

Effect of Financial Indicators on Financial Performance of Microfinance Institutions in Kenya

Wycliffe Mugun

Abstract— Microfinance is the provision of a broad range of financial services such as deposits, loans, payment services, money transfers and insurance to the poor and low-income households and their micro enterprises. The sector reaches out to 832,794 active borrowers with a loan book amounting to Kshs.28.6 billion and reporting 26.4 % annual growth in Kenya. However, owing to the fact that there is limited literature on the determinants of financial performance, various studies conducted indicate divergent views on the effect of financial indicators on financial performance. For this reasons it is not clear whether or not financial indicators affect financial performance of microfinance institutions (MFIs) in Kenya. The main objective of the study was to investigate the effect of financial indicators on financial performance of MFIs in Kenya. Fixed effect model was the preferred model based on the Hausman specification but the study used random effect model since fixed effect model gave insignificant results. Random effect model results revealed that debt to equity ratio had a negative but insignificant relationship with return on assets ratio. Portfolio to assets ratio had a positive relationship with financial performance but the relationship was not significant. Operating expense ratio had negative and significant relationship with return to assets ratio. The results for lagged ROA the coefficient was positive and was statistically significant. Autoregressive distributed lag model on debt to equity ratio preferred model random effect model findings postulated that debt to equity ratio had positive and significant relationship with return to assets ratio. Lagged DER had positive and significant relationship with return to assets ratio. ARDL model on portfolio to assets ratio preferred model random effect findings revealed that PAR had positive and insignificant relationship with return to assets ratio. Lagged PAR had positive and significant relationship with return to assets ratio. ARDL model on operating expense ratio and preferred model fixed effect model showed that OER had negative and significant relationship with return to assets ratio. The lagged OER had positive and insignificant relationship with return to assets ratio .The study concluded that negative and significant effect of operating expense ratio on financial performance shows that an increase in expenses decreases the performance of the MFIs industry in Kenya.

Index Terms— Microfinance, Financial ratios, Financial performance, Kenya.

I. INTRODUCTION

1.1 Microfinance Operation in Kenya

Micro finance is the provision of a broad range of financial services such as deposits, loans, payment services, money transfers and insurance to the poor and low-income households and their micro enterprises. Micro financing institutions (MFIs) are defined as institutions whose major

business is the provision of micro finance services. Their aim is to become sustainable and expand their microfinance services (Asian Development Bank, 2000).Micro finance refers to the provision of financial services to low income households, including the self-employed. These financial services include savings, credit, payment facilities, remittance and insurance (Ledgerwood 1999; Wright, 1999; Christen and Rosenberg 2000). Micro finance therefore encompasses micro-credit, micro-savings and micro-insurance. (Ruth 2002). With the passage of time, there has been increasing emphasis on the importance of offering a range of quality, flexible financial services in response to a wide variety of needs of the poor (Wright, 1999).The financial sector is fairly developed and diversified. The formal financial sector includes among others commercial banks, various building societies and insurance companies. Alongside the formal banking sector exists a microfinance sector which over the past three decades has demonstrated remarkable growth in terms of outreach, professionalism, recognition and specialization (AMFI, 2013).

Microfinance is provided by a variety of institutions of different legal forms, under at least nine different Acts of Parliament. It is estimated that currently there are over 200 microfinance providers in Kenya. These microfinance providers can be clustered into three broad categories: formal, semi formal and informal institutions, with the level of formality defined by the degree of formal regulation and supervision (AMFI, 2013).

So far, the steady growth in the microfinance sector has mostly been realized by six mainstream financial institutions namely; Equity Bank, Cooperative Bank, K-Rep Bank (Sidian bank), Kenya Post Office Savings Bank as well as Family Bank and Kenya Commercial Bank (AMFI, 2013). Some of the developing models developed by these banks have far-reaching impact, influencing microfinance practices and other outreach modalities within the East Africa Region. Two of the institutions transformed into a bank to collect deposit and offer other banking services to the population considered unbankable K Rep (Sidian bank) and Equity (AMFI, 2013).The rest operate as either micro finance institutions, Trusts or NGOs. Currently, five institutions have scaled up their outreach and have countrywide network (K-Rep, Equity, KWFT, Family, SMEs). The rest are limited in some areas in districts and town centres main operations are loans and savings with those turned into banks extra services like forex and remittances.(AMFI, 2013).There are estimated 3460 legally constituted microfinance providers as of June 2013.Also 3897 savings and credit cooperative, 56 micro finance institutions, 4 commercial banks, (K-Rep,

Equity, Post Bank and Cooperative Bank) 2 building societies. Some micro finance institutions are members of International forum like K-Rep Bank, Equity bank, SMEP, Faulu. K-Rep bank received the CGAP (Consultative Group to Assist the Poor) award for the second time running.

The government has created a rural finance department at the Central Bank of Kenya. A micro finance unit has been established at the Ministry of Finance. Microfinance are faced with myriad of challenges as indicated by Cooper (2013). Among these challenges include; unsupportive legal and regulatory environment, limited donor funding, little support from the government, lack of right technical skills for the managers and staff of these institutions, poor infrastructure are hindering the operations of these institutions and lack of capital. This includes introduction of the products for SMEs and low income clients (down-sealing) as well as innovative outreach modalities such as mobile banking vehicles and smart card solutions. This development has improved the services available to both banking clients and MFI clients (AMFI, 2013).

AMFI (2013) has indicated that as at December 2013, the sector showed positive growth trend, reaching out to 832,794 active borrowers with a gross loan portfolio of KES 49.1 billion achieving a 15.7% annual growth. The total assets of the sector registered a stable growth over the last 3 years (2011, 2012, and 2013) amounting to 298.4 billion. The relative market share of the different segments remained stable with 9 microfinance banks (formally DTMs), 46 credit only MFIs and 5 commercial banks.

The credit only MFI is mostly concentrated in their core lending activity as the net portfolio accounts for 69.5% of their total assets. Overall the sector reaches out to 832,794 active borrowers with a loan book amounting to KES 28.6 billion, reporting a 26.4% annual growth. This is without the banks. The sector continues to play a key role in employment creation and as at December 2013, it had a workforce of over 6,000. The growth momentum is expected to be supported by the agency model and increased usage of mobile phone platforms through partnerships with mobile service providers. Kenya's microfinance sector comprises of nearly 250 MFIs with only 50 of these being registered with their umbrella body Association of Microfinance Institutions. Only nine of these are licensed by Central bank of Kenya to take deposits. The remaining institutions are unregulated and offer microfinance services in combination with other services. Association of Microfinance Institutions report (2013) indicated that the registered MFIs had a stable assets growth of 30.4% over the period under consideration and were worth over Kshs.220 billion as of December 2011, up from Kshs.129 billion as of December 2009. Its worth mentioning that equity bank independently accounted for 80.4 % of the segments total assets. Actually the segments asset growth, without was less strong and fairly stagnant in 2012 ,with DTMS recording an adverse growth even with the improved number of deposit taking licenses approved that year.

1.1.2 Objectives of the study

The main objective of this study was to investigate the effect of financial indicators on financial performance of Microfinance Institutions in Kenya. The specific objectives

were to;

- i. Find out the effect of debt to equity ratio on the financial performance of Microfinance Institutions in Kenya.
- ii. Examine the effect of portfolio to assets ratio on financial performance of Microfinance Institutions in Kenya.
- iii. Examine the effect of operating expense ratio on the financial performance of Microfinance Institutions in Kenya.

II. LITERATURE REVIEW

INTRODUCTION

This chapter gives theoretical literature, review of empirical literature on financial performance of microfinance institutions and the research gaps that are to be filled by the study.

2.1 THEORETICAL LITERATURE

2.1.1 ARBITRARY PRICING THEORY

According to Jitka (2003) Arbitrage pricing Theory (APT) also known as Arbitrage pricing model (APM) serves as a generalization of the single factor Capital Assets pricing Model to a multifactor model. The idea behind the APT is that the returns vary from their expected values due to unanticipated changes in production, inflation, term structure and other economic factors. In the multifactor model, it is supposed that the return on an asset is explained in terms of a linear combination of more factors such as debt to equity ratio, portfolio to assets ratio and operating expense ratio. Note that in CAPM, the expected return on an asset is a linear function of the expected market return only. The development of the APT is based on the assumptions of an efficient market. A technical realization of APT uses two popular statistical methods; regression analysis and factor analysis.

According to Ross (1976) Arbitrage pricing theory is a one period model in which every investor believes that the stochastic properties of returns of capital assets are consistent with a factor structure .Ross (1976) argues that if equilibrium prices offer no arbitrage opportunities over static portfolios of the assets, then the expected returns on the assets are approximately linearly related to the factor loadings such as debt to equity ratio, portfolio to assets ratio, and operating expense ratio. The Arbitrage Pricing Model has several weaknesses. According to Fama (1991), one cannot expect any particular asset pricing model to completely describe reality an asset pricing model is a success if it improves our understanding of security market returns. By this standard the APT is a success. Besides, Current statistical methods are not amenable to testing an approximate pricing relation. As a result, tests of the exact multifactor pricing relation are joint tests of the APT and additional assumptions are necessary to obtain exact pricing.

2.2 EMPIRICAL LITERATURE

This section reviewed empirical literature between debt to equity ratio and financial performance, portfolio to assets ratio and financial performance and operating expense ratio

on financial performance.

2.2.1 Debt to equity ratio and financial performance

Panayiotis *et al* (2005) investigated Bank specific industry-specific and macroeconomic determinants of Bank profitability by applying the General method of moments (GMM) techniques to a panel of Greek banks for the period 1985 to 2001. The bank specific profitability determinants were capital, credit risk, productivity, expense management and size, macroeconomic determinants included inflation expectation and cyclical output while the industry-specific determinants comprised of ownership and concentration. The study revealed that bank profitability persists to a moderate extent, indicating that departures from perfectly competitive market structures may not be large. All bank specific determinants, with the exception of size affect bank profitability significantly in the anticipated way. The study on Malaysian banks by Guru *et al* (2004) also showed that efficient management is among the most important factors that explain high bank profitability. In the study, the choice between fixed effect and random effect were estimated using the Hausman specification test. Although the study was conducted on bank profitability determinants, the results are not consistent. In addition, the study was conducted on banks panel data in Europe.

Panayiotis *et al* (2006) examined the determinants of Bank profitability in the south eastern European Region using unbalance panel data –set of south eastern European (SEE) credit institutions over the period 1998-2002. The estimation results indicated that with the exception of Liquidity all bank – specific determinants significantly affect bank profitability in the anticipated way. A key result is that the effect of concentration is positive which provides evidence in support of the structure conduct performance hypothesis, while at the same time some relevance of the efficient – structure hypothesis cannot be rejected. The study employed linear regression model of estimation as well as the least squares method of fixed effect (FE) and random effect (RE) models. The study adopted a linear regression model and estimation done using Generalized Least Squares (GLS). The variables under study were profitability, liquidity, credit risk, capital, operating expenses management, size, and foreign ownership, market share, banking system reform, inflation and economic activity. The study could have generated more information had it included other variables such as debt to equity ratio which could affect financial performance.

Munyambonera (2012) investigated the determinants of commercial bank performance in sub-saharan Africa (SSA). The study focus was on profitability and total factor productivity as key measures of bank performance. The study used as unbalanced panel data of 216 commercial banks drawn from 42 countries in SSA for the period 1999 to 2006. In estimating bank total factor productively growth the gross accounting procedure, through estimation was by panel random effect methods in static framework. The findings revealed that both bank specific as well as macroeconomic factors explained the variation in commercial bank profitability over the study period. The explanatory variables were growth in bank assets, growth in bank deposits, capital adequacy, operational efficiency, liquidity ratios well as the

macroeconomic variables of growth in GDP and inflation. Bank profitability was measured using return on average assets as the dependent variable. The study used larger scope and robust econometric methods in sub-Saharan Africa. This study has also used robust methods and concentrated specifically on Kenya's Microfinance financial performance.

2.2.2 Portfolio to assets ratio and financial performance

Njeru *et al* (2015) examined the evaluation of financial performance on portfolio holdings held by person funds in Kenya. Using a sample of 35 person funds selected through judgmental sampling. The study utilized secondary data from pension funds and was analyzed using inferential statistics to determine if there was a significant statistical difference in the asset classes. The research findings revealed that discretionary and non-discretionary investment mandates to the fund manager affect the performance of the person funds. The most pertinent concern was lack of trustees to clearly understand and put proper benchmarks to monitor the performance of the funds. The study employed panel data from pension funds administrators. The study used fixed income allocation, equities allocation and offshore allocations as independent variables. The study failed to incorporate other variables of financial performance current study has introduced other variables such as portfolio to assets ratio.

Lingaraja *et al* (2015) examined the Long-run overseas portfolio Diversification benefits and opportunities of Asian Emerging stock markets and developed markets for the period 2005 to 2014. Models such as factor analysis principal component and maximum likelihood and correlation matrix were used for estimating the portfolio diversification opportunity and benefits. The study revealed that in the Asian emerging markets especially china, Indian, Malaysia, Taiwan, Indonesia and Thailand these are good opportunities for overseas portfolio diversification and the investors may earn high return. Investors could switch their investments into other different emerging markets in Asia that have sufficiently low correlation to developed markets. However, the study employed correlation analysis which is a weaker methodology, this study has used robust methodology such as regression analysis.

Ekeocha *et al* (2012) investigated the long run determinants of foreign portfolio investment in Nigeria over the period 1981 to 2010. To ensure robustness of the co-integration estimation the study employed both the Engle-Granger approach and the Johansen maximum likelihood procedure. The study applied time series analysis specifically the finite distributed lag model and results revealed foreign portfolio investment had a positive long-run relationship with market capitalization and trade openness in Nigeria. Multiple regression analysis of Vector Error Correction Model as well as the as the maximum likelihood estimation method was adopted in the study. However, the study used time series data, panel data will be employed in the current study on MFIs financial performance. Panel data is the most suitable tool when the sample comprises cross-sectional and time series data. Also the use of panel

data has advantages in the estimation namely; better identification and measure of those effects which are not observable either in cross-sectional or time series analysis

2.2.3 Operating expense ratio and financial performance

Allen and Rai (1996) estimated a global cost function using an instructional database of financial institution for fifteen countries. The sample was divided into two group sample was divided in to two groups according to the countries regulatory environment universal banking countries (Australia, Austria, Canada ,Switzerland, Germany ,Denmark, Spain, Finland, France ,Italy, United kingdom and Sweden) permitted the functional integration of commercial and investments banking while separated banking countries (Belgium, Japan and US) did not. Large bank in separated banking countries exhibit the largest measure of input inefficient and had anti-economies of scale .All other banks had significantly lower inefficiency measures .The finding showed that smaller banks in all countries had significant levels of economics of scale on the other hand Italian banks along with French, UK, US ones were found less efficient from the Japanese, Austrian, German, Danish, Swedish and Canadian ones. The study applied stochastic cost frontier approach and the distribution free model. In addition, the system of equations was estimated using Iterative Seemingly Unrelated Regression (SLTR) estimation technique. Weakness arose on the period when the study was conducted and the circumstances have changed through the years.

Fernandez, Gaskin and Gonzalez (2002) measured the Economic Efficiency of 142 financial intermediates in eighteen countries for period1989-1998 .The aim of the study was to establish the relationship between efficiency productivity change and share holders wealth maximization .The researcher applied data envelope analysis to estimated the relative efficiency of commercials bank of different geographical areas (North America, Japan and Europe) The European banks include those from Austria, Belgium, Denmark, Finland ,Germany ,Ireland, Italy, Luxemburg Norway ,Portugal Spain, Sweden, Switzerland and the United Kingdom .The three preferred outputs were total investments total loans and non-interest income plus other operating income .The three prefer outputs were total investments total loans and non-interest income plus other operating income. In parallel the four inputs variables were property salaries other operating expenses and total deposits .Result showed that commercials banks productivity across the world has grown significantly from 1989 to 1988.The study employed Malmquist productivity index and non-parametric estimation methods (DEA).Weakness was that the study was conducted among three geographical areas of North America, Japan and Europe. Current study is based in Africa and Kenya in particular. Also the study was on banking firms and not microfinance institutions.

III. CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology that was used in the study. The chapter outlines research design, target population, model specification, data collection, data analysis.

3.2 Model Specification

The model is specified to examine the effect of financial indicators on financial performance of Microfinance Institutions in Kenya. It is a multiple regression model whereby determinants of financial performance are the independent variables and dependent variable is the Return on Assets. Thus we have the multiple regression model of the firm derived and estimated as follows.

$$ROA_{it} = \beta_0 + \beta_1 DE_{it} + \beta_2 PA_{it} + \beta_3 OE_{it} + \varepsilon_{it} \dots\dots\dots (3.1)$$

Model I: Autoregressive Model

From model 3.1 the following models of estimation are considered incorporating the autoregressive framework to capture potential lag effect of ROA of the previous period having effect on the current ROA.The general model I estimates the effect of lag ROA, current period debt-to-equity ratio, portfolio to asset ratio and operating expense ratio on current ROA represented by equation 3.2.This autoregressive model was used in the basis of policy formulation.

$$ROA_{it} = \beta_0 + \beta_1 ROA_{it-1} + \beta_2 DE_{it} + \beta_3 PA_{it} + \beta_4 OE_{it} + \varepsilon_{it} \dots\dots\dots (3.2)$$

Model II: Autoregressive Distributed Lag Model

The second category of models are specific model which specifies the individual financial indicators against the ROA. The equations are 3.3, 3.4 and 3.5.

(i). Debt to equity ratio on Microfinance Institution

$$ROA_{it} = \alpha_0 + \alpha_1 DE_{it} + \alpha_2 DE_{it-1} + \varepsilon_{it} \dots\dots\dots (3.3)$$

(ii).Portfolio to assets ratio on Microfinance Institution

$$ROA_{it} = \delta_0 + \delta_1 PA_{it} + \delta_2 PA_{it-1} + \varepsilon_{it} \dots\dots\dots (3.4)$$

(iii).Operating expense ratio on Microfinance Institution

$$ROA_{it} = \gamma_0 + \gamma_1 OE_{it} + \gamma_2 OE_{it-1} + \varepsilon_{it} \dots\dots\dots (3.5)$$

ROA_{it} = Return on Assets DE_{it} =Debt to Equity ratio
 PA_{it} = Portfolio to Assets ratio OE_{it} =Operating Expense Ratio

i=...n, where n is the number of firms. β_0 =constant/the

intercept point of the regression line and the Y-axis. β is the slope /gradient of the regression line. ϵ is the error term.

The expected signs $\beta_1 \geq 0, \beta_2 \geq 0, \beta_3 \geq 0$

IV. RESULTS AND DISCUSSION

4.1 Introduction

This chapter summarizes results and discussion which includes summary of the variables, presentation, interpretation and discussion of the correlation analysis, descriptive statistics and regression results.

4.2 Descriptive Statistics

This section presents the descriptive statistics of the financial indicators of the Microfinance Institutions in Kenya.

Table 4.1 Descriptive statistics of financial ratios variables

	ROA	DER	PAR	OER
Mean	-1.742553	5.974721	50.35820	37.39356
Median	0.900000	3.350000	51.20500	29.46000
Maximum	7.290000	116.0100	103.0200	222.4000
Minimum	-21.56000	-13.23000	1.670000	11.80000
Std. Dev.	7.932501	18.20089	20.82976	32.96941
Skewness	-1.136218	4.955000	0.077665	4.152679
Kurtosis	3.417986	29.71987	2.559010	23.37151
Jarque-Bera	10.45492	1624.319	0.455416	907.4574
Probability	0.005367	0.000000	0.796357	0.000000
Sum	-81.90000	286.7866	2517.910	1682.710
Sum Sq. Dev.	2894.530	15569.80	21260.07	47827.22
Observations	47	48	50	45

Notes; ROA is return to assets ratio, DER is debt to equity ratio, PAR is

Portfolio to assets ratio and OER is operating expense ratio.

Source: Research Data

Table 4.1 shows the descriptive statistics of financial indicator variables. ROA measured by the net income divided by total asset has a mean value of -1.742 percent. This indicates that the sample MFIs on averaged earned a net income of -1.742 percent of the total assets. Since ROA indicates the efficiency of the management of MFIs in generating net income from all the resource from the institutions ,the higher ROA shows that the MFIs is more efficient in using its resources. The maximum value of ROA was 7.29 and minimum value -21.56 .This means that the most profitable microfinance institution among the sampled MFIs earned 7.29 percent of net income for a single US dollars invested in the assets of the firm.In addition, the least profitable microfinance institution of the sampled MFIs incurred -21.56 percent of loss for each US dollars invested in the assets of the firm and this loss may be due to lack of efficiency in expense management or higher operating costs and this eventually causes poor performance of the microfinance institutions and implies that the higher costs of operation negatively affects MFI performance.

Debt to equity ratio which is measured by the total debt divided by total equity has a mean value of 5.97 percent. This implies that the sample MFIs on average earned 5.97 percent

total debt of the total equity. The maximum value for debt to equity ratio 116.01 and minimum value is -13.23.The maximum value of 116.01 implies that the microfinance institutions which are heavily trapped in debt have to bear huge interests costs which take a big portion out of the operating incomes of these firms leaving little portion in the net income which will lead to poor performance of the MFIs.Portfolio to assets ratio which was measured by gross loan portfolio divided by total assets had an average of 50.35 with maximum value of 103.02 and minimum of 1.67 percent respectively. This meant that gross loan portfolio to total assets had a minimum value of 1.67 percent. It can also be deduced that highest level of investment in total assets expressed as a proportion of gross loan portfolio was 103.02 and lowest 1.67 percent of this microfinance institutions.

Another important variable used in the study was the operating expense ratio which was measured by the operating expenses divided by revenue. Operating expense ratio had a mean value of 37.39 percent and with minimum value of 11.8 and maximum value of 222.4 and standard deviation of 32.97.The mean of 37.393 shows that on average the sampled microfinance institutions incurred expenses of 37.393 percent of the total revenue. Also the standard deviation of 32.969 indicates that there was highest variability in operating expense ratio since standard deviation is a measure of dispersion which indicates how the spreads out variable measures are. Thus with maximum value being 222.4 implied that the microfinance institutions incur high costs of operation and some of them end up performing poorly financially because of higher operating expenses.The variables seemed not to be normally distributed since their skewness were either more or less than zero. Also, the variables seemed to have a relatively peaked distribution since their kurtosis were positive. All the variables except ROA were positively skewed.

4.3 Correlation Analysis

This section presents the correlation analysis of the financial indicators of the Microfinance Institutions in Kenya.

Table 4.2 Correlation matrix between the financial indicator variables

Covariance Analysis: Ordinary				
Sample: 2009 2013				
Included observations: 44				
Balanced sample (listwise missing value deletion)				
Correlation				
Probability	ROA	DER	PAR	OER
	ROA			
		DER		
			PAR	
				OER
	ROA	DER	PAR	OER
	1.000000			

	DER	0.012102		
	(0.9379)	-----		
	PAR	-0.26441	0.121917	
	(0.0828)	(0.4305)	-----	
	OER	-0.74392	-0.09352	1.000000
	(0.0000)	(0.5460)	(0.9430)	-----

Note: the figures in parenthesis are p-values

ROA is return to assets ratio, DER is debt to equity ratio, PAR is

Portfolio to assets ratio and OER is operating expense ratio.

Source: Research Data

In the table 4.2, the correlation matrix between the variables is presented. The results supported some level of correlation between returns to assets ratio, debt to equity ratio, portfolio to assets ratio and operating expense ratio. Correlation analysis was used to measure the degree of association between the variables. Overall with the correlation coefficients between the variables in the range below 0.5, indicated that multicollinearity was not an issue in these estimation as no two variables were highly correlated. Hailer et al (2006) supported that multicollinearity problem should only be corrected when the correlation is above 0.8 and 0.9 respectively.

Return on assets ratio correlated negatively with operating expense ratio (-0.7441). This results reveal that a decrease in expenses increases the profit of Microfinance institutions in Kenya. This indicates that the microfinance institutions in Kenya have much to profit if they are able to exercise efficient cost management practices. The results is consistent with the studies of Ghazouani et al (2013), Ezra (2013), Dietrich et al (2009), Sufian (2011), Birhanu (2012) and Amdemikael (2012). Portfolio to assets ratio had also a negative correlation with return on assets ratio (-0.2644). Whereas debt to equity ratio correlated positively with return on assets ratio (0.0121) and negatively with operating expense ratio (-0.0935). Operating expense ratio also correlated positively with portfolio to assets ratio (0.0111). In addition, debt to equity ratio was positively correlated with portfolio to assets ratio (0.0647)

In addition, debt to equity ratio and portfolio to assets ratio had statistically insignificant correlation with return on assets ratio. By contrast, operating expense ratio had significant correlation with return on assets ratio. Debt to equity ratio had probability value of 0.9379; portfolio to assets ratio 0.0828 and operating expense ratio 0.0000. Most of the correlations were not statistically significant indicating that multicollinearity was not likely to be a problem in the data.

4.4 Diagnostic Test Results

4.4.1 Hausman Specification Test

The decision on whether to use fixed or random effects model was reached through Hausman test where the null hypothesis was that, the preferred model was random effects versus the alternative fixed effects. The test was carried to determine whether or not the unique errors (u_i) were correlated with the regressors. The null hypothesis was that there was no

correlation between the unique errors (u_i) and the regressors. The Hausman test tested the efficiency and consistency between the fixed effects and random effect estimators. In this test, a rejection of the null hypothesis is when $prob \geq chi^2$, confirms the efficiency and consistency of the random effect in estimating the model.

Table 4.3 Hausman specification test results on the financial ratio

Coefficients				
	(b)	(B)	(b-B)	
sqrt(diag(V_b-V_B))				
	Fe	Re	Differenc e	S.E.
Llroa	.069146 5	.473385 8	-.404239 2	.1240889
Par	.006767 4	.009043 6	-.002276 2	.016294
Der	.000582	-.0026717	.0032538	.0051747
Oer	-.179317 6	-.1857857	.0064681	.097838
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
= 13.55				
Prob>chi2 = 0.0089				

Source: Research data

In the table 4.5 the computed chi-square value at 4 degrees of freedom was 13.55 which is more than the p-value at 0.0089 which is less than 5 % level of significance. This indicates that there was correlation between the unique errors (u_i) and the regressors. Although according to the Hausman specification test fixed effect model would be the preferred model of choice. However, fixed effect model gives insignificant values. This study has chosen random effect model as the preferred model since it's a good model and gives better results.

4.5 Fixed Effect Model

Table 4.4 Financial indicators fixed effect (within) regression estimations results Autoregressive Model

Fixed-effects (within) regression	Number of obs = 30				
Group variable: id	Number of groups = 11				
R-sq: within = 0.2724	Obs per group: min = 1				
Between = 0.9293	avg = 2.7				
Overall = 0.8617	max = 4				
F(4,15) = 1.40					
corr(u_i, Xb) = 0.7965	Prob> F = 0.2802				
roa	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]

Llroa	.0691465	.1658569	0.42	0.683	-.2843691	.4226622
Par	.0067674	.0276745	0.24	0.810	-.0522194	.0657542
Der	.000582	.018163	0.03	0.975	-.0381316	.0392956
Oer	-.1793176	.1099704	-1.63	0.124	-.413714	.0550788
_cons	4.770211	3.953296	1.21	0.246	-3.656041	13.19646
sigma_u 4.3723914						
sigma_e 1.5211281						
rho .89203668 (fraction of variance due to u_i)						
F test that all u_i=0: F(10, 15) = 2.32 Prob> F = 0.0683						

Source: Research Data

The fixed effect autoregressive model results as presented in table 4.3. The results show that lagged return to assets ratio had positive but not significant relationship with return to assets ratio in the current period. Debt to equity ratio had a positive relationship with return on assets ratio but the relationship was insignificant. Portfolio to assets ratio had a positive relationship with financial performance but insignificant relationship with return on assets ratio and

operating expense ratio had a negative and insignificant relationship with financial performance. The coefficient for lagged return to assets ratio was 0.691; debt to equity ratio was 0.0005, portfolio to assets ratio 0.0067 and for operating expense ratio was -1.793.

4.6 Random Effect Model Table

4.5 Financial ratios cross section random effect regression estimations results Autoregressive model

Random-effects GLS regression				Number of obs = 30		
Group variable: id				Number of groups = 11		
R-sq: within = 0.2068				Obs per group: min = 1		
between = 0.9817				avg = 2.7		
overall = 0.9277				max = 4		
				Wald chi2(4) = 250.71		
corr(u_i, X) = 0 (assumed)				Prob> chi2 = 0.0000		
Roa	Coef.	Std. Err.	Z	P> z	[95% Conf. Interval]	
llroa	.4733858	.1100475	4.30	0.000	.2576965	.689075
par	.0090436	.0223692	0.40	0.686	-.0347993	.0528864
der	-.0026717	.0174103	-0.15	0.878	-.0367953	.0314518
Oer	-.1857857	.0502117	-3.70	0.000	-.2841988	-.0873726
Cons	5.259502	2.100239	2.50	0.012	1.143108	9.375895
sigma_u .79788515						
sigma_e 1.5211281						
rho .21577061 (fraction of variance due to u_i)						

Source: Research Data

The random effect autoregressive model results as presented in table 4.4. The coefficient for lagged return to assets ratio was 0.4733. Debt to equity ratio had a negative relationship with return on assets ratio. However, debt to equity ratio did not have a statistically significant relationship with financial performance, the coefficient for debt to equity ratio was -0.0026. The statistical insignificance implied that debt to equity ratio did not play any role in determining return to assets ratio. Portfolio to assets ratio had a positive relationship with financial performance and the relationship was statistically insignificant, portfolio to assets ratio the coefficient was 0.0090. The statistical insignificance implied that portfolio to assets ratio did not play any role in determining financial performance. The coefficient for operating expense ratio was -0.1857. The results showed

that operating expenses ratio had a negative relationship with return on assets ratio. The relationship was statistically significant at 5% level. Operating expense ratio had negative and significant relationship with return to assets ratio in the current period. This significant effect of operating expense ratio indicates that operating expense ratio depends on financial performance of MFIs on Kenya.

The results for lagged ROA the coefficient was positive and probability was statistically significant at 5% level. This results indicates that lagged ROA had positive and significant relationship with return on assets in the current period. The lagged return to assets ratio was significant and the coefficient was positive implying that ROA from the previous period was an important determinant of return to assets ratio in the current period. This also indicates that the lagged

dependent variable is a driver of the current return to assets ratio.

The main objective of this study was to investigate the effect of financial ratios on financial performance of Microfinance Institutions in Kenya. The study specifically sought to examine the effect of debt to equity ratio on financial performance, examine the effect of portfolio to assets ratio on financial performance and estimate effect of operating expense ratio on financial performance of MFIs in Kenya using panel data for five years from the period 2009 to 2013.

The first objective of the study was to estimate the effect of debt to equity ratio on financial performance. Analysis of data on this objective was based on the null hypothesis that debt to equity ratio has no effect on financial performance of Microfinance Institution in Kenya. Debt to equity ratio had a negative but insignificant relationship with return to assets ratio. The results are contrary to the results of Disanayake (2012) who postulated that debt to equity ratio is statistically significant predictor variable in determining return on assets ratio. Empirical results showed a non-linear relationship between return on equity and debt to asset ratio. As the debt to assets ratio increases, initially the return on equity increases until an optimum debt level is reached after that it starts decreasing.

Watson and Wilson (2002) define debt capital a capital which a business raises by taking out a loan. Debt capital differs from equity or share capital because subscribers to debt capital do not become part owners of the business, but are merely creditors, and the suppliers of debt capital usually receive a contractually fixed annual percentage return on their loan, known as the coupon rate. Debt may be short term or long term. According to Watson and Wilson (2002) debt capital ranks higher than equity capital for the payment of annual returns. This means that before any dividend is paid to the suppliers of equity interest on debt capital must be paid in full.

Conversely, some studies have shown that debt has a negative effect on firm performance (Fama and French, 2000), for instance are of the view that use of excessive debt creates agency problems among shareholders and creditors and that could result in negative relationship between average and firm performance. From the results the study therefore does not reject the null hypothesis rather accept null hypothesis that states that debt to equity ratio has no effect on financial performance of Microfinance Institution in Kenya.

The second objective of the study was to examine the effect of portfolio to assets ratio on financial performance of MFIs in Kenya. Analysis of data on this objective was based on the null hypothesis that portfolio to assets ratio has no effect on financial performance of Microfinance Institution in Kenya. Portfolio to assets ratio had a positive and statistically insignificant relationship with return to assets ratio. These findings are not consistent with the results of (Ndong, 2015). Tabak *et al* (2010) who found that loan portfolio concentration increases returns and also reduces default risk, these are significant size effects, foreign and public banks seem to have less effect by the degree of diversification. And Njeru *et al* (2015) who supported that there was a strong positive relationship between loan repayment and financial performance of deposit taking SACCO in mount Kenya

region as indicated by correlation of 0.786 and p-value of 0.001 which was less than the acceptable significance level.

Muchomba (2013) results were also inconsistent with these study findings. The study supported that there exists a functional relationship between the commercial banks investment portfolio and the determinants in the Kenyan context. It also established that cash reserve and deposit assets ratios have the greatest impact on the investment portfolios.

However, these results are supported by the findings of Al-Tarawneh and Khataybey (2015) whose empirical results in general did not provide any support for interest rates which are important in determining the general composition of the portfolio holdings of Jordanian bank. From these results therefore the study does not reject null hypothesis but accept the null hypothesis which states that portfolio to assets ratio has no effect on financial performance of Microfinance Institution in Kenya because portfolio to assets ratio is statistically insignificant and does not affect the financial performance of Microfinance institutions in Kenya.

The third objective of the study was to examine the effect of operating expense ratio on financial performance of Microfinance institution in Kenya. Analysis of data on this objective was based on the null hypothesis that operating expense ratio has no effect on the financial performance of Microfinance Institution in Kenya. Operating expense ratio had a negative and statistically significant relationship with return on assets ratio. The findings support that of Ezra (2009) who found the coefficient of the variable representing operational efficiency was negative and significant. This is consistent with the theory that higher costs of operation negatively affect bank profitability. Operational efficiency indicator is the expense variable and explains how banks could be efficient in resource allocation and utilization including human resource and technological improvements in banking.

Also Abebe (2014) who found that that operating efficiency had a negative effect on bank profitability. Other consistent results are those of Athanasoglou *et al* (2013), Kosmidou *et al* (2008), Yadollahzadeh *et al* (2013), Weersainghe *et al* (2013) and Alkhatib (2012) who found negative relationship between operating cost and Bank performance. The negative effect to growth in bank profitability could be explained by high costs in bank operations. Results are consistent with findings of Disanayake (2012) who postulated that operating expense ratio are statistically significant predictors variable in determining return on assets ratio. And also results of brand *et al* (2001), Ugurs (2006) in profitability of MFI's from the study findings.

Therefore the study rejects the null hypothesis and accept the alternative hypothesis which states operating expense ratio affects financial performance is accepted by the study because the operating expense ratio is statistically significant and negatively affects the financial performance of Microfinance institutions in Kenya.

Table 4.6:Fixed effect (within) regression results

Fixed-effects (within) regression					Number of obs	=	33
Group variable: id					Number of groups	=	12
R-sq: within = 0.6055					Obs per group: min	=	1
Between = 0.0006					avg	=	2.8
Overall = 0.0000					max	=	4
F(2,19) = 14.58							
corr(u _i , Xb) = -0.2967					Prob> F	=	0.0001
roa	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]		
der	.0534118	.0156617	3.41	0.003	.0206315	.0861921	
llder	.0799378	.0164983	4.85	0.000	.0454065	.1144692	
_cons	-2.66287	.3234821	-8.23	0.000	-3.339926	-1.985815	
sigma_u 8.4481251							
sigma_e 1.4628308							
rho .9708903 (fraction of variance due to u _i)							
F test that all u _i =0: F(11, 19) = 77.44 Prob> F = 0.0000							

Source:Research data

Table 4.6 was the fixed effect model which revealed that debt to equity ratio had positive and statistically significant relationship with return ratio at 5 % level while lagged debt to equity ratio had positive and statistically significant relationship with return to assets ratio. The coefficient for debt to equity ratio was 0.0534 and lagged debt to equity ratio 0.079.

Table 4.7:Random effect GLS estimation results

Random-effects GLS regression					Number of obs	=	33
Group variable: id					Number of groups	=	12
R-sq: within = 0.6054					Obs per group: min	=	1
Between = 0.0006					avg	=	2.8
Overall = 0.0000					max	=	4
					Wald chi2(2)	=	29.53
corr(u _i , X) = 0 (assumed)					Prob> chi2	=	0.0000
Roa	Coef.	Std. Err.	Z	P> z	[95% Conf. Interval]		
Der	.0525143	.015408	3.41	0.001	.0223152	.0827133	
Llder	.0789972	.0162163	4.87	0.000	.0472138	.1107807	
_cons	-3.418111	2.494618	-1.37	0.171	-8.307471	1.47125	
sigma_u 8.6832395							
sigma_e 1.4628308							
rho .97240244 (fraction of variance due to u _i)							

Source:Research data

Table 4.7 was the random effect model. In this model the random effect model was the preferred model according to the Hausman specification test. The probability was 93.33% which is more than 5% level of significance. This also indicated that there was correlation between the unique errors and the regressors. Results from the random effect indicated that debt to equity ratio had positive and statistically significant relationship with return to assets ratio and results are consistent with the results of Disanayake (2014) who postulated that debt to equity ratio is statistically significant predictor variable in determining return to assets ratio. Lagged debt to equity ratio had positive and statistically

significant relationship with return to assets ratio. Coefficient for debt to equity ratio was 0.0525 and lagged debt to equity ratio was 0.0789 which implies that debt to equity ratio in the previous period is a determinant to the current period.

Table 4.8: Hausman Specification results

---- Coefficients ----				
	(b)	(B)	(b-B)	
	sqrt(diag(V _b -V _B))			
	Fe	Re	Difference	S.E.
D	.05341	.0525	.00089	.002

er	18	143	75	8076
ll	.07993	.0789	.00094	.003
der	78	972	06	0371
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
= 0.14				
Prob>chi2 = 0.9333				

Source:Research data

Table 4.9 Test of Heteroscedasticity

Breusch and Pagan Lagrangian multiplier test for random effects
roa[id,t] = Xb + u[id] + e[id,t]
Estimated results:

Var	sd = sqrt(Var)	
R	58.33731	7.637886
oa	2.139874	1.462831
E	75.39865	8.68324
U	Test: Var(u) = 0	
chibar2(01) = 14.69		
Prob> chibar2 = 0.0001		

Source:Research data

Table 4.9 Breusch-Pagan LM test results indicated presence of heteroscedasticity .The probability was 0.001 which is less than 5 % implying that we shall reject the null hypothesis and accept the alternative which states that heteroscedasticity exists in the model.

4.7.2 Portfolio to Asset Ratio on Microfinance Performance

Table 5.0 Fixed effect (within) regression results

Fixed-effects (within) regression				Number of obs = 34		
Group variable: id				Number of groups = 12		
R-sq: within = 0.4655				Obs per group: min = 2		
Between = 0.0214				avg = 2.8		
Overall = 0.0354				max = 4		
F(2,20) = 8.71						
corr(u_i, Xb) = -0.6177				Prob> F = 0.0019		
Roa	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	
Par	.01823	.037754	0.4	0.6	-.06051	.09699
	86	8	8	34	66	37
Llpar	.20117	.061323	3.2	0.0	.073251	.32908
		7	8	04		91
_cons	-12.295	2.45679	-5.	0.0	-17.420	-7.1708
	61	1	00	00	39	33
sigma_u 10.655111						
sigma_e 2.2631146						
rho .95683476 (fraction of variance due to u_i)						
F test that all u_i=0: F(11, 20) = 36.46 Prob> F = 0.0000						

Source:Research data

Table 5.0 was the fixed effect model which revealed that portfolio to assets ratio had had positive but insignificant relationship with return to assets ratio .While the lagged portfolio to assets ratio had positive and statistically significant relationship with return to assets ratio at 5 % level. The coefficient of portfolio to assets ratio was an important determinant of the current portfolio to assets ratio. This also implies that lagged portfolio to assets ratio has effect on return to assets ratio. The coefficient for portfolio to assets ratio was 0.0182 with probability of 0.634 whereas lagged portfolio to assets ratio had positive coefficients of 0.2011 and with a probability of 0.004 that was statistically significant at 5 % level.

Table 5.1 Random effect GLS estimation results

Random-effects GLS regression	Number of obs = 34
Group variable: id	Number of groups = 12
R-sq: within = 0.4648	Obs per group: min = 2
Between = 0.0219	avg = 2.8

Overall = 0.0357		max = 4				
		Wald chi2(2) = 12.98				
corr(u_i, X) = 0 (assumed)		Prob> chi2 = 0.0015				
Roa	Coef.	Std. Err.	Z	P> z	[95% Conf. Interval]	
Par	.02004 19	.03875 34	0.5 2	0. 605	-.05591 33	.09599 71
Llpar	.16214 06	.05933 94	2.7 3	0. 006	.045837 4	.27844 37
_cons	-12.263 65	3.7833 17	-3. 24	0. 001	-19.678 82	-4.8484 88
sigma_u 9.4552024						
sigma_e 2.2631146						
rho .94581517 (fraction of variance due to u_i)						

Source: Research data

Table 5.1 was the random effect model results which revealed that portfolio to asset ratio had positive and insignificant relationship with return to assets ratio the findings are inconsistent with the results of Muchomba (2013). Lagged portfolio to assets ratio had positive and significant relationship with return to assets ratio. The insignificant results between portfolio to assets ratio and return to assets ratio implies that portfolio to assets ratio is not a determinant of return to assets ratio. The coefficients for portfolio to asset ratio was 0.200 with probability of 0.605 and lagged portfolio to assets ratio had coefficients of 0.1621 with probability of 0.006 that was significant at 0.6 %.

Table 5.2 Hausman Specification results

---- Coefficients ----				
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fe	Re	Differen	S.E.
			ce	
Par	.01823 86	.020041 9	-.001803 3	.
llpar	.20117 6	.162140 6	.039029 5	.015473 5
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 5.99				
Prob>chi2 = 0.0500				
(V_b-V_B is not positive definite)				

Source: Research data

Table 5.2 was the Hausman specification test which indicated that random effect model was the preferred model.

Since the probability was 0.0500 which is more than 5 % significant level. Thus we shall not reject the null hypothesis which states that random effect model is the preferred model but rather we shall accept it. Also the chi-square value was more than the probability. This further indicated that there was no correlation between the unique errors (ui) and the regressors.

Table 5.3 Test of Heteroscedasticity

Breusch and Pagan Lagrangian multiplier test for random effects			
roa[id,t] = Xb + u[id] + e[id,t]			
Estimated results:			
Var	sd = sqrt(Var)		
Roa	67.93271	8.24213	
E	5.121688	2.263115	
U	89.40085	9.455202	
Test: Var(u) = 0			
chibar2(01) = 8.80			
Prob> chibar2 = 0.0015			

Source: research data

The Breusch –Pagan test of heteroscedasticity table 5.3 revealed the presence of random effects. Thus the null hypothesis was that no heteroscedasticity exists and alternative heteroscedasticity exists. The probability was 0.0015 which was less than 5 % level. which implied that heteroscedasticity exists. Thus the Hausman specification test and the Breusch-pagan test both indicated that random effect model was the preferred model.

4.7.3. Operating expense ratio on financial performance

Table 5.4 Fixed effect (within) Estimation results

Fixed-effects (within) regression	Number of obs = 30
Group variable: id	Number of groups = 11
R-sq: within = 0.2683	Obs per group: min = 1

Between = 0.9208		avg = 2.7				
Overall = 0.8287		max = 4				
F(2,17) = 3.12						
corr(u _i , X _b) = 0.7990				Prob> F = 0.0703		
roa	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	
Oer	-.21631 49	.08761 06	-2. 47	0.0 24	-.401157	-.03147 27
lloer	.02115 36	.05877 13	0.3 6	0.7 23	-.102842 9	.14515 01
_c ons	5.3881 37	2.8808 02	1.8 7	0.0 79	-.689823 9	11.466 1
sigma_u 5.2121517						
sigma_e 1.4328562						
rho .92973632 (fraction of variance due to u _i)						
F test that all u _i =0: F(10, 17) = 8.59 Prob> F = 0.0001						

Source:Research Data

Table 5.4 was the fixed effect model and the results indicated that operating expense ratio had negative and statistically significant relationship with return to assets ratio and results are consistent with results of Munyambonera (2012) who added that negative effect of growth in bank profitability could be explained by high costs in bank operations. Other results that are consistent with study findings are those of Abebe(2014), Alkhatib (2012) and Kosmidou *et al* (2008).The lagged operating expense ratio had positive and insignificant relationship with return to assets ratio .Operating expense ratio had coefficients of -0.2163 and probability of 0.024 while lagged operating expense ratio had coefficients of 0.0211 with probability of 0.723 which was insignificant relationship at 72.3%.The coefficients of the lagged operating expense ratio was negative and the negative sign of the coefficients could be explained by the high costs of the microfinance institutions in the previous period.

Table 5.5 Random effect GLS estimation results

Random-effects GLS regression				Number of obs = 30		
Group variable: id				Number of groups = 11		
R-sq: within = 0.2611				Obs per group: min = 1		
Between = 0.8990				avg = 2.7		
Overall = 0.8208				max = 4		
				Wald chi2(2) = 78.08		
corr(u _i , X) = 0 (assumed)				Prob> chi2 = 0.0000		
Roa	Coef.	Std. Err.	Z	P> z	[95% Conf. Interval]	
Oer	-.333912 8	.07534 96	-4. 43	0.00 0	-.48159 52	-.18623 04
Lloer	-.004824 1	.03011 96	-0. 16	0.87 3	-.06385 74	.054209 2
_cons	9.772487 3	1.7605 3	5.5 5	0.00 0	6.32191 2	13.2230 6
sigma_u 2.4693963						
sigma_e 1.4328562						
rho .74811947 (fraction of variance due to u _i)						

Source:Research data

Table 5.5 was the random effect model and results revealed that operating expense ratio had negative and statistically significant relationship with return to assets ratio whereas lagged operating expense ratio had negative but insignificant relationship with return to assets ratio .The coefficients for operating expense ratio was -0.3339 with probability of 0.000 whereas lagged operating expense ratio had coefficients of -0.0048 and probability of 0.873 .the relationship with return to assets ratio was not significant at 87.3 %.

Table 5.6 Hausman specification test

---- Coefficients ----				
(b)		(B)	(b-B)	
sqrt(diag(V _b -V _B))				
	Fe	Re	Differenc e	S.E.
oer	-.21631 49	-.333912 8	.117598	.04469 96
lloer	.021153 6	-.004824 1	.0259778	.05046 65

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
$\chi^2(2) = (b-B)'[(V_b - V_B)^{-1}](b-B)$ = 6.92
Prob>chi2 = 0.0314

Source:Research data

Table 5.6 was the Hausman specification test which showed that fixed effect model was the preferred model. The null hypothesis was that the preferred model was random effect and the alternative fixed model preferred model. The probability was 0.0314 which was statistically significant at 5%. The probability was significant at 0.03% implying that we shall reject the null hypothesis and accept the alternative. Thus fixed effect model was the preferred model. Also the chi-square test value 6.92 which was more than the probability value at 0.03% which indicated that there was correlation between the unique errors (ui) and the regressors.

Table 5.7 Test of Heteroscedasticity

Breusch and Pagan Lagrangian multiplier test for random effects			
$roa[id,t] = Xb + u[id] + e[id,t]$			
Estimated results:			
Var		sd = sqrt(Var)	
roa	42.83768	6.54505	
E	2.053077	1.432856	
U	6.097918	2.469396	
Test: Var(u) = 0			
chibar2(01) = 9.23			
Prob> chibar2 = 0.0012			

Source:Research data

Table 5.7 Breusch –Pagan test of heteroscedasticity for return to assets ratio was conducted. The null hypothesis was that no heteroscedasticity existed and alternative heteroscedasticity exists. The chi-square value was 9.23% greater than the probability value at 0.1%. The probability was 0.1% which was less than the 5% significant level. This indicated that heteroscedasticity existed.

Table 5.8 Test for Heteroscedasticity:Autoregressive Model

Test for Serial correlation			
Breusch and Pagan Lagrangian multiplier test for random effects			
$roa[id,t] = Xb + u[id] + e[id,t]$			
Estimated results:			
Var		sd = sqrt(Var)	
Roa	42.83768	6.54505	
E	2.313831	1.521128	
U	.6366207	.7978851	

Test: Var(u) = 0
chibar2(01) = 0.18
Prob> chibar2 = 0.3372

Source:Research data

Table 5.8 was the heteroscedasticity test of autoregressive model. Results of the probability indicated no presence of heteroscedasticity. The null hypothesis was that no heteroscedasticity and alternative heteroscedasticity exists. The probability was 0.3372 which was more than the 5% level of significance. The probability value was 33.72%. Thus we shall not reject the null hypothesis but rather accept the null which states that no heteroscedasticity exists. The test was carried out using the Breusch-pagan LM test. The Chi-square value at 1 degree of freedom was 0.18 which is less than the p-value at 0.3372. This therefore meant that the variance of the random component was constant at 1% significant level. There was no presence of random effects.

V. CHAPTER V: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings on the effect of financial indicators on financial performance of Microfinance institutions in Kenya, conclusions, relevant policy recommendations and areas for further research.

5.2 Summary of Findings

Return on assets ratio exhibited a negative correlation with operating expense ratio. Results revealed that a decrease in expenses increases the profit of Microfinance institutions in Kenya. This indicates that the Microfinance institutions in Kenya have much to profit if they are able to exercise efficient cost management practices. Debt to equity ratio correlated positively with return on assets ratio and negatively with operating expense ratio whereas portfolio to assets ratio had a negative correlation with return on assets ratio. Operating expense ratio also correlated positively with portfolio to assets ratio. In addition, debt to equity ratio was positively correlated with portfolio to assets ratio. Fixed effect model would have been the preferred model based on the Hausman specification panel estimation technique but the study chose random effect model since it gives better results. The random effect model results showed that debt to equity ratio had a negative relationship with return on assets ratio but the relationship was statistically insignificant. Portfolio to assets ratio had a positive and insignificant relationship with return on assets ratio. In addition, operating expense ratio had a negative relationship with financial performance (ROA). The relationship was statistically significant with returns on assets ratio. Debt to equity ratio on financial performance autoregressive distributed lag model random effect model was conducted. In this model the random effect model was the preferred model according to the Hausman specification test. Results from the random effect indicated that debt to equity ratio had positive and statistically significant relationship with return to assets ratio. Lagged debt to equity ratio had positive and statistically significant relationship with return to assets ratio.

Autoregressive distributed lag model was also conducted on portfolio to assets ratio on financial performance and the random effect model results revealed that portfolio to asset ratio had positive and insignificant relationship with return to assets ratio. Lagged portfolio to assets ratio had positive and significant relationship with return to assets ratio. The insignificant results between portfolio to assets ratio and return to assets ratio implies that portfolio to assets ratio is not a determinant of return to assets ratio. Hausman specification test indicated that random effect model was the preferred model. Since the probability was 0.0500 which is more than 5 % significant level. Thus we shall not reject the null hypothesis which states that random effect model is the preferred model but rather we shall accept it.

Autoregressive distributed lag model was conducted on operating expense ratio on financial performance and fixed effect model results indicated that operating expense ratio had negative and statistically significant relationship with return to assets ratio. The lagged operating expense ratio had positive and insignificant relationship with return to assets ratio. The coefficients of the lagged operating expense ratio was negative and the negative sign of the coefficients could be explained by the high costs of the microfinance institutions in the previous period. Hausman specification test which showed that fixed effect model was the preferred model. The null hypothesis was that the preferred model was random effect and the alternative fixed model preferred model. Thus fixed effect model was the preferred model.

5.3 Conclusion

The objective of the study was to examine the effect of financial indicators on financial performance of microfinance institutions in Kenya. The study concentrated on 12 MFIs due to insufficient data available for the panel data of 42 MFIs within a span of five years from 2009-2013. The findings of the study showed a negative correlation between portfolio to assets ratio and return on assets ratio whereas debt to equity ratio correlated positively with return on assets ratio. Operating expense ratio exhibited a negative correlation with returns on assets ratio. The negative coefficient and significant effect of operating expense ratio on financial performance (ROA) shows that decrease in expenses increases the performance of the microfinance institution industry in Kenya. This indicates that the MFIs in Kenya have much to profit if they are able to exercise efficient cost management practices. The negative coefficient (-0.1857) of the operating expense ratio implies that there is a lack of efficiency in expense management in MFIs industry in Kenya. Thus highly significant and negative coefficient of the OER causes poor performance in Kenyan MFIs. This means that the higher costs of operation negatively affect financial performance of the Microfinance institutions.

In addition, the researcher postulated that operating expense ratio and debt to equity ratio are statistically not significant predictor variables in determining return on assets ratio. Conclusions of this study are contrary to the results of Brand *et al* (2001) and Zeynap (2006) in profitability of MFIs whereas the study findings constitute the results of Modigliani *et al* (1958), Berger *et al* (2006) a study on leverage of MFIs.

5.4 Policy Recommendations

The main aim of MFIs is to provide access to financial empowerment to support self employment and small enterprises. Thus the following recommendations are put forward in order to improve the financial performance of MFIs. Association of Microfinance Institution should conduct audit to ensure that all microfinance institutions maintain a proper balance between debt and equity in order to ensure that proper debt management practices are affected and the right investment decisions are made. This will help in regulating microfinance institutions especially in maintaining proper credit policies and making the right investment decisions.

Microfinance institutions in Kenya should aim at formulating and implementing strategies that are likely to enhance rate of returns from their investment portfolios. They could do this by stepping up their effort in educating their clientele about the loan products and they can in turn invest. This would make loans more attractive and competitive thus widening the interest spreads and a higher rate of return. However, changes in interest rate should be done on the basis of interest rate elasticity. Also, the MFIs should lower their interest rate to a level that would cover its operating expenses and at the same time facilitate the growth of their client business.

The government should tighten up the regulations governing the MFI businesses in Kenya to ensure a complete regulatory framework. This will ensure that licensing of microfinance institutions is done as opposed to the current system where there are different forms of institutions offering microfinance services. The government should enact a law that requires that all MFIs should belong to the Association of Microfinance institutions. This will promote accountability and make the MFI industry grow stronger in terms of resource mobilization and thus improve the MFIs financial performance.

5.5 Recommendation for Further studies

In the final analysis, this study opens up areas for further research. One would be to investigate the effect of financial indicators on financial performance of the Microfinance Institutions in other countries, regions and continents and add to the existing literature.

Secondly, the study only used a few of the variables such as returns on assets ratio, debt to equity ratio, portfolio to assets ratio and operating expense ratio. Future studies may consider other variables such as return on equity, net interest margin, write off ratio, capital assets ratio and other financial ratios on financial performance of Microfinance Institutions.

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