangladesh as an example, many poor

clients lost their savings due to improper and fraudulent action of little known unregulated institutions (Wright, 2000). MFIs that fall under deposit-taking and donor-funded only categories should be under some form of tiered regulation, with licensing and monitoring linked to the sources of funds and the clients served (Van Greuning et al., 1999; Hardy et al., 2003).

Typically banking regulations in most countries do not cover microfinance activities. Changes in regulation mechanisms and laws that cover microfinance activities usually result from active promotion by large microfinance networks such as ACCION International operating mainly in Latin America or when the MFI sector becomes more active in their operations and thus draws the attention of the regulator. The lack of regulations has had both positive and negative consequences. Taking Ghana for instance where microfinance activities has brought the attention of the Bank of Ghana that many people have their monies locked up. Noninvolvement by the regulators makes establishing and operating an MFI easier. This scenario is exactly what helped MFIs in some Latin American Countries in their early stages and helped laid the foundation for the sector (Christen and Rosenberg, 2000). However, ambiguity in regulation leaves MFI being at risk to regulatory discretion in the interpretation of the legal basis for lending activity, as happened in Russia (Safavian, et al. 2000). Currently, some MFIs operate as regulated or non-regulated. That is MFIs can be subject to either mandatory entry regulation, prudential regulation, or some sort of entry regulation (tiered regulation).

Sustainability, Outreach and Regulation

It is believed that when MFIs are regulated, they will be able to utilize private, unsubsidized sources of funding to raise capital in order to grow and serve more clients. In becoming regulated, these institutions now have a "double bottom line": a financial objective of sustainability to satisfy their funders in addition to their social objective of outreach (CGAP, 2004). Originally, most MFIs rely on donations and subsidies for funding. Because these sources of funds are vulnerable to shocks, many MFIs chose to attract private sources of funds. These private sources of funding include: deposits, loans from commercial banks, bond issuances and other short-term financial liabilities. By accessing deposits and loans from commercial sources, regulated MFIs can grow and avoid a liquidity crunch by tapping commercial sources of funding (Berger et al, 2006). The emphasis on Sustainability should also be important to MFIs, especially, if they hope to help their clients out of poverty because their survival as organizations matters.

The regulation of microfinance has raised concerns regarding mission drift arising from the tension of the "double bottom line". Serving the poorest clients has the highest average costs, which could impact negatively on sustainability and outreach. Thus, if the financial objective outweighs the social objective for the MFI then outreach will likely suffer. In addition, MFIs may move "up market" (Swanson, 2008) with their more successful clients. This shift away from poorer potential clients would again indicate mission drift. Bateman (2009) points out the enormous benefits for those promoting regulation, but not for the poor on the receiving end. Regulation has gained momentum in the microfinance industry both in magnitude and as a percentage of total funding (Garmaise et al, 2010). Some within the industry have also called for the future of the microfinance industry to be driven by commercial MFIs. Among the best-practice model that emerged within the international development community envisaged the provision of microfinance through market-driven, independent, commercially oriented, and financially self-sustaining MFIs (Harper, 2011). Whether this regulation trend has had an impact on the industry's sustainability and outreach is an important question to address.

Methodology
Theoretical Model Specification

Giving the heterogeneous nature of MFIs in SSA and in most cases mission driven, investigating how regulation influences outreach and sustainability is important. Understanding of the factors that may influence these missions of MFIs come from a model that explores the possibility of matching managers and principals in mission driven organizations such as MFIs, as developed by Besley and Ghatak (2007). The authors show that a change in mission can occur as a result of competition for donations. Donors, therefore, would be willing to support an MFI if they are assured that the original mission will be sustained. Thus:

$$Y = f(R, Fx, M) \qquad (1)$$

Where Y is performance variable of the financial institution, R is regulatory framework variable, Fx is Financial institutions specific characteristics and M is macroeconomic and institutional characteristics.

In this model it could be inferred that mission drift among the financial institutions can occur as a result of competition for donations. Again, donors are likely to support MFIs if they are assured that the original mission will be maintained. The model predicts that managers would perform better in organizations with large endowments as they are less likely to be forced to adjust their mission to attract donations. The model also predicts that competition among mission-driven organizations improves efficiency because it improves matching between donors and managers and thus improves managers' incentives. Consistent with the literature and following works on analysis of bank performance, Barth et al., (2004) and (Berger, Demirgüç-Kunt, Levine, & Haubrich, 2004), and adapting the bank performance model, outreach and sustainability (performance) of MFIs is specified as:

$$Out \; or \; Sust = f(R, Zx, Mv) \qquad (2)$$

Where $Out \; or \; Sust$ is outreach or sustainability by the MFI, R is the regulatory variable, Zx is (MFI) specific characteristics and Mv is macroeconomic and institutional characteristic.

Empirical Model Specification

In line with the above model, the empirical model for MFI which specifies outreach or sustainability as a function of MFI specific variables, macroeconomic and institutional factors and regulatory framework is specify as:

$$OUTR_{ijt} = \beta_{0j} + \beta_{1j}Reg_{ij} + \sum_{m=1}^{5} \beta_{2\_m} Z_{ijt} + \sum_{n=1}^{3} \beta_{2\_n} CV_{jt} + \varepsilon_{ijt} \qquad (3)$$

$$SUST_{ijt} = \beta_{0j} + \beta_{1j}Reg_{ij} + \sum_{m=1}^{5} \beta_{2\_m} Z_{ijt} + \sum_{n=1}^{3} \beta_{2\_n} CV_{jt} + \varepsilon_{ijt} \qquad (4)$$

where $OUTR_{ijt}$, $SUST_{ijt}$ are outreach and sustainability variables for MFIs i in country j at time t Reg_{ij} captures the effects of regulation by MFI; Z_{ijt} is a vector of MFI specific variables (Age, Deposit, Capital, Interest Rate(Rate), Mfi type,); CV_{jt} are macroeconomic country-specific variables (inflation (CPI), GNI per and regulatory quality), ε_{ijt} is MFIs specific error term.

Estimation Technique

The empirical analysis uses panel data of different levels where one level of data is nested in another. Thus, MFIs data nested in country data, the model is as a mixed or nested model set which can also be termed as a hierarchical model. Having such model that comprises different levels of data requires a first step to determine what empirical estimation technique to use and the most appropriate. The study then employs a two stage multilevel model to deal with this hierarchical nature of data structure. The multilevel analysis employed is highly relevant in this study because the model structure of the study involves different levels. Changes in MFI activities vary substantially in structure and also across countries in sub-Saharan Africa. Thus, the study area is composed of mixture of groups (countries which is seen as a higher level variable) and MFIs (individuals seen as a lower level variable) and hence such study can be termed as a study that involves a hierarchical data. The arguments justifying the use of multilevel models to analyse hierarchical data in addition are well known in the literature (Goldstein, 2011; Skrondal & Rabe-Hesketh, 2004). According to arguments pose, when units are clustered, classical regression analysis are not appropriate since the underlying hypothesis of independence of the observations is violated. Again, in the case of this study, MFIs in the same countries tend to be more similar to each other than those in different countries. As a result of this dependency, using classical regression analysis leads to downward bias standard errors and, hence, inferences about the effects of the covariates might be spurious (Hox, 1995). A standard solution to such a problem is to use robust methods for estimating the standard errors. Hence, multilevel models are more appropriate. In this model, two levels of measurement are estimated. One equation capturing MFI level of measurement and other capturing country variables.

Outreach and Sustainability Models

In the first stage, lower level (MFI characteristics) is specified as:

$$OUTR_{ijt} \text{ or } SUST_{ijt} = \beta_{0j} + \beta_{1j}Reg_{ij} + \sum_{m=1}^{5}\beta_{2m}Z_{ijt} + \varepsilon_{ijt} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\textbf{(5)}$$

In the second stage, the units of analysis are groups:

$$\left.\begin{array}{l}\beta_{0jt} = \beta_{00} + \sum_{n=1}^{3}\beta_{01\_k}CV_{jt} + \mu_{0jt} \\ \beta_{1jt} = \qquad\qquad \beta_{10} + \mu_{1jt}\end{array}\right\} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\textbf{(6)}$$

Substituting equation 6 into 5 and rearranging gives us the final reduced form in equation 7.

$$OUTR_{ijt} \text{ or } SUST_{ijt} = \beta_{00} + \sum_{n}^{3}\beta_{01_n}CV_{jt} + \beta_{10}Reg_{ijt} + \sum_{m=1}^{5}\beta_{2m}Z_{ijt} +$$
$$\mu_{0jt} + \mu_{1jt}Reg_{ijt} + \varepsilon_{ijt}\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (7)$$

This final equation (7) random-effects model. The first row of the reduced form model can be thought of as the "fixed effect part" because their coefficients are specific, whereas the last row on equation (7) represents the "random effect part because their coefficient are based on changes in the countries MFIs are located.

Data and Sample Size Justification

The empirical data for this study is from the MIX Market on SSA countries (www.mixmarket.org), a nongovernmental organization that aims to promote information exchange and transparency in the microfinance industry. Such data contains the best publicly available cross-country data on individual MFI's balance sheets and performance indicators. MFIs also report outreach and administrative measures to the MIX, which are accessible through their database. Again, the MFIs are selected based on the quality and extent of their

data. It provides detailed information on financial, operational and social performance of MFIs worldwide. Using the MIX data in addition is said to be the valid data because researchers worldwide on MFIs uses it comprehensively and the data determines and limits their businesses and products, and specifies criteria and standards for the sound and sustainable operations of MFIs (Chaves & Gonzalez-Vega, 1992; Gallardo, 2002; Seelig & Novoa, 2009) For the empirical analysis, the dataset consists of annual data on MFIs in 30 SSA countries collected from the MIX database 2014. The data year spans from 2002 to 2012. In addition, the study also uses data from the World Bank Data Indicators and World Governance indicators for country characteristics. Using data from World Bank website was to look for where information on country specific variables such as the GDP per capita and Inflation rate from the online data stream. In addition, data on regulatory quality were extracted from the 8th edition of the Governance Matters report where five other dimensions of governance are measured between 2002 and 2012.

The sample size for the study is unbalanced panel constituting 30 countries and 576 MFIs, which gives a total of 1237 sample size. Upon managing the data and accounting for unique/missing values in the sustainability and outreach indicators, final sample size for study dropped from 1237 on sustainability and outreach indicators. The differences are given below:

➢ Sustainability (OSS) sample size = 1229 observations. This constitutes 30 countries and 360 MFIs
➢ Outreach (PFB) sample size = 968 observations. This constitutes 30 countries and 317 MFIs
➢ Outreach (ALBPB) sample size = 1122 observations. This constitutes 30 countries and 330 MFIs
➢ Outreach (NAB) sample size = 1130 observations. This is made up of 30 countries and 330 MFIs

Definition and measurement of variables
Table 1 presents the definition and measurement of the variable for the study.

[INSERT TABLE 1]

RESULTS.
Table 2 presents descriptive statistics of variables used in estimating the effect of regulation on MFIs Outreach and Sustainability in SSA. The mean and standard deviations measures the averages of the variables and the spread around the mean values respectively, while the minimum and maximum captures the range of variables used in the analysis. The standard deviations in Table 2 is averagely smaller than the mean values of the variables with the exception of average loan balance per borrower (ALBPB), this is an indicative that there isn't grater variations in our variables for the study. This is shown in Table 2.

[INSERT TABLE 2]

MFI's Outreach by Regulatory Status
Figure 1 shows the extent of outreach by microfinance institutions using different measures. On the average, at one percent significance level, it is evident that regulated institutions decrease depth of outreach but increase breadth of outreach than non-regulated institutions. That is, regulated institutions offer higher larger loan sizes (ALBPB, 1.269) than non-regulated institution (ALBPB, 0.574). And this is also evident as regulated institutions on the average serve fewer women (PFB, 0.577) than non-regulated institutions (PFB, 0.685). This could mean that regulation can be seen associated with additional cost to the institutions and

these institutions may try to look for means to cover such cost for which some of the MFIs may end up marginalizing the poor as a way of overcoming their cost (Staschen, 2010).

On the contrary, regulated MFIs, on the average have higher breadth of outreach (NAB, 9.211) than non-regulated MFIs (NAB, 8.998). This could add to the fact raised previously that regulation is associated with an additional cost to the financial institutions and this compel the institutions to cut off the pro-poor or marginalize the pro-poor and end up serving the marginal poor which leads to increase in the breadth of outreach as revealed in the study.

[INSERT FIGURE 1]

In the regression analysis, this paper set forth to study the effects of regulation on MFIs sustainability and outreach using a multilevel estimation technique to address problem of heterogeneity in data. To this end, MFIs indicators of sustainability (OSS) and outreach; Average Loan Balance per Borrower (ALBPB), Proportion of Female Borrower (PFB), Number of Active Borrower (NAB) and were regressed on regulatory variables, and MFIs characteristics such as age, type of MFI and other covariates of MFI as indicated in Table 3

[TABLE 3]

Post-estimation tests such as the likelihood-ratio (lrtest) and intraclass correlation (ICC), normality test were conducted to test for model specification and goodness-of fit respectively. The lr test results show that the model is correctly specified and suggests that the model is of good-fit. This is an indicative that there is a statistically significant difference between a simple regression model and the use of multilevel estimation technique for this study. Implying that, choosing the multilevel estimation for this analysis is deemed appropriate and the random coefficients model provides a better fit. With regard to the inter-class correlation coefficient (ICC) for the two model indicators, sustainability (17.2%) and outreach (35.12%, 21.58% and 23.06%), show the reliability of the results. That is, the conditional assumption that the random country effect is not different from zero, which indicates the correlation of measurements within the same individual and the proportion of variance explained by the individual random effect. The study fails to accept such assumption that the conditional assumption of random country effect is not different from zero. A normality test also conducted in the residuals to detect if the errors follow a standard normal distribution, since the errors are expected to be normally distributed in any good-fitting model. The normality test on the residuals show that the predicted errors are normally distributed around the mean.

Regulation in the study is meant all forms of regulation that an MFI is subject to and it is measured as a dummy, indicating that whether the MFI is regulated or not. Taking cognizance of the nature of the hierarchical nature of the data, we began estimating a single equation by employing a two stage level analysis to offset clustering effect problem likely to bias the result of the models. The study focuses on one main variable - regulation - and how it affects the outcome of MFIs sustainability and outreach.

Compared to non-regulated institutions, regulating additional MFI leads to 0.089 units higher in sustainability. This means, regulated MFIs are better off than non-regulated institutions in terms of sustainability. This is in consonance with public interest theory of regulation and supports Cull et al. (2009) and Okumu (2007). We found that in the short term regulation positively affects the sustainability of MFIs. However, this finding contradicts the findings of (Hartarska & Nadolnyak, 2007) who found that regulation does not directly affect the sustainability of the MFIs. From the depth of outreach result, the study shows that

regulation is negatively related to the depth of outreach as indicated by a negative sign to PFB and positive sign ALBPB at 10 percent significance level. Regulating one more MFI is associated with a reduction in PFB by 0.061 units lesser than non-regulated MFIs and increases in ALBPB by 0.552 units higher than non-regulated MFIs all other things being equal. The results show that regulated MFIs are likely to charge /or offer larger amount of loan sizes to their clients as well as decreasing the extent of outreach services they offer to their female clients. This result is in consistent with the study by Okumu (2007) and Kablan (2013) who argue that reforms (regulation) decrease outreach (depth) while financial sustainability increases. But this result fail to confirm that of Pati (2012) which confirms that regulation does not significantly affect the performance of MFIs activity. However, the breadth of outreach result reveals that regulation significantly and positively affects the breadth of MFIs outreach. At 5 percent significance level, regulating one more MFI is associated with 44.1 percentage points increases in number of active borrowers (NAB) than non-regulated institutions holding all other variables constant across country and overtime. This indicates that regulation increases the breadth of outreach for regulated MFIs. This finding confirms Mawumba (2012) who argued that regulation significantly affects the outreach of MFIs. These findings could also be associated to what pertains in literature, that regulation comes with additional cost (Staschen, 2010), so when the institutions are regulated it becomes expensive for them to serve poorer clients hence cuts off the active poor clients and end up serving marginal poor clients.

On the relationship between perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development, it is found that regulatory quality significantly and positively improves the sustainability of MFIs, regulatory quality also has a positive sign across all the outreach indicators but significant in the depth of outreach. A unit increase in regulatory quality is associated with 0.147 unit increases in sustainability, 0.548 unit increase in proportion of female borrowers and 0.038 increase in average loan sizes at a 5 percent, 10 percent and 1 percent significance levels respectively. Thus, the effectiveness of government in contributing to the development of private institution development is seen crucial as indicated by the result. This result however fails to confirm the work of Barth et al., (2004) who postulates that there is no evidence of positive impact of higher regulatory power on financial institutions performance and evaluation.

With reference to new institution young institutions are less sustainable by 0.089 units at 5 percent significant level. Lower and matured institutions are more sustainable at 1 percent significance level by 0.072 units higher than new institutions respectively. Only matured institutions are significant in both the PFB and the ALBPB model. However, the result is a bit puzzling. At 10 percent, matured MFIs decrease their outreach of PFB by 0.009 units lower than new institutions holding all other variables constant. This indicates that, matured institutions end up serving the marginal poor at the expense of the active poor. In the PFB model, matured institutions are seen to decrease the extent of their outreach to women borrowers. However, the scenario is different in the ALBPB model, as matured institutions offers smaller loan sizes than new institutions. This is evident in the result with a negative coefficient in the ALBPB, although not significant. Age of the institution in the breadth of outreach result indicates that at 1 percent significance level, young institutions decrease number of active borrowers by 57.9 percentage points lower and matured institutions at 1 percent significant level increase number of active borrowers by 67.2 percentage points higher than new institutions respectively all other variables remaining constant across country and overtime. This finding could imply that as MFIs thrive long in the industry, the likelihood for such institutions to serve wealthier clients is likely to be anticipated. And this could be contributed to why matured institutions decrease outreach to women and are more

likely to be sustainable. The result indicates that the longer institution thrive in the industry, the least likelihood for the institution to serve poorer clients.

Controlling for interest rate, deposits, and capital, the study found that a unit increase in interest rate, deposits, and capital leads to 0.335, 0.187 and 0.317 points increase in OSS at 1 percent significance levels respectively across country and over time all other things being constant. Hence, MFIs that take deposit from the people are more likely to be sustainable than non-deposits taking MFIs. In addition MFIs with larger capital base is seen to improve their sustainability level. GDP/Capita and inflation were all significant at 10 and 5 percent respectively. A dollar increase in GDP/Capita and inflation, leads to a 0.091 and 0.004 points increase in the sustainability of MFIs respectively. This shows that in times of higher inflation, most MFIs have developed strategies to improve their activities (Hartarska & Nadolnyak, 2007). In the depth of outreach model interest rate, deposits, and capital are significant in the PFB model results. At a 1 and 10 percent significance levels, a unit increase in interest rate and deposits, leads to 0.138 unit increase and 0.049 unit decrease in PFB respectively holding all variables constant. The positive relation in the interest rate and women reached by MFIs could add to the notion that women are less sensitive to interest rate and are ever ready to pay for rates charged on loans. In the ALBPB model results, at 1 significant level, a unit increase in interest rate, capital is associated with a 0.996 decrease in ALBPB and 0.027 points decrease in depth of outreach in ALBPB model respectively holding all other factors constant across country and overtime. Hence, deposit taken institutions are seen to cut off poorer clients. One striking feature is that institutions with bigger capital base are seen to decrease depth of outreach. And this could mean that such institutions are rather serving the marginal poor in an attempt to increase profit. Other covariates such as type of MFI, region of operation, GDP/Capita play significant role in the sustainability and outreach results.

Discussion
The association between regulation and MFIs core objective (outreach and sustainability) has been explored by researchers in with different methodology. In view of this evidence, the current study sought to investigate the effect of regulation on MFIs outreach and sustainability in SSA using a multilevel methodological approach in a region which has received little attention in terms of research on the topic. The study revealed that regulation indeed affects the activities of the microfinance institutions in SSA. That is, regulation affects MFIs core objective in terms of sustainability and outreach. The study again revealed that MFIs activities in SSA could improve sustainably when the institutions are regulated. In addition, the study further revealed that regulation id likely to associate with additional costs and this compels some of microfinance institutions to cut off from serving poorer clients as evident in the results on a decrease in depth of outreach but positive to the MFIs sustainability. As a result, it is evident that institutions that marginalise the poor end up widening their breadth of outreach by serving wealthier clients. Again, deposit taking institutions are seen to be sustainable and serve fewer poorer clients. The depth of outreach model revealed that regulation decreases depth of outreach which is evident by the two measurements of breath of outreach (Average Loan Balance per Borrower and Proportion of Female Borrowers).

Conclusion and Recommendations
Regulation does good to the microfinance institutions by ensuring sound financial positions by the MFIs but the likelihood for the institutions goal or core objective to be shifted is likely to manifest. This is so because regulation and the depth of outreach have negative relationship. In addition, effort by government to ensure sound and conducive environment to

enhance private investment activities was also seen to contribute immensely to the development of MFIs activities. This was evident in the quality of regulation as the quality sees to improve the sustainability of the MFIs and also improves outreach positively. Finally, the study revealed that institutions that accept deposits from the poor people are more sustainable but such institutions tend to serve the marginal poor people.

On the basis of the above findings and conclusions of this study, it is clear that microfinance sector is having a great expansion and performing quite well in SSA. This expansion in scale and services increase the need for regulation in the sector (SSA). The concern of the regulatory authority is the security of the people's deposits and the soundness of the financial market. it is recommended that regulatory authorities, should apply prudential regulation to microfinance institutions when: they mobilize deposits from the general public in order to strengthen such MFIs financial position so as to safeguard clients deposits and non-prudential regulation should be apply to care more on lending efficiency, consumer protection and sector development to ensure enabling atmosphere that will enhance the achievement of microfinance social objectives. Finally, it is also recommended that regulatory authorities should improve their quality of regulation such as strengthening their old existing rules: staffing appropriate staffs where needed; ensuring that authorities trust with duty execute them properly through monitoring mechanism just to mention few, than implementing new rules without the capacity to manage it would not be of great help to the microfinance institutions. But ensuring appropriateness and the quality wise in regulation will go a long way to improve and ensure efficiency in the microfinance institutions activities in Sub-Saharan Africa.

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Correlation Matrix for the Explanatory Variables

	Regulated	Age	Region	MFI type	Rate	Deposit	Regulatory quality	GDP/Capita	Inflation
Regulated	1.000								
Age	0.068*	1.000							
Region	-0.097***	-0.086***	1.000						
MFI type	0.3867**	-0.0278**	0.0218***	1.000					
Rate	-0.165***	-0.174***	0.264***	-0.0565***	1.000				
Deposit	0.216***	0.099***	-0.179***	0.3305***	-0.133***	1.000			
Regulatory Quality	-0.187***	0.012	-0.131***	-0.0150*	0.175***	-0.099***	1.000		
lnGDP/Capita	-0.011	0.033	-0.107***	0.0333**	0.205***	0.148 ***	0.328***	1.000	
Inflation	-0.113***	-0.039	0.089***	-0.0861***	-0.139***	-0.158***	-0.083***	-0.272***	1.000

*p<0.10 **p<0.05 ***p<0.01
Source: Computed   from   MIX   Data,   WGI   and

APPENDIX B

Country	Regulatory Status		
	Not Regulated	Regulated	Total
Angola	2	5	7
Benin	4	70	74
Burkina Faso	3	45	48
Burundi	1	12	13
Cameroon	4	45	4
Central African Republic	1	4	5
Chad	0	7	7
Congo, Democratic Rep	5	28	33
Congo, Republic of the	2	9	11
Cote d'Ivoire (Ivory)	3	35	38
Ethiopia	2	91	93
Ghana	25	112	137
Guinea	2	16	18
Kenya	49	40	89
Madagascar	0	45	45
Malawi	6	21	27
Mali	3	58	61
Mozambique	19	30	49
Namibia	5	3	8
Niger	2	17	19
Nigeria	5	56	61
Rwanda	7	38	45
Senegal	0	67	67
Sierra Leone	6	8	14
South Africa	1	14	15
Swaziland	2	5	7
Tanzania	28	22	50
Togo	1	52	53
Uganda	20	52	72
Zambia	1	19	20
Zimbabwe	1	1	2
Total	**207**	**1030**	**1237**

Variable	Definition	Measurement	A priori sign		
			NAB	SUS	PFB/ALBPB
Regulation	Regulatory status	Dummy	+	+	-
Interest Rate	Real gross portfolio yield for interest rate	Continuous	+	+	+/-
Deposit	Ratio of saving to total assets	Continuous	-	+	-
Capital	Ratio of total equity to total assets	Continuous	+	+	+
Regulatory Quality	Government effectiveness to strengthen private institutions	Continuous	+	+	+
lnGDP/Capita	Logarithm of GDP per capita in constant 1995 US dollars	Continuous	+	+/-	+/-
Inflation	percentage of change of the GDP CPI	Continuous	+	+/-	+
MFI type	Type of microfinance institutional	Dummies	+	+/-	+
Region	Regional Dummies	Dummies	+	+/-	+
Age	Age of Institutions	Dummies	+/-	+/-	+/-

Source : Author, 2015

Table 2 Summary Statistics for Variables used for the Analysis

| Variable	Observation	Mean	Standard Deviation.	Minimum	Maximum
OSS	1229	1.064	0.454	-0.391	8.416
PFB	968	0.596	0.253	0.004	1.256
ALBPB	1122	1.183	2.406	0.001	42.667
lNAB	1130	9.156	1.680	2.398	13.595
Regulatory Status	1237	-	-	0.000	1.000
Age	1255	-	-	1.000	3.000
Region	1229	-	-	1.000	5.000
MFI type	1227	-	-	1.000	3.000
Rate	1229	0.271	0.231	-0.247	2.762
Capital	1227	0.295	0.353	0.005	1.000
Savings	1229	0.416	0.361	0.000	5.702
Regulatory Quality	1229	0.493	0.400	-2.053	0.778
lnGDP/Capita	1229	6.181	0.613	4.892	8.680
Inflation(CPI)	1225	8.836	6.982	-8.975	44.391

Computed from MIX Data, WGI and WDI, 2002-2012
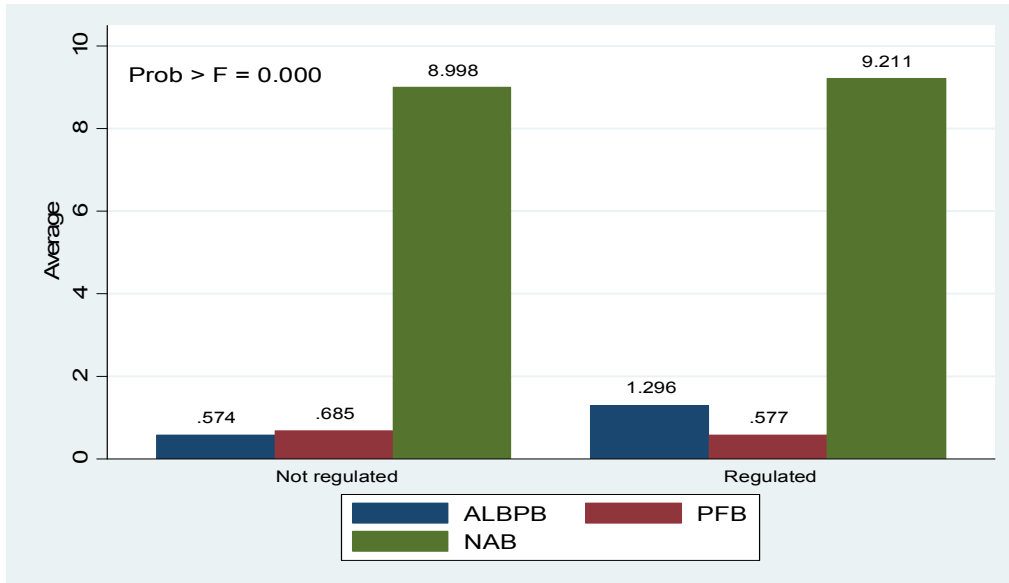
Figure 1: Outreach by MFIs Regulatory status
Source: Computed from Mix Market data from 2002-2012

Table 3: REGRESSION RESULTS

	DEPENDENT VARIABLES			
	OSS	PFB	ALBPB	lNAB
Explanatory Variable (Fixed Parameters)				
Regulated	0.089**	-0.061*	0.552*	0.441**
	(0.044)	(0.034)	(0.316)	(0.220)
Age of Institution (Base= New Institutions)				
Young institutions	-0.089**	-0.008	0.006	0.579***
	(0.036)	(0.024)	(0.215)	(0.164)
Matured institutions	0.072***	-0.009*	-0..152	0.672***
	(0.027)	(0.005)	(0.162)	(0.110)
Region(Base=Western)				
Eastern	0.042	-0.075	-0.434	0.430***
	(0.061)	(0.050)	(0.449)	(0.068)
Central	0.086	-0.266***	1.155**	0.252
	(0.065)	(0.051)	(0.474)	(0.365)
Southern	-0.177***	-0.130	0.257	0.107
	(0.066)	(0.053)	(0.471)	(0.375)
Indian Ocean island	0.019	-0.176	0.077	0.264
	(0.144)	(0.134)	(1.268)	(0.836)
MFI type(Base=NGO)				
NBFI	0.025	-0.154***	0.304	-0.248*
	(0.032)	(0.020)	(0.170)	(0.131)
Banks & Rural Banks	0.110**	-0.219***	0.740***	0.349**
	(0.043)	(0.019)	(0.160)	(0.177)
Interest rate	0.335***	0.138***	-0.996***	-0.059
	(0.056)	(0.043)	(0.352)	(0.239)
Deposits	0.187***	-0.280*	0.027*	-0.467**
	(0.050)	(0.036)	(0.013)	(0.227)
Capital	0.317***	-0.049	-1.064***	-0.334
	(0.049)	(0.034)	(0.222)	(0.206)
Regulatory Quality	0.147**	0.548*	0.0385***	0.393
	(0.064)	(0.264)	(0.038)	(0.206)
GDP/Capita	0.091*	-0.099**	-0.440	0.196
	(0.055)	(0.045)	(0.397)	(0.299)
Inflation	0.004**	0.002*	-0.009	-0.002
	(0.002)	(0.001)	(0.012)	(0.008)
Constant	0.105	1.341***	4.374	7.049***
	(0.331)	(0.265)	(2.338)	(1.790)
Random Parameters				
Regulation	0.015***	0.015***	1.150***	0.447*
	(0.006)	(0.006)	(0.154)	(0.215)
Constant	0.012***	0.010	0.015**	0.127**
	(0.002)	(0.005)	(0.006)	(0.115)

Residual	0.133***	0.046***	4.234***	1.915***
	(0.005)	(0.002)	(0.138)	(0.831)
Sample Size	1229	968	1122	1130
Standard Errors in parentheses				
* p<0.1, ** p<0.05, *** p<0.001				
lr test chi2(2)	37.58	48.42	130.10	72.43
Prob>chi2	0.0000	0.0000	0.0000	0.0000
ICC	17.2%	35.12%	21.58%	23.06%