THE EFFECT OF SERVICES OF MICRO FINANCIAL INSTITUTIONS ON THEIR FINANCIAL PERFORMANCE: A VIEW FROM GHANA

Christine Avortri[1], Prof. T. B. Wereko[2]

[1]PhD Candidate, Banking and Finance Department, University of Professional Studies, P.O. Box LG 149, Legon, Accra, Ghana, Corresponding Author

[2] Dean of Business, Accra Institute of Technology, Accra- North, Ghana

ABSTRACT

The rampant collapse of Microfinancial institutions in Ghana in recent times justifies investigation into the effect of the core services (micro-credit and micro-savings) on their sustainability. The study assesses the effect of the core services namely: micro-credit and micro-savings on the sustainability of Microfinancial Institutions.

The study was conducted in Ghana using unbalance panel data from a sample 16 selected Microfinancial Institutionsin the country which had reported to the Microfinance Information Exchange Market for a seven year period. The study adopted quantitative approach and used the Pooled Prais-Winsten regression with correlated panels corrected standard errors (PCSEs) in analysing the data.

The study found that micro-credit, age, regulatory status, financial intermediation and outreach had positive and statistical significant effect on operational self-sufficiency. However, micro-savings, size, diamond rating and profit status had negative and statistical significant effects on operational self-sufficiency. The study also found that age and target market had positive but outreach had negative statistical significant effect on portfolio at risk. Both micro-credit and micro-savings have weak positive and insignificant effect on portfolio at risk.

The findings of the study have several implications for researchers, managers and Policy Makers and specific recommendations are that Managers of MFIs should manage key intervening factors like outreach, size, profit motive and adhere to regulatory requirements so as to enhance their sustainability. Also Managers should reduce cost associated with mobilizing micro savings through the use of technology and money box.

Keywords: *micro-credit; micro-savings; Operational self- sufficiency; Portfolio at risk; Sustainability*

1. INTRODUCTION

Microfinance has been generally accepted as a developmental tool (Augsburg, 2009; Ibtissem and Bouri, 2013) and widely adopted by developing economists as such. According to Simanowitz and Brody (cited in Bank of Ghana Report, 2007), micro-financing (MFs) is also a promising tool for reaching the Millennium Development Goals (MDGs) and for building global financial systems that meet the needs of the less privileged.

In Ghana the rampant collapse of MFIs of late has raised the concern of all stakeholders as itthreatened the attainment of these goals. Thus ways must be found to make these institutions sustainable. This is because it is only sustainable institution that can deliver services in sustainable ways to meet the needs of their clients and those of MDGs. The core business of MFIs is to develop methods that can enable them to extend financial services to the hitherto un-bankable.However, in Ghana,like most countries, the regulatory framework of MFIs does not allow all the various categories of MFIs to accept deposit. There is the need to research into the core services (micro- credit and micro-savings) to assess the influence they exert on their sustainability and to identify the influence each of these services individually exerts on the financial performance of MFIs.

1.1Statement of Problem:

The performance of Microfinancial institutions has been of great concern to all stakeholders of which Ghana is no exception. This is because Microfinancing hasgained reputable acceptance from all sectors as a development tool (Boateng andAdjei, 2013) and has also become part and parcel of the financial system of Ghana. The rampant collapse of MFIs in the country is therefore a great worry to all stakeholders and has attracted several national debates.The importance of having sustainable MFIs has been re-affirmed by Nyamsogoro (2010) cited by Gashayie and Singh (2015) that it is better not to have MFIs at all than having those that are unsustainable. This view has attracted attention of many researchers, development practitioners, organizations and governments of developing nations to research into how to enhance performance of the Microfinance Sector. As pointed out earlier, the core business of MFIs is to develop methods that can enable them to extend financial services to the hitherto un-bankable. However, in Ghana like most countries, the regulatory framework of MFIs does not allow all the various tiers/ categories of MFIs to accept deposit. Meanwhile, the findings of Nyamsogoro (2010); Khachatryan (2013) and Rossel-Cambier (2012) Hartarska, Parmeter and Mersland (2011) established that Product types affect the sustainability of MFIs. Also Kipesha and Zhangi, (2013), citedCGAP, 2004 which stated thatMFIs are likely to achieve sustainability and profitability, when they offer better products and services that meet clients' needs.

Though, considerable studies have been undertaken, they were mostly focused on determining either factors affecting performance of MFIs or assessing the effects of other varied variables, such as age, capital structure, corporate governance, legal status and outreach just to mention a few on the financial performance of MFIs services (Sekabira, 2013; Quayes, 2012); Kipeshaet al, 2013; Zerai and Rani, 2012; Rai, 2012; Nyamsogoro, 2010 and Kipesha, 2013). Only limited studies have been conducted on the effects of the core products of MFIs on their sustainability (Hartarskaet al, 2011; Khachatryan, 2013; Rossel-Cambier, 2012 and Kinde, 2012). Even with these studies the focus are on how micro-savings combined with micro-credit help to promote the sustainability of MFIs or reduce default rate and not on estimating the effect of each of these services. The study of Hartarska, Parmeter and Mersland (2011) concluded that financial performance of MFIs varies across the type of services and country where the MFIs operate.This studytherefore fills the gap in

knowledge by examining the effect of these core services on the financial performance of MFIs in Ghanaian context.

Addressing the gap will be useful to the industry and other stakeholder since it will bring to light which of the core services provided is more crucial to the sustainability of the MFIs.It will also bring to the attentionof MFIs' managers especially those which offer combined services toformulate policy and strategies that can help reduce the associated cost and risk relating to each service. In addition, it will also point out the stakeholders if service diversification is crucial to the sustainability of MFIs.

1.2 Purpose of the Study/ Research Question/Objective

The purpose of this study is to investigate the effect of micro-credit and micro-savings on the sustainability of MFIs.The objective of the study is to examine the effect of micro-credit and micro- savings on the financial performance of Microfinancial institutions. Relating to the objective, the research question is stated as follow: What is the effect of micro-credit and micro- savings of the financial performance of Microfinancial institutions?

1.3 Definition of Terms

Financial performance: Financial performance of MFIs is viewed from two ways. That is profitability and sustainability of the institution. The profitability measure focuses on shareholders' wealth which is mostly measured by return on asset and return on equity. It shows the ability MFIs generates excess funds for reinvestment and expansion (Kipeshaet al, 2013; Kar and Swain, 2013). The sustainability measure focuses on the survival of the MFIs to continue to render services that meet the needs of their clients. It therefore, refers to the ability of MFIs to generate revenue to cover their cost of operation without depending on external subsidies (Kipesha and Zhang, 2013). According to Khachartryan(2013)and Kinde 2012) Sustainability is measured at two levels. That is, financial sustainability and operational sustainability. The financial sustainability is a measure of the ability of MFIs to cover cost of operation from operating revenue and unsubsidized capital (Kipeshaet al, 2013).

Operational sustainability is a measure of the ability of MFIs to generate revenue through its operation to cover their cost of operation regardless of whether it is subsidized or not (Meyer, 2002 cited in Kinde, 2012). It is therefore a break-even measure where total revenue equals total operating cost. The standard measure according to Khachartryan (2013) includes operational self-sufficiency and portfolio at risk. The focus of this study is on sustainability of MFIs. For the purpose of this studyoperational sustainability, is used as a measure of the financial performance of MFIs. This is in line with the view of Kipeshaet al (2013), who stated that sustainability of MFIs is a step towards profitability and this starts with operational sustainability. Two key proxy indicators of operational sustainability are operational self-sufficiency and portfolio at risk > 30 days as indicated by Khachartryan (2013). At least one of these proxies have been used by other researchers like (Kipeshaet al, 2013; Karet al, 2013)

Micro credit

Micro credit is the various loan products offered by a lending institution to its customer (MicroBanking, 2009).The Natural logarithm of total gross loan portfolio was used as a proxy for micro credit. This is because the loan portfolio of lending institutions is a measure of the different credit products offered by them to their

customers. Also Vingo (2012) found that gross loan portfolio relates positively to sustainability of MFIs and was used by Tehuru, (2013) as a proxy for micro credits.

Micro-savings

Ledgerwood (2002 cited by Khachatryan, 2013) define saving as putting aside a certain sum of money to be accessible in the future in exchange for a series of savings made now.According to Khachatryan(2013), it could be compulsory or voluntary savings. The various savings products and the amount deposited in the accounts constitute the total deposit of any deposit taking institution. For the purposes of our study, the Natural logarithm of total deposit was used as proxy indicator for micro-savings.

2. LITERATUR REVIEW

This sub-section presents review of theories that underpin the theoretical bases of the study. It also reviews empirical literature that indicated the gaps in literature.

2.1. REVIEW OF THEORIES
The Theory of Economies of Scale
The Theory of Economies of Scale is a theory which is of interest to the study. This theory has been accredited to the renowned Economist, Alfred Marshall who devoted several pages in his Book, Principles of Economics to the discussion on the Internal Economies of Scale (Marshall, 1910). Marshall postulated that there is positive relationship between scale of production and efficiency which ultimately translates to decreasing cost of production. According to him large scale production promotes different economies of scale such as economies of skills, economies of machinery and economies of material. With the economies of machinery, Marshall was of the view that firms which engage in large scale production will keep the utilisation of their equipment steadily high. Since such machines are fixed full utilisation will result in reduction in per unit cost of production. Such large scale firms also have more resources to spend and have easy access to credit and other related benefits. The economies of skill relate to large labour force and therefore stand to benefit from specialisation and division of labour.

He was quick to add that firms also do benefit from what he referred to as external economies as well. These are positive externalities shared by all firms in the industry. It is larger external changes in government policies, infrastructure, social amenities and technological development that are shared by all firms. He however, pointed out that internal economies of scale is firm specific and therefore gives greater competitive edge to firms.

He also touched on the age of the firm. To him firms that have existed for long can have better access to resources and have greater economies of scale.

His theory has been critiqued by writers like (Witaker, 1987) who were of the view that Marshall's theory can best be practised in imperfect or monopolistic market and not in modern perfect market (Lavizzi, 2001). Notwithstanding this criticism, Khachatryan (2013) applied this theory in his study. This theory is applicable to our study because our main focus is to examine the effect of micro-savings and micro-credit on the financial performance of MFIs by controlling for size of the firm.

The Industry Life Cycle Theory (Alfred Marshall)

This theory has also been accredited to the work of Alfred Marshal. He postulated that the performance of industry should be viewed over time. The theory divide the life cycle of industries into five stages namely: the pioneering development stage; rapid accelerating stage; Mature growth stage; stabilization and market maturity and Deceleration of growth and decline stage. With this theory the first three stages (the pioneering development stage; rapid accelerating stage; Mature growth stage) of industry life experiences progressive increment in performance but decline in performance from the last two stages (stabilization and market maturity and Deceleration of growth and decline stage). This theory is applicable to the study because, the age of the firms is included in the financial model as controlled variable.

2.2.Empirical perspectives

This sub section focuses on review of work of prior researchers in order to sharpen the focus of the study as well as to establish gaps.

Kipesha(2013), studied the impact of size and age on the performance of MFIs in Tanzania. The study used panel data of five years of 30 MFIs in Tanzania. The study indicated positive impact of firm's size which was measured by total assets and number of borrowers. The study also found positive impact between the age of the MFIs and efficiency, sustainability and revenue level but negative impact on profitability. He concluded that both size and age impact on the performance of MFIs. His study however found negative relationship between size, measured by staff size and efficiency, sustainability and profitability.

Although his study examined the impact of a number of factors indicated above and established their relationship and impact, it did not consider the effect of the main products offered by the MFIs on their performance. This study therefore fills these gaps by establishing the effect of services offered by Microfinancing being measured by micro-credit and micro-savings on their financial performance.

Vingo (2012), Studied the effect of capital structure on performance of Microfinancial Institutions. He carried out a cross- country analysis and a case of Vietnam. The ordinary Least Squared Method was used to link capital structure to performance of MFIs. The study established that leverage in case of profit- making MFIs has significant effect on their sustainability. This confirmed the findings of Kar (2011) that increasing leverage increases the profitability of MFIs. The study concluded that debt including savings mobilization is increasingly becoming preferred source of funding for profit- making MFIs. He also established that Regulated MFIs which are profit oriented and used more commercial funds are more sustainable. The findings again revealed that Gross loan portfolio is positively related to Sustainability as well as profitability. The study concluded that increased in outstanding loan is likely to promote internal economies of scale which will enable MFIs to achieve higher self-sufficiency.

Although Vingo(2012) discussed wide range of issues relating to Microfinancing, the study did not discuss any theory in the literature review to provide theoretical base for the study. Beside the methodology indicates panel dataset was used, but it failed to mention the number of MFIs sampled as well as the year range. In relating the scope of operation of MFIs (services offered) the study used only gross loan portfolio though Micro-savings (deposit) has equally become an important product offered by MFIs. This study fills these gaps by including micro-credit (deposit) in the scope of operation as well as the credit implementation processes. It

also discusses the theory of economies of scale, the stakeholder theory and Industry Life Cycle theory to form the theoretical base of our study.

Sabhatu (2011) studied Management of Savings and Credit Cooperatives in Ethiopia by identifying factors which affect the performance of Savings and Credit Cooperatives. The study used qualitative methods and identified the following as factors that affect the outreach and sustainability of savings and credit Cooperatives in Ethiopia: lack of awareness and poor savings culture, weak organizational arrangement and governances, policy and regulatory environment, lack of differential products, weak institutional capacity and low capital baseamong others.

Furthermore, although the study identified lack of differential products as one of the factors that affect outreach and sustainability of savings and credit Cooperatives; like Kinde (2012),it only identified factors butfailed to carry out scientific analysis to establish the effect of these products on the performance of the institutions.

Magali(2013) sought to investigate whether the rural Savings and Credit Cooperatives Societies (SACCOS) in Eastern, Central and Northern zones of Tanzania were still sustainable after the phasing out of capacity building projects in 2013. The study applied qualitative and multivariate regression analysis and revealed that the SACCOS were not sustainable because of high NPL and failure to issue new loans from 2006-2013. However, deposit and age influenced sustainability positively which confirms the findings of Kipesha (2013). In addition loan size has significant effect on sustainability of MFIs such the larger the loan size the more sustainable the institutions. This because larger loan size reduces cost associated with loan screening and monitoring.

The study also revealed that savings and deposit to total assets influence outreach negatively. This is in line with the findings of Kar (2011) which shows negative impact of leverage on outreach but contrary to the findings of Khachatryan (2013) who found that institutions which offer deposit have wider coverage of outreach.

His study did not focus on the effect of the service offered by the institutions and therefore was not geared towards improving the performance of the MFIs but just to establish the state of affair of the institutions after the state's support was withdrawn.

Kar (2011) used panel dataset of 782 MFIs across 92 countries, and found decreasing leverage with the sustainability of the MFIs. Also, leverage had negative impacts on outreach. The study confirmed the agency theory by stating that increasing leverage raise the profitability of MFIs. This study like Kipesha (2013) considered the effects of debt and other variables on the performance of MFIs but not the core products.

Khachatryan (2013) linkedservices (micro credit and micro savings) and capital structureto the social performance and financial of Microfinance Institutions of Central and Eastern Europe and the New Independent state. He used Propensity Matching Score (PMS) to analyze the effects of how micro- saving combined with lending can help reduce default, hence promoting the sustainability of MFIs. The study found that Microfinance Institutions which accept deposits are more sustainable and cover wider outreach and this confirms the findings of Rossel-Cambier, 2012 but contrary to that of Hartarska, et al (2011). He

recommended that deposits should be encouraged since it is a better way to tailor better Microfinance services to the needs of the Microfinance service users. He also found that portfolio quality is on the average less risky for institutions that do not accept deposits compared to those which accept deposits. The focus of Khachatryan (2013) was on how savings when combined with lending can help reduce loan loss. Besides, the study used experimental model which is best used when the researcher has total control over the observed variables. But in social science one cannot have absolute control over the observed. More so the fact that researcher used secondary data means he had no control over the observed variables. This means the analytical model may affect the validity of the findings.

Hartarska, et al (2011), studied joint production of microloans and micro deposits on economies of scale of MFIs from over 50 countries. Their study adopted quantitative approach. They made use of semi-parametric smooth coefficient model to estimate a generalized cost function for a dataset from rated MFIs with over 777 annual observations on MFIs from over 50 countries. Their findings indicate that economies of scale are significant across both models since in both models, over 70 percent of the MFIs in the dataset experienced reductions in cost by offering both savings and loan services. They also find that not all MFIs that offer micro-savings are sustainable. They therefore argued that if delivery of savings is important from policy perspective, however, it should not be expected to promote financial sustainability of all MFIs in every environment. This finding is contrary to that of Khachatryan, 2013 and Rossel-Cambier, 2012, who established that combined service promotes sustainability of MFIs. This may be due to the differences in scope of coverage of the study area. Their result again showed that economy of scale varies across the type of services and country where the MFIs operate. This implies that the environment in which MFIs operate affects their cost economies. Another finding was that lending methodology affects the scope of economies, in such that MFIs using individual lending have higher scope of economies than those using group lending and village banks.

Though their study linked both services to performance of MFIs they found that not all MFIsfrom all countries are able to deliver micro savings in a sustainable manner, thus providing justification for such a study in Ghana.

Another study which examined the impact of combined multiples of financial products on performance of MFIs was carried out by Rossel-Cambier (2012). The study explored the impact of combined microfinance services (credit plus savings or insurance) on poverty outreach in Latin America and the Caribbean. The study adopted quantitative approach and sampled 250 MFIs covering the fiscal year of 2006. The study used OLS to estimate the impact. The findings revealed the impact of combined service on the depth of outreach is marginal though statistically significant at least one of the variables of interest (efficiency, productivity, sustainability or portfolio quality indicators). This is contrary to the findings of Khachatryan, 2013 who established that MFIs which offer microcredit combined with savings perform better in terms of outreach. However, like Khachatryan (2013) and Hartarska,et al (2011), outreach was used as a proxy for the social performance.

Kinde (2012) carried out research into factors affecting sustainability of Microfinance Institutions in Ethiopia. The study adopted quantitative approach using a balanced panel from 14 Microfinance Institutions over the period of 2002-2010.

Study revealed positive and significant effect of loan portfolio on sustainability of Microfinance Institutions. Kinde (2012) concluded that Microfinance Institutions should increase the number of borrowers so that they could increase the volume of loanable assets. Also they should increase the average loan size since that will improve financial sustainability. His study however, revealed negative relationship between number of borrowers and profitability. Kinde (2012) recommended further research into other aspects of Microfinance Institutions including Microfinance Institutions products delivery methodology. This is because more clients with larger loan enables Microfinance Institutions to enjoy economies of scale hence reduced cost which will lead to sustainability.Kinde, like Sabhatu (2011) and Tehuru only identify the factors affecting the sustainability of MFIs and not towards assessing the influence they exert on their sustainability.

Tehuru, (2013) studied in the financial determinants of sustainability of Microfinance Institutions in East Africa. He employed unbalanced Panel Data from 23 Microfinance services. Using, Binary and Ordinary Probit regression modelthe finding showed that micro-credit, measured by gross loan portfolio had positively significant effect on sustainability. The study however revealed that breadth of outreach and deposit mobilizations are not important determinants of sustainability of Microfinance Institutions. His study only considers financial performance and not social performance.

3. METHODOLOGY AND DATA
3.1 Data Description
This section describes type and source of data, population, sample size and justification.

The study examines the effect of micro-credit and micro-savings on the financial performance of MFIs in Ghana. The study adopts quantitative approach. It uses secondary data obtained from the Microfinance Information Exchange database (the MixMarket online platform 2013). The Microfinance Mix market is a platform where MFIs all over the world voluntary report their financial and operationaldata to. It is a credible source used by many microfinance researchers. The study sampled 16 of the 32 MFIs operating in Ghana which had reported to the platform. The selection of this sample size is based on the criterion that the institution should report at least three years within the years of study and must still be in operation as MFIs as at 2013 when data was obtained. Also must haveinformation on their credit products and pricing on the McrofinanceTransperency.org. The data obtained was unbalanced panel data such that some of the MFIs reported for just three years, whiles some for four years and abovefrom 2006 to 2012.

3.2 Model Specification and Estimation
The study use two indicators as proxies for services offered (natural log of gross loan portfolio as micro-credit and natural log of total deposit as micro-savings) as the independent variables. The study also uses operational self- sufficiency and Portfolio at risk greater than 30days as proxy indicators for sustainability of the MFIs (the dependent variables). The study controls for three categories of variables namely, industry benchmarking variable (diamond rating); group dummy variable (regulation) and institutional specific variables (age, size, profit status, Financial Intermediation, target market, scale and outreach). These variables are controlled based on discovery from literature and the result from the correlation matrix which shows significant relationship of these variables with the financial performance of MFIs. Detail explanation of these variables is captured under definition of variables.

We employed general panel regression analysis model which was expressed as $Y_{it} = \lambda + \beta X_{it} + e_{it}$ ………… (1)and was also used by Kipesha and Zangi (2013).

Where : Y_{it} = is the dependent variable, λ is the intercept term, β is a k x 1 vector of parameters to be estimated on the explanatory variables, X_{it} is the 1 x k vector of observations on the explanatory variables, t denotes time period t=1,…., T, i denote cross section i=1,…..,N.

Extending equation1, our empirical financial performance panel regressions model is captured below as:
$$Y_{it} = \beta_0 + \beta_1 \text{MicroCredit}_{it} + \beta_2 \text{MicroSavings}_{it} + \beta_3 (\text{MicroCredit}_{it} * \text{MicroSavings}_{it}) + \alpha_i CV_{it} +$$
$$\varepsilon_{it} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (2)$$

Where: $Y_{it} = \begin{bmatrix} \text{FIN\_PERF\_1} \\ \text{FIN\_PERF\_2} \end{bmatrix}$ is a 2 x1 vector of financial performance indicators where:

$$\text{FIN}_{\text{PERF}_1} = \text{operational self} - \text{sufficiency}$$

$$\text{FIN}_{\text{PERF}_2} = \text{portfolio at risk} > 30 \ days$$

$$\beta_0 = \text{an autonomous term}$$

$\beta_1, \beta_2, \beta_3$ are slope coefficients measring both the individual and interactive effects of micro-credit and micro-savings on financial performance of MFIs

$\alpha_i = \alpha_1, \alpha_2, \ldots \alpha_N$ represent slope coefficients of N control variables as captured below:

- ➢ Age of MFI measured ; New= 1, young =2, mature =3
- ➢ Size of MFI computed as natural logarithm of total assets and
- ➢ Diamonds rating; 1 = high diamond rating and 0 = otherwise
- ➢ Regulation ; Non-Regulated =0, Regulate =1
- ➢ Financial Intermediation ; HighFin Intermediation = 1 and 0 =otherwise
- ➢ Outreach ;   large =1 and 0 otherwise
- ➢ Profit Status ; Profit =1 ,0 if non-for-profit
- ➢ Scale level ; large scale =1 and 0 if otherwise
- ➢ Target market; HighTargetMarket =1, 0 if otherwise

In effect, the $CV_{it} = \begin{bmatrix} \text{Age} \\ \text{Size} \\ \text{D Rating} \\ \text{Reg Status} \\ \text{Fin Inter} \\ \text{Outreach} \\ \text{ProfitStatus} \\ \text{Scale} \\ \text{T Market} \end{bmatrix}$, representing a 9 x 1 matrix of control variables

e_{it} is defined as the error term.

Definition of variables and treatments

Micro credit: The study uses natural log of gross loan portfolio as micro-credit.The study also uses natural log of total deposit as micro-savings. These two variables have been used as proxies for services offered by MFIs because; they are the core services and are also under strict regulation and supervision by Bank of Ghana.AlsoVingo (2012) found that gross loan portfolio relates positively to sustainability of MFIs and was used by Tehuru, (2013) as a proxy for micro credits.Operational Self- sufficiency (FIN_{PERF_1}) measures the ability of the MFIs to cover its operating cost from revenue generated irrespective of the source of funds. Portfolio at risk greater than 30 days (FIN_{PERF_2}) is a standard measure of the MFIs' portfolio quality. These two variables are used as proxies for financial performance since Kharchatryan (2013) stated that they are proxyindicators for operational sustainability.Besides, Operational self-sufficiency was used by Kipeshaet al (2013) as a measure of financial performance and Portfolio at risk greater than 30days was used by Karet al (2013).Besides, the study controlled for age to allow for the possibility that age of the institutions will influence efficiency in managing cost associated with the core services offered. The age dummy grouped MFIs into three categories: New equal to one Young equal to two and Matured equal to three.The study expects age to be positively linked to sustainability of the MFIs.The binary variables Regulation and Profit motive are categorised into two. In the model one is equal toinstitutions that are regulated; for profit and zero is equal to Non-regulate and not –for- profit.The study also controlled for size measured by the natural log of total assets. These variables were also controlled by Karet al (2013) and Kharchatryan (2013).The study also controlled for financial intermediation as dummy variable. This is because MFIs which receive financial support in the form of subsidies, donation or grants will have access to cheaper source of funding. It was grouped into none, low and high. In the model one is equal to institutionsfinancial high intermediation and zero for otherwise. Target marketdummy is based on average balance of loan.It was grouped into four categories: Small business, Low-end, Broad- end and high-end.In the model high targetmarket (T market) is equal to one and zero otherwise. This variable was also controlled by Kharchatryan (2013). Diamond ratingdummy variableis how the various MFIs are rated in terms pricing transparency and following standard accounting reporting. It indicates proper internal control and efficiency which is likely to reduce possible operational risk therefore the study expects it to have positive effect on performance (MicroBanking, 2009). In our model one is equal to high rating (Drating). The next variables are outreach and level of scale. The outreach dummy variable indicates the poverty level of the different categories of client reached.Whiles level of scale measure indicates the number of poor the MFIs serve. It is measured by borrower per staff (MicroBanking, 2009) as large, medium and small.In the model one is equal to large (scale and Outreach) and zero if otherwise.

Diagnostic tests: To decide on which panel data parameter estimation will best suit our data, we performed series of diagnostic test related to panel data analysis. The study performed Hausman test in order to know whether the fixed effects model provided a better model fit over the random effects model or vice-versa. The p-value (≥chi square) of the Hausman test is p= 0.0065 ≤0.05. This implies that the fixed effects model provides a better fit for the models than the random effects model. We however, test for panel effects using Breusch-Pagan Lagrange multiplier (LM) to decide between random effects regression and a simple OLS regression. The results of the Breusch-Pagan Lagrange multiplier (LM) indicates that there is no evidence of significant differences across MFIs (no panel effect) (Prob, 0.1970>; chi-square1. 66 ≥0.05); meaning that the random effects model is not appropriate when compared with the pooled OLS model. We further tested for

the following: cross-sectional dependence/contemporaneous correlation using Breusch-Pagan LM test of independence, heteroskedasticity using modified Wald test for GroupWise heteroskedasticity, autocorrelation using the p-value of F statistics based on the Wooldridge test for autocorrelation for panel data is lesser than 0.05. The p-value of the test were less than 0.05 which shows the presence of cross-sectional dependence/contemporaneous correlation, heteroskedasticity and autocorrelation are all present in our data set. Such conditions could best be dealt with using the Generalized Least Squares estimator if the data is highly balanced (Greene, 2012; Maddala andLahiri, 2006. The unbalanced nature of our panel data therefore could not allow ours to use the generalized least squares estimator. We therefore employed Prais-Winsten regression with correlated panels corrected standard errors (PCSEs) recommended by Beck and Katz (1995) in dealing with the problems of Serial Correlation cross-sectional dependence and heteroskedasticity since the estimates are BLUE for the estimation of model 1.

4. DATA ANALYSIS AND RESULTS

This section first examines the effect of micro-credit and micro-savings on the operational self-sufficiency of MFIs. The (PCSEs) results show an R-squared of 0.6396 and p-value of chi –square statistic =0.0000). These indicate that the independent and the control variables (age, size, credit rating, regulation status, financial intermediation, outreach, and profit status, microcredit and micro-savings services offered) could significantly accounted for 63.96% of variations in operational self-sufficiency of MFIs.

The results indicate that age of MFI has positive statistically significant [B= 0.1084316, p= 0.015 ≤0.05] effect on financial performance 1 (operational self-sufficiency). This means that as MFI's age status changes from new, to young, to mature, their operational self-sufficiency is likely to increase which may be due to improved efficiency in operations and management. Regulation status has positive and statistically significant (B=0.2557155; p=0.000 ≤0.05) effect on OSS. This means that though regulation goes with cost to the MFIs, the benefits gained from reduction in risk exposure far off-set the cost and is thereby likely to makeregulated MFIs more sustainable. Besides, financial intermediation and outreach were also control variables that had significant positive effects on operational self-sufficiency of MFI's (p≤0.05, 0.10). However, Size (B=-0.2830912; p= 0.009 ≤ 0.10) and profit status (B=-0.3485346; p= 0.024   ≤ 0.05) have negative but significant effects on operational self-sufficiency. This means that MFIs which increase total asset by aggressive branch expansion and increased credit portfolio but of poor quality and aggressive profiteering are likely to expose themselves to extra operating cost and risk. Diamonds rating had negative but significant effects (B=-0.1856376; p= 0.026*≤ 0.05) on operational self-sufficiency. Of all the control variables, only scale and target market had insignificant effects on OSS on MFI's (p≥0.05, 0.10).

Natural logarithm of micro-credit exerted a significant positive effect on operational self-sufficiency (B=0.1402319; p ≤0.05). In other words, if microcredit increases by 1 unit operational self-sufficiency of MFIs is expected to increase by 0.1402319 units. This literally implies that as MFIs increase their gross loan portfolios, their expected financial performance in terms of operational self-sufficiency increases significantly. This because, although lending goes with cost and associated default risk, if effective credit management practices are put in place the revenue generated in the form of interest income and fees and other charges will outweigh the cost. Natural logarithm of micro-savings, on the other hand, has a negative effect on operational self-sufficiency though statistically insignificant (B=-0.1296475; p= 0.173≤0.05), meaning that a 1 unit increase in micro-savings (deposits) could lead to a 0.1296475 decrease in operational self-sufficiency of

MFI's. This is because mobilizing micro- savings is labour intensive and costlysince officers have to engage in door to door services. Also there are instances where some officers either run away with the amount collected or understate the amount collected from customers. Besides, eventhough it has been argued that deposits offer cheaper funds for operation, the increasing competition for customers' deposit is forcing MFIs to offer higher interest rate on customers' deposit so as to attract such funds. These might have partially accounted for the negative effect. The interaction between credit and savings has very weak and statistically insignificant effects on OSS of MFIs (0.0076086; p 0.278≥0.05). Refer to table 4.1 below.

Table 4.1 Effects of Micro-Credit and Micro-Savings on Financial Performance Indicator 1(operational Sustainability)

Number of gaps in sample: 1						
(note: computations for rho restarted at each gap)						
Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)						
Group variable: CROSSID			Number of obs = 77			
Time variable: YEAR			Number of groups = 16			
Panels: correlated (unbalanced)			Obs per group: min = 3			
Autocorrelation: panel-specific AR(1)			avg = 5.133333			
Sigma computed by pairwise selection			max = 7			
Estimated covariances = 120			R-squared = 0.6396			
Estimated autocorrelations = 16			Wald chi2(9) = 362.31			
Estimated coefficients = 13			Prob> chi2 = 0.0000			

		Panel-corrected				
Fin_Perf_1	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Age	.1084316	.0446391	2.43	0.015*	.0209405	.1959226
Size	-.2830912	.10906	-2.60	0.009**	-.4968447	-.0693376
D_Rating	-.1856376	.083631	-2.22	0.026*	-.3495514	-.0217239
Reg_Status	.2557155	.05749	4.45	0.000*	.1430371	.3683939
Fin_Inter	.0651591	.036412	1.79	0.074**	-.0062071	.1365252
Outreach	.1818242	.0500416	3.63	0.000*	.0837444	.2799039
Profit_Status	-.3485346	.1542212	-2.26	0.024*	-.6508026	-.0462665
Scale	.0580401	.0872337	0.67	0.506	-.1129348	.229015
T_Market	-.0707744	.0579581	-1.22	0.222	-.1843703	.0428215
Ln_Credit	.1402319	.0707752	1.98	0.048*	.0015149	.2789488
Ln_Savings	-.1296475	.0951696	-1.36	0.173	-.3161766	.0568815
Ln_CrexLn_Sav	.0076086	.0070121	1.09	0.278	-.0061348	.021352
_cons	3.518392	.7447757	4.72	0.000	2.058658	4.978125
rhos = .4316751 -.0782639 .0824643 .2719338 .1611257 ... .4838116						

Significant at 0.05 level
Significant at 0.10 level   **Source: Author's Analysis (2016).**

We again examine the effect of micro-credit and micro-savings on portfolio at risk less than 30 days (PAR30). Again, the series of diagnostic test favour the Pooled Prais-Winsten regression with correlated panels corrected standard errors (PCSEs) .The (PCSEs) results show an R-squared of 0.3308 and p-value of chi – square statistic =0.0000). These indicate that the independents and the control variables (age, size, credit rating, regulation status, financial intermediation, outreach, and profit status, microcredit and micro-savings services) could significantly accounted for 33.08% of variations in Financial Performance Indicator 2(Portfolio at Risk > 30 days) of MFIs. Though, the R-squared is only 0.3308, Correron (2009) and Ganta (2010) Cited in Kinde (2012), stated that for panel data, R^2 above 0.2 is still large enough for reliable conclusions.

From the results, age again exerts significant positive effect on portfolio at risk (>30 days) of MFIs (B=0.0287534; $p=0.004 \leq 0.05$). Target market also exerts significant positive effects on portfolio at risk (>30 days) of MFIs (.0129548; $p=0.093 \leq 0.10$) whiles outreach exerts a significant but negative effect on portfolio at risk (>30 days). This means outreach which measures depth of outreach rather helps to reduce credit going bad.

The result also shows that both Micro-credit and micro-savings have positive but insignificant effects on portfolio at risk (0.0149595; $p= 0.134 \leq 0.10$) and (0.016483; $p=0.235 \leq 0.10$) respectively. The interactive effect (micro-credit x micro-savings) rather exerted a negative, though very small and insignificant effect on portfolio at risk (-0.0009444; $p=0.379 \geq 0.10$).**Refer to table 4.2 below.**

Table 4.2Effects of Micro-Credit and Micro-Savings on Financial Performance Indicator 2(Portfolio at Risk > 30 days)

Number of gaps in sample: 1		
(note: computations for rho restarted at each gap)		
Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)		
Group variable: CROSSID	**Number of obs = 77**	
Time variable: YEAR	**Number of groups = 16**	
Panels: correlated (unbalanced)	**Obs per group: min = 3**	
Autocorrelation: panel-specific AR(1)	**avg = 5.133333**	
Sigma computed by pairwise selection	**max = 7**	
Estimated covariances = 120	**R-squared = 0.3308**	
Estimated autocorrelations = 16	**Wald chi2(12) = 64.56**	
Estimated coefficients = 13	**Prob> chi2 = 0.0000**	

Fin_Perf_2	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
		Panel-corrected				
Age	.0287534	.0099233	2.90	0.004*	.0093042	.0482027
Size	-.0140085	.0167138	-0.84	0.402	-.046767	.0187499
D_Rating	-.0015778	.0128614	-0.12	0.902	-.0267856	.02363
Reg_Status	.0198651	.0451838	0.44	0.660	-.0686934	.1084237
Fin_Inter	-.0037748	.0115588	-0.33	0.744	-.0264297	.01888
Outreach	-.039296	.0147813	-2.66	0.008**	-.0682669	-.0103252
Profit_Status	.0576228	.0384043	1.50	0.134	-.0176484	.1328939
Scale	.0160349	.0196636	0.82	0.415	-.0225051	.0545749
T_Market	.0129548	.0077091	1.68	0.093**	-.0021547	.0280644
Ln_Credit	.0149595	.0099911	1.50	0.134	-.0046226	.0345416
Ln_Savings	.016483	.0138742	1.19	0.235	-.01071	.0436759
Ln_CrexLn_Sav	-.0009444	.0010739	-0.88	0.379	-.0030491	.0011603
_cons	-.1335812	.1719166	-0.78	0.437	-.4705315	.2033691

rhos = -.2805852 .1583731 .2017537 .1493062 -.0922131 ... .2100357

Significant at 0.05 level

**Significant at 0.10 level*

Source: Author's Analysis (2016).

5. DISCUSSION OF RESULTS AND CONCLUSIONS
5.1DISCUSSION OF RESULTS

The resultsshow that micro-credit has positive and significant effect on OSS whichconfirms the findings of Tehuru (2013) and Kinde (2012) who also found positive effect of gross loan portfolio on sustainability of MFIs. This therefore confirmsEconomies of Scale theory, since increase in loan portfolio will promote the sustainability of the MFIs.

The results again indicate that age of MFI has a positive and statistically significant effect on operational self-sufficiency and Portfolio at Risk > 30 days.This means that as MFI's age status changes from new, to young, to mature, their operational self-sufficiency is likely to increase. This confirms the findings ofKipesha (2013) and Magali(2013) who found positive effect of age on the operational self- sufficiency of MFIs.It as such confirmed the theory of Industry Life Cycle. The positive co efficient of age on Portfolio at par greater than 30 days has to be interpreted with care. The positive effect rather indicates that age rather increases portfolio at risk. That is increase credit portfolios that will go bad. This result is quiet interesting since one will assume that the more MFIs stay in business the more experience they will get in credit management and will expert age to contribute to reduction in portfolio at risk. This may be due to the progressive lending methodology applied by MFIs. This means as the MFIs increase in age, customers who equally have long association with them are likely to benefit from larger amount of credit facilities. This may expose them to default risk if the funds are not properly utilized. This is in line with Hermes (2011 cited in Magali, 2013), who found that older firms are less sustainable.

Size of MFIs have a negative significant effects on operational self-sufficiency and this is line with Kar and Swain (2013) but contrary to the findings of Nyamsogoro (2010) and Kipesha(2013) who found size positively affecting sustainability of MFIs. This may be due to aggressive branch expansion and increased credit portfolio but of poor quality.

Outreach has positive significant effects on operational self-sufficiency but negative on Portfolio at risk this confirms the findings of Quayes (2012); Kipesha and Zhangi (2013) but contrary to the findings of Tehuru,T.A (2013).This may be due to the recognition by the very poor that, they need to honour their repayment obligation to the only category of institutions which are ready to attend to their financial needs.

5.2.Conclusions and Recommendation

The aim of the study is to examine the effect of the two core financial services on the sustainability of MFIs. The study was conducted using a sample of 16 MFIs from Ghana. The Pooled Prais-Winsten regression with correlated panels corrected standard errors (PCSEs) results show that Micro-credit contributes to operational sustainability of MFIs. Micro-savings rather had negative influence on the operational sustainability of MFIs. Also,control variables such as age, regulation, and outreach have exerted positive influence on the effect of the core services. Whiles other control variables such as size and profit status retard the contribution of the two core financial services to sustainability of MFIsThe study fills the knowledge gap by establishing the effect of each of the core financial services on the sustainability of Microfinancial institutions in Ghana.

The study recommended that MFIs should adopt proper credit management practices to reduce the risk associated with credit sincelending has positive impact on their sustainability. Also, MFIs should use

technological devices like mobile phones and lockboxes to reduce the cost associated with regular visit by the field officers and the risk of field officers running away or understating clients' deposits.

Regulation contributes to sustainability of MFIs; Managements of MFIsshould be given adequate education on the relevance of complying with regulation. Also Bank of Ghana should decentralize its supervision duty. They must promote grassrootssupervision from the district assembly level. This will promote closer linkage between the regulator and the MFIs.

Aggressive profiteering can render MFIs unsustainable. MFIs therefore should not focus only profit but should be concern with their continuous existence. This will guide them to avoid engaging in activities and practices that are likely to result in their collapse.

The study calls for further study into difference in the performance of MFIs that offer combined service and those that offer only micro-credit.It also calls for examination of the effect of pricing of products of Microfinancial Institutions on their financial performance.

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