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ASSESSING THE IMPACT OF THE GLOBAL FINANCIAL CRISIS ON AFRICAN MICROFINANCE INSTITUTION PERFORMANCE: EMPIRICAL EVIDENCE FROM EAST AFRICA

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ABSTRACT

Using an econometric approach on unbalanced panel data collected from 23 microfinance institutions (MFIs) in East Africa from the period 2004 to 2009, this study has identified the determinants of operational self sufficiency of MFIs. The random effects GLS regression results show that MFIs' operational sustainability (OSS) is positively and significantly driven by the ratio of gross loan portfolio to total asset and breadth of outreach. Management efficiency measured by operating expenses /asset ratio and credit risk measured by PAR > 30 days have a negative and significant impact on operational sustainability of MFIs. Another interesting result is that MFIs in East Africa have performed even better, in terms of OSS, during the global financial crisis though the result is not statistically significant. Finally, GDP growth has a positive and significant impact on OSS at 95% confidence interval. Thus, management efficiency, loans intensity, portfolio at risk, breadth of outreach and GDP growth are important determinants of MFIs' operational sustainability in East Africa.

KEYWORDS

East Africa, Financial performance, Global financial crisis, Microfinance institutions.

INTRODUCTION

Poverty eradication is at the forefront of Africa's development strategy. Inadequate access to credit by the poor has been identified as one of the contributing factors to poverty. Microfinance institutions help in reducing poverty by providing the poor with sustainable credit facility to start a small business. Empirical evidence establishes that less than 15 percent of the population in developing countries has access to the mainstream financial services (Aryeetey, 1995). The microfinance sector, apart from being a critical component of the financial system, is also regarded as a poverty reduction strategy for developing countries (kyereboah-coleman, 2007).It is in this regard that microfinance is very crucial. As many people in East Africa are living below poverty line, the health of MFIs is very critical to the health of the general economy at large.

The global financial crisis is spreading quickly in emerging markets, but little is known about its impact on the microfinance sector (CGAP, 2009). In March 2009, CGAP surveyed over 400 MFI managers from all regions to identify present impacts of crisis. MFIs (65%) have reported that their gross loan portfolios were either flat or had decreased and 69% of the respondents reported deterioration of loan portfolio quality.The CGAP survey also indicated that MFIs in Latin America and the Caribbean faced a decrease in repayment rate and portfolio quality. The location of MFIs is also an important factor because of economic, regulatory and country specific conditions influencing development of MFIs. Evidently, the impact of the crisis on microfinance sector would differ by geographical location of MFIs (Dokulilova et al, 2009).

East Africa is the least developed region. Interventions through the delivery of microfinance services are considered as one of the policy instruments of their government to eradicate poverty. For sustainable poverty alleviation, the MFIs themselves should be sustainable. Given the relation between the well being of the microfinance sector and the goal of poverty eradication, knowledge of the underlying factors (including the impact of the global financial crisis) that influence the sectors performance is therefore essential not only for the managers of the MFIs, but for numerous stakeholders such as the central bank, governments, and other financial authorities.

Studies, however, on the determinants of operational sustainability of microfinance institutions are very limited and in most cases been carried out on a single country and before the global financial crisis. Empirical evidence regarding the determinants of East African MFIs' sustainability is also missing. Therefore, by using random effects panel data regression model, this study examined the determinants of East African microfinance institutions operational sustainability during the period 2004-2009.

The remaining part of the paper is organized as follows: Section II provides a brief review of the literature on the determinants of MFIs' performance. Section III discusses the dependent and explanatory variables used for examining MFIs' performance determinants. Section IV describes the data and methodology and section V presents empirical results. Finally, section VI concludes.

LITERATURE REVIEW

Studies on the impact of the global financial crisis on performance of MFIs are limited or non-existent. Typically the studies have focused on theoretical issues and empirical work has relied on the analysis of descriptive statistics rather than rigorous statistical estimation. Studies on determinants of performance of African MFIs are also virtually non- existent. Recently, Tilahun and Derege (2011) assessed the financial performance of Amhara Credit and Saving Institution during the global financial crisis and found that there was a negative shift in the performance indicators particularly in the year 2009. Their findings show that gross loan portfolio, number of active borrowers, return on asset and return on equity have declined and a deterioration in portfolio quality revealed.Nawaz (2010) attempts to identify the determinants of MFIs profitability and sustainability using a panel data set of 179 MFIs worldwide. The evidence does not support the trade off between outreach and sustainability, however, the trade off between costs and sustainability of MFIs is well supported. The productivity and efficiency of MFIs contributes towards sustainability.

Bogan (2009) examined the relationship between capital structure and sustainability of MFIs and found that increased use of grants by large MFIs decreases operational self sufficiency. Asset size is significantly and positively related to sustainability. The country level macroeconomic indicator variables (GDP and inflation) are not significant determinants of operational sustainability.

Using an econometric approach on panel data collected from 53 MFIs in Uganda over a period of six years, Okumu (2007) has identified the determinants of sustainability and outreach of MFIs. The study indicates that sustainability is positively and significantly driven by real effective lending rates and age of MFIs and negatively by the ratio of gross outstanding loan portfolio to total assets, the ratio of average loan size to the national per capita income and the unit cost of loan disbursed.

Kyereboah-Coleman (2007) examined the impact of capital structure on the performance of microfinance institutions. This study revealed that leverage, as expected, impacts positively on outreach. This could mean that with microfinance institutions, the higher the leverage, the greater the outreach level, and the higher the premium that is extractable from the credit advanced. This premium then translates into the firm's income flow and profitability which could be used to service the debt. Again greater outreach enables MFIs to enjoy economies of scale essentially as a result of reduction in average cost of operation. Thus, according to this study, when outreach increases, the profitability outlook of the firm will be enhanced.

Ejigu (2009) made performance analysis of a sample MFIs of Ethiopia. The study indicated that profitability and sustainability of the MFI depend on their size with large MFIs having high ROA, ROE and OSS. Using a simple correlation analysis, this study found that there is a trade off between serving the poor and being operationally self sufficient. MFIs age correlates positively with efficiency, productivity, the use of debt financing (commercialization) and OSS.

PERFORMANCE MEASURES AND DETERMINANTS

PERFORMANCE MEASURE

In the microfinance sector, return on asset (ROA), return on equity (ROE), operational self sufficiency (OSS), impact and outreach can be used as a measure of MFIs' performance. In this study operational self sufficiency (OSS) is used as dependent variable since the study seeks to identify determinants of sustainability of MFIs. Given that the MFI data are obtained from MIX market, I utilize the MIX market definitions of operational self sufficiency (OSS). OSS is defined as total financial revenue/ (Financial expense + Operating expense + Loan loss provision expense). Table1 provides a brief description of the dependent and independent variables along with their hypothesized relationship. **[Insert Table1 here]**

INTERNAL FACTORS

The nine measures used as internal determinants of performance are: Operating expense/ Asset ratio(OETA) as an indicator of management efficiency; Debt to Equity ratio (DE) which represents financial leverage ; loan size / GNI per capita (LSGNI) to represent client poverty level; loan to asset ratio (LTA) to measure loans intensity ;age (AGE) which indicates the years since MFI has started operation; portfolio at risk (PAR) to indicate portfolio quality or credit risk; natural logarithm of number of borrowers (LNNB) which represents breadth of outreach; deposit to Asset ratio (DTA) to measure deposit mobilization; and Natural log of total asset (LNTA) which represents size of MFIs.

Operating expense to total asset is used as an indicator of management's ability to control costs. Higher ratios imply a less efficient management and for the most part, the literature argues that reduced expenses improve the efficiency and hence raise the profitability of a financial institution, implying a negative relationship between operating expense ratio and profitability (Bourke, 1989). However, Molyneux and Thornton (1992) observed a positive relationship, suggesting that high profits earned by banks may be appropriated in the form of higher payroll expenditures paid to more productive human capital.

Debt to equity ratio measures the extent to which a firm uses debt relative to equity. The higher the debt/ equity ratio, the higher the financial risk and the higher the cost of funds. This normally means lower profit. A number of studies provide empirical evidence supporting this negative relationship between debt level and firm's performance or profitability (Rajan and Zingales, 1995; Wald, 1999; Booth et al, 2001; Fama and French, 2002). However since debt is the cheapest source of finance and also provides tax shields due to interest expense tax deductibility, this variable can have a positive impact on sustainability. Average loan size divided by the GNI per capita is used as a proxy for measuring the depth of outreach (client poverty level). The smaller the loan size the deeper is the outreach or the poorer the clients. Since small size loans increase the transaction costs of MFIs, the smaller the loan size, the higher the costs or the lower the profit. Thus, LSGNI is expected to affect performance positively. However, Okumu (2007) found negative impact on sustainability.

The gross loan portfolio is the main source of income to a MFI and thus, LTA is expected to have a positive impact on performance. Other things constant, the higher the loan, the higher the interest revenue and profits. However, if a MFIs' risk increase when its loan to asset ratio increase, then profits may decrease. In a study by Okumu (2007) LTA is negatively related with OSS.

The age of MFIs affects sustainability through accumulated experience from learning by doing. Okumu, 2007 and Cull et al, 2007 found positive relation between financial performance and age of MFIs. However, Mersland and Storm (2007) found negative relationship between age of MFI and ROA. Kyereboah-coleman (2007) argued that the age variable could have either effect depending on other factors and measures put in place by the firm to deal with repayment. Hence if a firm is unable to ensure repayment as it grows and reaches out to more clients, default rates are likely to increase and thus lower profitability.

Portfolio at risk (PAR) is an indicator of credit risk or portfolio quality. The higher the PAR, the higher the credit risk or lower profitability. Hence, PAR is expected to have negative impact on performance. Breath of outreach (LNNB) is measured by number of active borrowers. The larger the outreach, the higher the gross loan portfolio and the higher the income that is extractable. However, when the outreach increases if average loan size per borrower decreases, this could have a negative impact on sustainability.

The variable DTA is included in the regression model as a proxy variable for deposit mobilization. It would be reasonable to assume that MFIs with higher DTA are able to attract more deposits, which is a cheaper source of funds. The LNTA variable is incorporated as an independent variable in the regression analysis as a proxy of size to capture the possible cost advantages associated with size (economies of scale). A positive relationship between size and MFIs' sustainability is expected. The study by Bogan (2008), Mersland and Storm (2007) and Cull et al (2008) shows that size is positively and significantly related to financial performance.

EXTERNAL FACTORS

Turning to the external determinants, three variables are considered. These variables include GDP growth (GDPG), Inflation (INF) and Global financial crisis dummy (GFC). Generally, higher economic growth encourages MFIs to lend more and permits them to charge higher margins as well as improve the quality of their assets. Thus, GDP growth is expected to have a positive impact on sustainability. Inflation affects the real value of costs and revenues although it may have a positive or negative effect on profitability depending on whether it is anticipated or unanticipated **(Perry, 1992).**

Finally in order to examine for the impact of the global financial crisis on the sustainability of East African MFIs, GFC (a dummy variable that takes a value of 1 for the crisis period and O for pre-crisis) is included in the regression analysis.

DATA AND METHODOLOGY

DATA

To investigate the determinants of operational sustainability of MFIs, I utilize panel data on MFIs in East Africa for the years 2004 through 2009. The MFIs data is collected from individual institutions as reported to MIX market.[1] since the study seeks to examine the impact of the global financial crisis, all MFIs that have reported the required data to MIX market for at least the period 2006 through 2009 are included in the study. This yielded unbalanced panel data for 23 MFIs, consisting of 121 observations. Additional data on country macroeconomic variable (GDP growth and Inflation) is collected from the World Bank Key development data and statistics web site.[2]

A test for multicollinearity has been made using variance inflation factor (VIF). The VIF value of LNTA (size) is 33.59. **(Insert Table 2 here)**. Therefore, size is dropped from the regression analysis since its VIF is greater than 10. As a rule of thumb, if the VIF for a variable exceeds 10, that variable is said to be highly collinear (Gujarati and Sangeetha, 2008). When size is dropped from the regression model, the new VIF value for each explanatory variable becomes less than 3 indicating that multicollinearity problems are not severe or non-existent. **(Insert Table 3 here)**.

METHODOLOGY

To test the relationship between MFIs operational sustainability and internal and external determinants described earlier, I estimate a linear regression model in the following form:

$$P_{it} = \beta_0 + \sum_{j=1}^{9} \beta_j X_{jit} + \sum_{e=10}^{12} \beta_e Y_{eit} + \varepsilon_{it} \quad (1)$$

Where $_i$ refers to an individual MFI; $_t$ refers to year; P refers to performance measures (operational sustainability), X_j represents internal factors (determinants) of sustainability for MFIs; Y_e represents the external factors (determinants) of sustainability for MFIs; β_0 is the constant; $\beta 1, \beta_2, ---, \beta 12$ represent the coefficient for the independent variables and ε_{it} is error term(=$\eta_i + \mu_{it}$).

To examine the determinants of operational sustainability of MFIs I apply random effects GLS regression model. The choice between fixed effects model and a random effects model is based on the use of the Hausman test. The Hausman specification test shows that the difference in coefficients estimated using fixed and random effects regression is not systematic (Chi2 (11) = 2.36, Prob> Chi2 = 0.9968). Thus, random effects GLS regression is favored. Breusch and Pagan

Lagrangian multiplier test for random effects (chi2(1) = 78.72, Prob > chi2 = 0.0000) also shows that data is fit for the random effects GLS regression than pooled OLS.Extending equation (1) to reflect all the explanatory variables used as described in Table1, the baseline model is formulated as follows.

$$S_{it} = \alpha + \beta_1 OETA + \beta_2 DE + \beta_3 LSGNI + \beta_4 LTA + \beta_5 AGE + \beta_6 PAR$$
$$+ \beta_7 LNNB + \beta_8 DTA + \beta_9 LNTA + \beta_{10} GDPG + \beta_{11} INF + \beta_{12} GFC + \varepsilon_{it} \quad (2)$$

Where S represents operational self sufficiency (OSS) and others as described in Table1.

Autocorrelation and heteroskedasticity is controlled by using clustered robust standard errors in the random effects model. The normality of the error term is tested by using Shapiro-Wilk test for normal data and is found normal since P-value is 0.63916 (See **Table 4**).

EMPIRICAL RESULTS

In this section, I will discuss the determinants of operational sustainability of East African MFIs measured by using random-effects GLS regression. The regression results focusing on the relationship between MFIs sustainability and the explanatory variables are presented in Table 5. **(Insert Table 5 here)**.

A model fitness test is checked by the Wald test (Wald chi2 (11) = 187.37, prob> chi2 = 0.0000). This shows that the explanatory power of the model is reasonably high.

INTERNAL FACTORS

As expected the coefficient of operating expense /asset ratio (OETA) is negative indicating a negative relationship with MFIs' sustainability. The result is statistically significant at the 1% level and imply that an increase(decrease) in these expenses reduces(increases) the sustainability of MFIs operating in East Africa. Consistent to this finding, Pasiouras and Kosmidou (2007) and Kosmidou(2008) have also found that poor expenses management to be among the main contributors to poor bank profitability.

The coefficient of debt/equity ratio (DE) is positive though not statistically significant. Debt financing is the cheapest source of finance and hence MFIs earn a higher spread which normally means higher operational sustainability. A number of studies provide empirical evidence supporting this positive relationship between debt level and firm's performance or profitability (Roden and Lewellen,1995; Champion,1999; Berger and Bonaccorsi di patti,2006).

As expected average loan size divided by the GNI per capital (LSGNI) is found to have a positive impact on operational sustainability. Since small size loans increase the transaction costs of MFIs, the larger the loan size, the lower the costs and the higher the profit. However, the result is not statistically significant.

The coefficient of loan to asset ratio (LTA) is positive and statistically significant at the 1% level. This shows that operational sustainability is positively and significantly driven by the ratio of gross loan portfolio to total asset. This result contradicts with findings of previous literature which document a negative impact of LTA on MFIs' sustainability(Okumu,2007).

The coefficient of portfolio at risk (PAR) is negative which is consistent with the hypothesis. The result is statistically significant at 1% level. This result may be explained by considering the fact that the more MFIs are exposed to credit risk, the higher is the accumulation of unpaid loans and lost interest income which reduces operational sustainability of MFIs. Age of MFIs is also found to have a negative impact on operational sustainability but not significant. As expected the deposit /asset ratio is positively related to operational sustainability. However, the result is not statistically significant since p-value is greater than 10%.

Finally it is found that breadth of outreach (LNNB) is positively and significantly related to operational sustainability. This could mean that the larger the outreach, the higher the gross loan portfolio and the higher the financial revenue, which is the numerator in determining OSS. Again greater outreach helps MFIs to enjoy economies of scale due to reduction in average cost of operation.

[1]www.mixmarket .org.

[2]http://web.worldbank.org.

EXTERNAL FACTORS

When we look at the impact of external factors on operational sustainability (OSS), inflation and global financial crisis have no significant effect on OSS since the p-value is greater than 10%. However, GDP growth is found to have a positive and significant impact at 95% confidence interval since P-value is less than 5%. This provides support to the argument of positive association between economic growth and MFI performance.

The coefficient of inflation (INF) is negative indicating that the inflation was not anticipated and MFIs did not get the opportunity to adjust interest rates accordingly. The result, however, is not statistically significant. Finally it is found that MFIs in East Africa have performed even better during the global financial crisis (the coefficient for GFC is positive but not significant).

CONCLUSIONS

This study examined the impact of internal and external factors on East African MFIs' operational sustainability. Unbalanced panel data for 23 MFIs consisting of 121 observations, covering the period 2004 – 2009, provided the basis for the econometric analysis.

The results indicate that MFIs' operational sustainability is positively and significantly driven by the ratio of gross loan portfolio to total asset and breadth of outreach. Management efficiency measured by operating expenses /asset ratio and credit risk measured by PAR > 30 days are found to have a negative and significant impact on operational sustainability of MFIs. Therefore, by influencing these internal factors, a MFI could be able to improve its sustainability.

When we consider external factors, inflation has no significant impact on OSS. Another interesting result is that MFIs in East Africa have performed even better, in terms of OSS, during the global financial crisis though the result is not statistically significant. Finally, GDP growth is found to have a positive and significant impact on OSS at 95% confidence interval.

Thus, management efficiency, loans intensity, portfolio at risk, breadth of outreach and GDP growth are important determinants of MFIs' operational sustainability in East Africa. Finally, further research could examine the determinants of credit risk and outreach since these variables are the main determinants of sustainability but studies aimed at assessing the same is missing.

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TABLES

TABLE 1: DESCRIPTION OF VARIABLES AND HYPOTHESIZED RELATIONSHIP

Variables	Description	Operational sustainability
OETA	Operating expense divided by total asset	-
DE	Debt/equity ratio	+/-
LSGNI	Average loan size divided by GNI per capita	+
LTA	GLP divided by total asset	+/-
AGE	The number of years since date of establishment	+/-
PAR	Portfolio at risk greater than 30 days	-
LNNB	Natural logarithm of number of active borrowers	+/-
DTA	Total deposit scaled by total asset	+
LNTA	Natural logarithm of total assets	+
GDPG	GDP Growth rate	+
INF	Annual inflation rate	+/-
GFC	Global financial crisis dummy	-

TABLE 2: MULTICOLLINEARITY DIAGNOSTICS

Variable	VIF	1/VIF
LNTA	33.59	0.02977
LNNB	23.77	0.042065
LSGNI	4.84	0.206654
AGE	2.89	0.346404
DTA	2.41	0.414396
GDPG	1.93	0.517884
OETA	1.72	0.581715
LTA	1.72	0.581795
GFC	1.47	0.681575
PAR	1.32	0.759453
INF	1.31	0.761112
DE	1.24	0.807173
Mean VIF	6.52	

TABLE 3: MULTICOLLINEARITY DIAGNOSTICS (VARIABLE- SIZE DROPPED)

Variable	VIF	1/VIF
LNNB	2.7	0.370979
DTA	2.35	0.426306
AGE	2.09	0.47886
LSGNI	1.9	0.525791
OETA	1.65	0.606653
GDPG	1.49	0.669174
INF	1.31	0.761358
GFC	1.3	0.766832
PAR	1.26	0.793467
DE	1.22	0.819128
LTA	1.18	0.847643
Mean VIF	1.68	

TABLE 4: NORMALITY TEST OF THE ERROR TERM

Variable	Obs	z	Prob>z
e	121	-0.356	0.63916

TABLE 5: RANDOM EFFECTS GLS REGRESSION RESULTS

Independent Variables	**Dependent Variable:OSS**	
	Coef.	**P>z**
DE	0.1891421	0.517
DTA	0.0623227	0.709
LTA	0.7514775	0.000*
LSGNI	0.0485953	0.216
OETA	-1.067297	0.000*
PAR	-0.5807452	0.000*
GDPG	1.41822	0.048**
INF	-0.1026546	0.585
GFC	0.1781568	0.959
AGE	-0.0031529	0.996
LNNB	9.538053	0.001*
_cons	-24.93397	0.371
Number of observations	121	
Model Fitness Test	Wald Chi2(11)=187.37	
	Prob> Chi2=0.0000	
Hausman Test	Chi2(11)=2.36, Prob>Chi2=0.9968	
corr(u_i, X)	0	

Notes: 23 MFIs, period 2004-2009, No. of observations=121, Observations in each group or MFI is: min=4, avg=5.3 and max=6, * 99% level of confidence. **95% level of confidence.

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