Effect of Debt to Equity Ratio on Financial Performance of Microfinance Institutions in Kenya

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***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. 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 debt to equity ratio on financial performance. For this reasons it is not clear whether or not debt to equity ratio affect financial performance of microfinance institutions (MFIs) in Kenya. The main objective of the study was to investigate the effect of debt to equity ratio on financial performance of MFIs in Kenya. The specific objectives were to; find out the effect of debt to equity ratio, portfolio to assets ratio and operating expense ratio on the financial performance of MFIs in Kenya. Sample size consisted a panel data set of 12 MFIs selected using purposing sampling method for the period from 2009 to 2013 and secondary data was collected. 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 coefficient for lagged return to assets ratio was 0.4733, debt to equity ratio was -0.0026, portfolio to assets ratio was 0.0090 and coefficient for operating expense ratio was -0.1857. P-values for DER was 0.878 , PAR, 0.686 and OER, 0.000. The study recommends that AMFI should conduct audit to ensure that all MFIs maintain a proper balance between debt and equity.**

Keywords: **Microfinance, Financial ratios, Financial performance, Kenya**

I. INTRODUCTION

1.1 Concept and Scope of Micro Finance

According to Robinson, (1998) micro finance refers to the provision of a broad range of financial services such as; deposits, loans, payment services, money transfers and insurance products-to the poor and low income households for their micro enterprises and small businesses to enable them to raise their income levels and improve their living standards. Anan (2002) further elaborates this by describing the core principles of micro finance to include; access to appropriate financial services among the poor-micro financing is based on the premise that the poor has the capability to repay loans, pay the real cost of loans and generate savings, micro finance is an effective tool for poverty alleviation, microfinance institutions must aim to provide financial services to an increasing number of disadvantaged people, microfinance can and should be undertaken on a sustainable basis and microfinance NGOs and programs must develop performance standards that will help define and govern the micro finance industry towards greater reach and sustainability. Gungen (2002) described the features of microfinance based on the type of client, lending technology, loan portfolio, organizational ideology and institutional structure. On the client type for micro finance, Gungen (2002) noted that clients are characterized by low income, employment in the informal sector, low wage bracket, lack of physical collateral, closely interlinked household/business activities. According to Lafourcade, Isern, Mwangi and Brown, (2005) microfinance institutions (MFIs) in sub-Saharan Africa include a broad range of dispersed institutions that offer financial services to low-income clients; non-governmental organizations (NGOs); Non-bank financial institutions, cooperatives, rural banks, savings and postal financial institutions, and an increasing number of commercial banks. Overall, the prospects and processing of MFIs in Africa are dynamic and growing. Africa's MFIs appear to serve the broad financial needs of their clients by offering savings as a core financial service for clients and use it as an important source of funds for lending. MFIs in Africa tend to report lower levels of profitability, as measured by return on assets, than MFIs in other regions, in the world. Among the African MFIs, that provide information for Lafourcade *et al* (2005) research 47 percent posted positive unadjusted returns, regulated MFIs reported the highest return on assets of all MFI types, averaging around 2.6 per cent. The microfinance sector in Africa is expanding rapidly and the institutions have increased their activities. African MFIs are among the most productive globally as measured by the number of borrowers and savers. It's also reported the MFIs in Africa also demonstrate higher levels of portfolio quality with an average portfolio at risk of over 30 days of only 4 percent.

II. THEORETICAL FRAMEWORK

2.0.1 Arbitrary pricing theory

Arbitrary pricing theory was employed to measure microfinance financial performance. The approach has been adopted from the work done by Ross (1976).The Arbitrage Pricing Theory of Ross (1976, 1977) and extensions of that theory constitute an important branch of asset pricing theory and one of the primary alternatives to the capital asset pricing model (CAPM).In a factor model, the random return of each

security is a linear combination of a small number of common or pervasive factors, plus an asset specific random variable. The APT is a substitute for the capital assets pricing model (CAPM) in that both assert a linear relation between assets expected returns and their covariance with other random variables .In the CAPM, the covariance is with the market portfolios return. The covariance is interpreted as a measure of risk that investors cannot avoid by diversification. The slope coefficient in the linear relation between the expected returns and the covariance is interpreted as a risk premium.

Focusing on the assets returns governed by a factor structure, the APT is one period model in which preclusion of arbitrage over static portfolios of these assets leads to a linear relation between the expected return and its covariance with the factors. The arbitrage pricing theory has various practical applications due to its simplicity and flexibility. The three areas of applications include assets allocation, the computation of the cost of capital and the performance evaluation of managed funds. The application of the APT in assets allocation is motivated by the link between the factor structure and mean- variance efficiency. Since the structure with k factors implies the existence of k assets that span the efficient frontier, an investor can construct a mean –variance efficient portfolio with only k assets .The use of the APT in the construction of an optimal portfolio is equivalent to imposing the restriction of the APT in the estimation of the mean and covariance matrix involved in the mean –variance analysis.

Other attempts to apply the APT model to compute the cost of capital included Bower *et al*(1984) and Goldenberg who used the APT to study the cost of capital for utility shocks and Antonio *et al*(1998) who used the APT to calculate the cost of equity capital when examining the impact of the European exchange rate mechanism. The application of the asset pricing model to the evaluation of money managers was pioneered by Jensen (1968).When the APT to evaluate the money managers, the managed funds returns are regressed on the factors and the intercepts and compared with the returns on benchmark securities such as treasury bills. 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.

III. RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology that was used in the study. The chapter outlines, model specification, data collection and 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.

$$ROA_{it} = \beta_o + \beta_1 \quad DE_{it} + \beta_2 \; PA_{it} + \beta_3 \quad OE_{it} \quad + \varepsilon_{it}$$

…….…….. (3.1)

Model I: 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

$$ROA_{it} \quad = \alpha_0 \quad + \alpha_1 \; DE_{it} \quad + \alpha_2 \; DE_{it-1} \quad + \varepsilon_{it}$$

…….. (3.3)

(ii).Portfolio to assets ratio on Microfinance Institution

$$ROA_{it} \quad = \delta_0 + \delta_1 \; PA_{it} \quad + \delta_2 \; PA_{it-1} \quad + \varepsilon_{it}$$

…….…... (3.4)

(iii).Operating expense ratio on Microfinance Institution

$$ROA_{it} = \gamma_0 + \gamma_1 \; OE_{it} \quad + \gamma_2 \; OE_{it-1} \quad + \varepsilon_{it}$$

……..…. (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 $\beta_1 \geq 0, \beta_2 \geq 0, \beta_3 \geq 0$

3.3 Hausman Test

This tests the efficiency and consistency between the fixed effect and random affect estimations. Although the econometric theory recommends random effect estimation for unbalanced panels, a confirmatory test by use of the Hausman specification test is usually carried out to evaluate the efficiency between fixed effect and random effect estimation methods. A rejection of the null hypothesis is when Prob > $Ch_2 = \alpha$ confirms the efficiency and consistency of the random effect in estimating the model, Munyambonera (2012).

Table 3.1 Hausman specification test results on the financial Indicators

Coefficients				
(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))	
	Fe	Re	Difference	S.E.
Llroa	.0691465	.4733858	-.4042392	.1240889
Par	.0067674	.0090436	-.0022762	.016294
Der	.000582	-.0026717	.0032538	.0051747
Oer	-.1793176	-.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 3.1 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. Hence the null hypothesis was rejected and fixed effect estimation was favoured against random effect estimations. However the fixed effect model was not a good model thus the study chose the random effect model which gave good results.

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 regression results.

4.2 Diagnostic Test Results

4.2.1 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 4.1 Hausman specification test results on the financial ratio

Coefficients				
(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))	
	Fe	Re	Difference	S.E.
Llroa	.0691465	.4733858	-.4042392	.1240889
Par	.0067674	.0090436	-.0022762	.016294
Der	.000582	-.0026717	.0032538	.0051747
Oer	-.1793176	-.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 4.1 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.

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 as 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 0.001which 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, this 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 this results therefore the study does not reject null hypothesis but accept the null hypothesis which states that portfolio to assets ratio has no affect 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.

4.3 Autoregressive Distributed Lag Models

4.3.1 Debt Equity Ratio on Microfinance Performance

Table 4.2: 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 4.2 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 4.3: 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 4.3 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 4.4: Hausman Specification results

---- Coefficients ----				
(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))	
	Fe	Re	Difference	S.E.
der	.0534118	.0525143	.0008975	.0028076
Llder	.0799378	.0789972	.0009406	.0030371
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 4.5 Test of Heteroscedastcity

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	58.33731	7.637886
e	2.139874	1.462831
u	75.39865	8.68324
Test: Var(u) = 0		
chibar2(01) = 14.69		
Prob> chibar2 = 0.0001		

Source: Research data

Table 4.5 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.

4.3.2 Portfolio to Asset Ratio on Microfinance Performance

Table 4.6 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	.0182386	.0377548	0.48	0.634	-.0605166	.0969937
Llpar	.20117	.0613237	3.28	0.004	.073251	.3290891
_cons	-12.29561	2.456791	-5.00	0.000	-17.42039	-7.170833
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 4.6 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 4.7 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	.0200419	.0387534	0.52	0.605	-.0559133	.0959971
Llpar	.1621406	.0593394	2.73	0.006	.0458374	.2784437
_cons	-12.26365	3.783317	-3.24	0.001	-19.67882	-4.848488
sigma_u 9.4552024						
sigma_e 2.2631146						
rho .94581517 (fraction of variance due to u_i)						

Source: Research data

Table 4.7 was the random effect model results which revealed that portfolio to asset ratio had positive 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 4.8 Hausman Specification results

---- Coefficients ----				
(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))	
	Fe	Re	Difference	S.E.
Par	.0182386	.0200419	-.0018033	.
Llpar	.20117	.1621406	.0390295	.0154735
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 4.8 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 4.9 Test of Heteroscedastcity

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 4.9 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 tha 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.

4.3.3. Operating expense ratio on financial performance

Table 5.0 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, Xb) = 0.7990				Prob> F = 0.0703		
Roa	Coef.	Std. Err.	T	P>|t|	[95% Conf. Interval]	
Oer	-.2163149	.0876106	-2.47	0.024	-.401157	-.0314727
Lloer	.0211536	.0587713	0.36	0.723	-.1028429	.1451501
_cons	5.388137	2.880802	1.87	0.079	-.6898239	11.4661
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 5.0 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 5.1 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	-.3339128	.0753496	-4.43	0.000	-.4815952	-.1862304
Lloer	-.0048241	.0301196	-0.16	0.873	-.0638574	.0542092
_cons	9.772487	1.76053	5.55	0.000	6.321912	13.22306
sigma_u 2.4693963						
sigma_e 1.4328562						
rho | .74811947 (fraction of variance due to u_i)						

Source: Research data

Table 5.1 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 5.2 Hausman specification test

---- Coefficients ----				
(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))	
	Fe	Re	Difference	S.E.
oer	-.2163149	-.3339128	.117598	.0446996
lloer	.0211536	-.0048241	.0259778	.0504665
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)				
= 6.92				
Prob>chi2 = 0.0314				

Source: Research data

Table 5.2 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 0.0314nwhich 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 5.3 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	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 5.3 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.

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

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

5.2 Summary of Findings

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 main objective of the study was to examine the effect of debt to equity ratio 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.

MFIs should consider the provision of long term loans to their clients thus reducing the frequency of repayment. MFIs should consider setting up offices in the rural areas. The MFIs have not been able to access the rural areas due to poor infrastructure. Hence efforts should be geared towards the improvement of the infrastructure by the government thus providing an enabling environment for the MFIs to operate.

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 or return. However, changes in interest rate should be done on the basis of interest rate elasticity.

5.5 Limitations of the study

The study had various limitations which need to be considered by other researchers when carrying out further research .The study only considered the effect of financial ratios on financial

performance of Microfinance Institutions in Kenya and period of study was also short.

5.6 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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