MICROFINANCE INSTITUTIONS IN ETHIOPIA, KENYA, AND UGANDA

Loan Outreach to the Poor and
the Quest for Financial Viability

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Gashaw T. Ayele (MSc)

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Loan Outreach to the poor and the Quest for Financial Viability

By Gashaw Tsegaye Ayele[1]

Loan outreach—financial viability nexus is among the unsettled issues in microfinance literature: unyielding stance favoring viability for increased outreach to the poor (depth) versus a trade-off view justifying subsidized Microfinance Institutions (MFIs). The concern is exceedingly relevant to developing countries that opt for right policies towards financial inclusion. Even leading microfinance industries are challenged to reach the wider poor. In their microfinance operations, Kenya and Uganda ranked first and second in Africa; fifth and eighth in the world, respectively; and Ethiopia, although not in the ranking, is an emerging fellow. Yet, the loan service outreaches to the poor in these countries fall short of the escalating demand. This study contextualizes microfinance depth-of-outreach and financial viability issues in Ethiopia, Kenya, and Uganda; analyses depth of loan outreach and financial viability nexus; and quantifies the path from depth to viability. Hausman-Taylor Instrumental Variable Technique (H-T) and Generalized Structural Equation Model (GSEM) are employed on unbalanced panel dataset of 31 MFIs (2003-to-2012) sampled from the three countries. The H-T estimates supported lending to the poor for enhanced viability if operational expenses are contained. Operating-Expense-Per-Loan-Portfolio and Debt-to-Equity-Ratio relate inversely with viability while 'Real-Yield' relates directly. The GSEM revealed positive association between lending to the poor and size of operating expenses, which indirectly hampers viability. Support to MFIs targeted to ensuring efficiency through reduced operational costs can reinforce a complementary outreach—viability nexus otherwise, tradeoff would be inevitable.

Keywords: depth of outreach; financial viability; loan; microfinance institutions; operational self-sufficiency; operating expense.

JEL classification: G21, G20, G00

[1] Gashaw T. Ayele is a research fellow at the Horn Economic and Social Policy Institute (HESPI). He can be reached at gashts@yahoo.com or gashaw.tsegaye@hespi.org. HESPI is an autonomous, non-profit Institute established in 2006, with a vision to become a Regional Institute of excellence and point of reference in socio-economic policy research, advocacy, and institutional capacity building.

I. INTRODUCTION

Low-income people seldom realize their economic opportunities through financial resources of conventional commercial banks— chiefly, loan services. The poor are considered high-risk borrowers; their loan sizes are small requiring high transaction costs; they cannot present high valued collaterals; and their income sources are highly unstable. Thus, the poor long relied on alternative sources of finance: small loans and grants from close relatives, loans from self-established Rotating Savings and Credit Associations (ROSCAs), loans from Saving and Credit Cooperatives (SACCOs) ,and loans from traditional local moneylenders, often at unaffordable rates. The start of micro lending institutions in the 1970s which later grew to microfinance institutions, with added financial services to the financially excluded (manly the poor), has received a warm welcome globally.[2]

Unlike commercial banks, MFIs use methodologies such as solidarity group lending, progressive loan structure, immediate repayment arrangements, regular repayment schedules, and collateral substitutes to minimize associated financial risks and thereby reach the poor[3]. For instance, Consultative Group to Assist the Poor (CGAP) reported that conventional banks in Sub-Saharan Africa serve only one quarter of the total borrowers. The reminder three-quarter borrows from nonbank financial intermediaries, nongovernmental organizations, credit unions/financial cooperatives and others. Banks held 53 percent of the total loan portfolio and 60 percent of the total deposits (CGAP, 2011). This indicates that banks are involved in large loans per client while MFIs dealt with lower per capita loans suggesting MFIs' deeper outreach to the poor.

Thus, governments and donors have committed to support MFIs and thereby promote financial inclusion. Financial inclusion and microfinance in particular, has been a policy priority among governments in Africa. A Conference of African Ministers of Economy and Finance (CAMEF) in December 2009 recommended minimum set of policies meant to advance MFI services amid African Union member countries:

> (i). Adopt the Key Principles for Microfinance Focus on the three complementary roles of fostering an enabling policy and regulatory environment for microfinance that balances increased access for poor people, financial stability, and consumer protection (ii) Create the momentum for continental, regional, and sub-regional financial capability (CAMEF, 2009:1).

[2] Financial inclusion as defined by Lidgerwood, (2013:17) encompasses increased access, improved and effectively used products and services, with better-informed and equipped consumers. Financial exclusion on the other hand is a case when financial inclusion indicators grow to the reveres. Grameen Bank in Bangladesh and affiliates of ACCOIN International in Latin America embark to the microfinance world triggered massive expansion of similar institutions globally. Provision of loans to the world's poor, especially women has been the primary target of microcredit providers. In 2011, 195 million clients worldwide received such credit services (Microcredit Summit Campaign, 2011 cited in Economist Intellegence Unit (EIU), 2013).

[3] Collateral substitutions are sanctions and credit denial as punishments to be imposed on defaulting borrowers.

According to CGAP's estimate (2014), in 2012, the global fund committed for financial inclusion reached USD 29 billion. Moreover, the estimate showed Sub-Saharan Africa's stand at Eastern Europe, Central and South Asia level as one of the top priority destination for international financial inclusion funds.

However, the effect of such funding on sustainability of MFIs has ignited mounting concerns. The concern is on MFIs ability to extend loan services to the poor without donors and governments' financial support in the long term, and on the ability of governments and donors to continue funding to meet the growing demand for finance. Competing views on this has dominated the policy and academic debates.

The nexus between MFIs' loan service outreach to the poor and their institutional financial viability invites intensified scholarly debate on the approaches that MFIs, donors, and governments are advised to follow to promote financial inclusion. The debate is predominantly between the proponents of the self-sustainability approach (also called the financial systems approach or the institutionalist approach) and the poverty lending approach (also called the welfarist approach). The source of the controversy is whether MFIs could continue targeting the poor while remaining financially self-reliant (the poor with economic opportunities distinct from the extreme poor).

The poverty lending approach favors micro-lending to the poor at a lower cost (lower interest rates) through donor and government subsidies to decrease poverty (Millson, 2013; Cull et al., 2007; Schreiner, 2002; Conning, 1999 & ; Morduch ,1999a, 1999b).In contrast, advocates of the self-sustainability approach contend that unless MFIs are sustainable through full-cost recovery, the global microfinance demand will remain unmet. Donors and governments are shorthanded to reach the global microfinance needs, and their subsidies will be short-lived. In other words, while governments and donors provide relatively low cost financial access, their capital resources are insufficient to respond to the overwhelmingly huge loan demand. The self-sustainability proponents further suggest MFIs seek alternative sources of funds, such as mobilizing funds from savings, leveraging equities, and making for-profit investments.

> If there is one unresolved tension that animates those who spend their days working on microfinance, it entails how to navigate the trade-off between maximizing social impact and building strong, large financial institutions. It is healthy tension but an inescapable one. (Armendariz & Mordush, 2010:x)

> Over the years, the popular consensus on microfinance has shifted across the spectrum with an anti-poverty silver bullet at one end and a threat to the financial solvency of the global poor at the other. ... Full financial inclusion is the next frontier for microfinance (Economist Intelligence Unit/EIU, 2013:6).

This study is intended to investigate the loan outreach-viability nexus in the microfinance industries of Ethiopia, Kenya, and Uganda. Kenya and Uganda are admired for their financial innovations and success stories, Ethiopia although an emerging MFI destination is not at par and hence not in global-MFI-branded country list. The EIU (2013) 'Global Microscope on the Microfinance Business Environment' ranking of world leading microfinance destinations, Kenya leads the African continent as ever before , also ranked fifth in selected 55 countries known for microfinance business in the world. Uganda ranked second in Africa and eighth in the world.[4]

Few country specific studies exist that include Okumu (2007) on Uganda and Abate et al. (2013) on Ethiopia, for instance. Using panel data from 53 MFIs and 31 non-bank financial institutions in Uganda, Okumu (2007) found an inverse relationship between the viability indicator (Operational Self-Sufficiency /OSS) and depth of outreach to the poor. Okumu's study mixes Savings and Credit Cooperatives (SACCOs) and specialized MFIs; and it covers a six-year time span. Abate et al. (2013) approached the viability and depth of outreach issues from an organizational form perspective. They raise a question if organizational forms matter in the outreach-viability relationship. Using disaggregated data of microfinance providers in Ethiopia, they compared financial cooperatives and specialized microfinance institutions. The results showed that specialized MFIs face trade-off for higher cost of service delivery while the case of financial cooperatives was mutualism.

The current study shares some features with Okumu (2007) and Abate et al. (2013). However, it differs in its coverage by focusing on multiple countries, methodology used, depth of industry assessment, length of panel period and variable selection. The prior studies although contributed a lot in understanding the direct relationship of depth and viability, none of them looked into the indirect channel. Thus, this study is also different for considering the indirect sources of outreach-viability association. It covers deposit taking and credit only MFIs and looks only into the loan service from all the services MFIs provide these days. Accordingly, the purpose is to investigate (a) how outreach to the poor affect MFIs' financial self-reliance in Ethiopia, Kenya, and Uganda? (b) What are the main determinants of MFIs' financial viability? Does lending to the poor lead to increased operational expenses and thereby threaten viability?

The remaining sections of the paper are structured as follows. Section II reviews the literature on depth of outreach, financial viability and their nexus. Section III contains overview of the MFI industries and comparisons. Section IV discusses the econometric approach while Section V presents estimates and results; and the last section, Section VI, concludes the study.

[4] Other African countries in the ranking after Uganda were Rwanda (22nd), Nigeria (24th) and Tanzania (26th).

II. LITERATURE ON DEPTH OF OUTREACH , FINANCIAL VIABILITY AND THEIR NEXUS

2.1 Definitions and Measurements

2.1.1 ***Depth of Outreach***

Several social performance (outreach) indicators exist in the literature. Schreiner (2002) summarized them into "Six Aspects":'Breadth of Outreach' also called scale of outreach (number of clients served regardless of per capita loan amounts); 'Scope of Outreach' (types of financial services available); 'Length of Outreach' (persistence of microfinance service supply); 'Worth of Outreach' (customer satisfaction or customer loyalty); 'Cost to Clients' (sum of price and transaction costs) ; and 'Depth of Outreach' also called 'Quality of Outreach' (the extent particular target groups are affected such as the poor and women).

Depth of outreach in a social welfare function is the relative importance of the client in the total societal welfare. If society prioritizes improvement of welfare of the poor over the better off, then reduction of poverty would improve societal welfare.

Direct measurement of depth of outreach is difficult and hence indirect proxies are often used. The proxies could be the extent the service reached to disadvantaged groups such as women, rural communities, less or uneducated people, ethnic minorities and so on. The MFIs financial performance can also give clue to their social performance. Woller (2006) argued that poorer clients are less able to absorb larger loans. Either size of average outstanding loan per borrower per Gross National Income (GNI) (used for instance by Wagenaar, 2012; Quayes, 2012; Schriener, 2002; Cull et al., 2007) or adjusted loan size (used for instance by Armendaritz & Szafarz, 2010) are common depth of outreach indicators. Lower values imply deeper outreach with a presupposition that poor clients take small-sized loans.

Average outstanding loan balance per borrower may be increased for three reasons, as argued by Armendaritz & Szafarz (2010). (i) MFIs usually give small loan to new clients and gradually increase the amount as clients prove themselves creditworthy and their income levels increases (progressive lending). (ii) MFIs could lend to wealthier clients to subsidize loans to poorer clients (cross subsidization). (iii) MFI could drift away from lending to the poor for profit (mission drift). Although Armendaritz & Szafarz questioned using average loan size per borrower per GNI as proxy for poverty level of clients under progressive lending and/or cross subsidization, under certain assumptions it can qualify a better proxy. A client who started poor can at some point be wealthy enough to access commercial bank loans, thus, sticking to such groups should instead be considered as a mission drift than as a progressive lending. MFI with social responsibility should relocate loans from the previously poor and the now wealthier clients to the starter poor. It is under this assumption that average loan size per loan portfolio would still qualify a better proxy for depth of outreach. Cross-subsidization, if it does exist, will manifest

itself on scale of outreach than on depth of outreach. The increased average outstanding loan balance to the cross-subsidizers will be equated by small loans extended to newer low-income clients, which would make depth of outreach remain unchanged. Thus, cross subsidization is less of a concern in undermining the quality of the depth proxy.

Yet, I concede that meaningful analyses of poverty outreach would be possible by assessing direct poverty indicators that allow a broader and deeper sight of poverty impact, such undertakings often require longer time and huge financial resources. Hence, average loan size per borrower per GNI is used as proxy for depth of outreach in this study.

Indicators such as percent of women from the total borrowers are also combined with the average loan size proxy to complement measurement of depth, following Kar (2010). Women represent some of the poorest people whose exclusion from the formal financial services is apparent and the case is even worse in developing countries i.e. more women borrowers could imply poorer clients as women often are economically disadvantaged . Thus, proportion of women from the total loan clients can be another proxy for depth of outreach. Hermes et al. (2011) cited in Millson (2013) argued that lower average loan balance and higher share of female borrowers lead to loss of efficiency. Women are better credit risk, but they take small loans that lead to efficiency loss (D'Espallier, 2011 cited in Millson (2013). Thus, in this paper, two depths of outreach indicators are used- average outstanding balance per client per GNI and proportion of women from the total loan clients.

2.1.2 ***Financial Viability***

> Financial viability refers to the ability of a MFI to cover its costs with earned revenue. To be financially viable, an MFI cannot rely on donor funding to subsidize its operations. To determine financial viability, self-sufficiency indicators are calculated. (Ledgerwood, 1999:216-217)

Common financial viability indicators used in past studies are Financial Self-Sufficiency (FSS), Operational Self-Sufficiency (OSS), and even the profitability ratios such as Return On Asset (ROA), Return On Equity (ROE). Transition to viability is from operationally unviable (unable to cover operational costs from operational revenues) to operationally viable (able to cover operational costs from operational revenues) to financially viable (able to cover operational costs without subsidy). Failure to achieve OSS means lesser funds to loan to borrowers, hence, endangers the long-term existence of a MFI as an institution. OSS requires instituting strategies to optimize yield and/or achieve cost efficiency.

Although FSS is superior to other indicators (Cull et al., 2007;Morduch, 1999b) for its comprehensiveness as it passes several adjustments to bring a more complete picture, for the purpose of this paper OSS is used because it is a straight forward measure and it allows easy verification by donors and governments.

2.2 Theoretical and Empirical Debates on the Depth —Viability Nexus

2.1.3 Theoretical Literature

The theoretical debate on depth of outreach and financial viability is predominantly between welfarists and institutionalists. Walfarists argue that MFIs with higher weight to financial objective will have to assign lower weight to their social objectives i.e. trade-off is inevitable (Millson, 2013). If keeping methodologies to deliver small loans and to mobilize deposits while keeping interest rates and fees at sustainable level is impossible, then MFIs will have to develop a framework that consider MFI as a social tool that may have to rely on continued subsidization (Aghion & Mordush, 2005). "Institutionalists" stand against the walfarists claim that financial viability and social objectives can be achieved together because cost of finance do not bother the poor as much as denied access to finance.

The MFIs' success in recovering outstanding loans has confronted the deeply held myth that poor people are not creditworthy and MFIs cannot remain sustainable while extending financial services to low income people. Rhyne (1998) argues that MFIs are reinventing their service delivery methods tailored to their clienteles at the same time efficient enough to recover their cost and hence become financially sustainable i.e. no correlation between addressing the poor and lack of financial viability. The MFI cost structure and service delivery methodologies are instead principal determinants of viability. The debate would precipitate into the question of whether to subsidized interest. Ensuring viability would boost MFIs candidacy for funds directed to outreach expansion, suggesting that viability is a means to increase outreach than a rival. Thus outreach should be considered as an ultimate financial objective while viability as a means to get there (Rhyne, 1998).

While the "Institutionalists" share a firm-stand against direct financing of loan portfolios, they do subscribe to donors' and governments' institutional support to MFIs in areas of technical assistance, information systems , equity funding and similar others. Sustainable MFIs allow donors to use their funds for maximized outreach (Robinson, 2001). Institutional support to MFIs should be to cover the start-up costs. Donor funds will eventually ignite innovations that lead to efficiency through reduced per unit cost of service delivery and increased revenue generation capabilities (Schreiner, 2002).

The fundamental concern, as the "Institutionalists" argue, is MFIs' failure to remain productive, efficient, and unable to charge interest and fees high enough to cover the cost of service delivery. MFIs' reliance on external assistance is not sustainable as donors and governments lose capacities and motivations to continue with subsidizing MFIs.

Against the above claim is the fact that the success in repayment rate has not turned in to financial viability as donor dependent MFIs failed to graduate into financially self-sufficient institutions (Cull et al. 2007).

Another view on this debate is the mathematicians (economist's) view. This view considers that viability and outreach issue as a dual maximization problem with no single solution. Viability is a constraint that should be kept constant in outreach maximization problems. This view is grounded on the concept of Production Possibility Frontiers (PPF) that portrays outreach and viability objects on a two dimensional graph. Once a point is reached on the PPF, the only possibility to further achieve outreach is by sacrificing viability and vice versa, a case where trade-off becomes inevitable. Simultaneous increase in both objectives is possible insofar as outreach-viability combination lies under the PPF. This view concludes that trade-off is a situation that happens when MFIs touch their frontier.

Manos and Yaron (2009) dichotomized the outreach-viability nexus to short- and long-run cycles. They concluded inverse relationship in the short-run, which will turn out to be positive in the long -run; when MFIs succeed in economies of scale, improved operation, and innovation.

2.1.4 Empirical Literature

The role of subsidy in enhancing credit outreach to the poor was evident in the pioneering MFI (Grameen Bank). Evidences show that successful MFIs do not sprung up all by themselves. Although Grameen bank had relied on donors and had witnessed high cost of service delivery, the role of subsidy in the Bank's outreach is uncontested. For instance, between 1985 and 1996, the effective subsidy Grameen bank received was USD175 million which was equal to a 12 fold growth in scale of outreach. The efficacy of subsidy depends on the weight assigned to a dollar earned by poorer clients than that earned by richer clients. Thus, clients' welfare levels should be centers in interest rate determination. Thus, the benefit of continued subsidization need not be undermined although it requires an exhaustive social cost and benefit analysis (Morduch, 1999b).

Cull et al (2007) cross sectional study on 124 institutions in 49 countries concluded that profitability- outreach trade-off or mutuality is a matter of whom MFIs are serving. There is a possibility of profitability while serving the poor but trade-off is the case when services are extended to the poorest clients. They argued for the possibility of increasing yield while maintaining repayment rates and thereby meeting both the social mission and viability given that the clients are less poor (economically active poor). However, their disaggregated analysis by lending methodologies supported outreach-viability trade-off under individual lending methodology i.e. individuals based lenders witnessed highest average profit but they were found to be the least in outreach.

Wagenaar (2012) using a 15-year panel data of 1,558 MFIs concluded mission drift on MFIs transformed from non-profit to profit institutions. Disregarding the possibilities of cross-subsidization and progressive lending, Wagenaar used average loan size and percent of female borrowers to measure depth of outreach. The result showed that as MFIs transform into a for-profit institution, their average loan size increases and the proportion of female borrowers goes down.

Kipesha and Zhang (2013) specified panel data model using the welfarists' and institutionalists' approach separately on 47 MFIs and 4 panel periods in East Africa and found: the welfarist's approach specification revealed trade-off between profitability and outreach while financial viability and outreach showed no tradeoff. The specification based on institutionalists' approach supported no tradeoff between depth and viability. The current paper differs from Kipesha and Zhang's in the specific countries covered, specific panel model used, variable selection, and length of panel period. Quayes (2012) investigation of 702 MFIs selected from 83 countries revealed complementarities between depth of outreach and financial viability.

Woller and Schreiner (2002) study pooling thirteen village banks (including FINCA of Uganda) for over a three-year period found statistically significant and positive relationship between financial self-sufficiency and depth of outreach. A study by Befekadu (2007) concluded mutualism between outreach and viability in Ethiopia. Befekadu's study used the profitability ratios: return on asset and return on equity as indicators of viability using correlation approach. Although, profitability ratios signal a move towards viability, the direct viability measures give a better picture. Besides, the correlation approach to analyzing the nexus is defective as it overlooks controlling the partial effects of other variables that determine viability and outreach.

Although the transmission mechanism from outreach indicators to financial viability was unclear, a random effect panel estimation of 14 MFIs (2002-2010), Bayeh (2012) found a positive relationship that run from breadth of outreach and depth of outreach to financial viability.

In sum, the literature on viability and outreach nexus provided mixed evidences. The studies different in the institutions considered, methodology applied, data representations, and countries covered. Some are mixing different microfinance providers and others are focusing on specific types of institutions. The current study acknowledges the inherent institutional differences that exist in microfinance providers and delves into the debate by putting the E-K-U in perspective and it has benefited a lot from the strengths a mnd weaknesses of the prior studies.

III. OVERVIEW OF THE INDUSTREIS AND COMPARISONS

3.1 Overview of the Industries

MFI in Ethiopia:

MFIs are 1990s phenomenon in Ethiopia. The Microfinance proclamation in 1996 marked start of deposit taking MFIs in Ethiopia. The sector has progressed from humanitarian orientation to combining outreach and viability missions. The Government's hand in the MFI industry is huge ranging from extending institutional and portfolio supports to claiming ownership in MFIs. An assessment study on Access to finance (Weidmaier et al., 2008) noted that some of the government led MFIs have registered outstanding performance while targeted lending by state

governments resulted in a distorted market. Large MFIs in Ethiopia are characterized by huge affiliation to the government. For instance: Amhara Credit and Saving Institution (ACSI), Dedebit Credit and Savings Institution (DECSI), Oromia Credit and Savings Share Company (OCSSCO), Addis Savings and Credit Institution (ADSCI) and Omo Microfinance Institution Share Company(OMO). In 2008, government share in ADSCI and OMO reached 97 percent and 80 percent, respectively. The inexpensive funding and staff salaries can partly explain the low interest rates on loans existent in most of the MFIs in Ethiopia (Weidmaier et al., 2008).

According to the National Bank of Ethiopia (NBE), the number of MFIs in the country has reached 33. In 2011/12, registered MFIs total capital and total asset were 'Birr' 3.8 billion (USD 190 million) and 'Birr' 13.3 billion (USD 665 million), respectively. Competition within MFIs in Ethiopia does not seem to be fierce. In 2011/12, four MFIs (Amhara, Dedebit, Oromia and Omo Credit and Saving Institutions) accounted for 75 percent of the total capital in the industry, 88 percent of the loan outstanding, and 82.7 percent of the total assets. The NBE 2010/11 annual report indicated: of the total MFIs in Ethiopia, about 50 percent are in Addis Ababa. Of the total credit disbursed through MFIs, Addis Ababa (with 5 percent of the country's population) accounted for 40.4 percent, and few other regions accounted for amount of the rest: namely Tigray 20.1 percent (with less than 5 percent share of the population), Amhara 16.4 percent (with over 20 percent share of the population), Oromia 11.8 percent (with over 25 percent share of the population) (NBE, 2011).

Table 1 Registered Microfinance Institutions Aggregate Performance in Ethiopia

					Growth		
MFIs' aggregate	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2009/10**	**2010/11**	**2011/12**
Capital (million USD)	86.870	118.761	147.299	187.774	28	37	24
Saving deposits (million USD)	104.937	132.948	188.954	272.530	44	27	42
Loan outstanding (million USD)	246.807	291.225	349.599	464.482	33	18	20
Total Assets (million USD)	331.032	397.910	507.819	665.410	31	20	28
Loan outstanding to asset ratio (%)	75	73	69	70			
Loan outstanding to capital ratio (%)	284	245	237	247			
Capital Asset Ratio (%t)	26	30	29	28			
Saving liability to asset ratio (%)	32	33	37	41			

Source: National Bank of Ethiopia (NBE) report 2011 and 2012

The steady decline in loan outstanding to asset ratio in table-1 indicates a slower growth of loan outstanding than growth of assets overtime. The ratio ranges between 69 and 75 percent for all the years implies the remaining 31 to 25 percent were in the form of other assets.

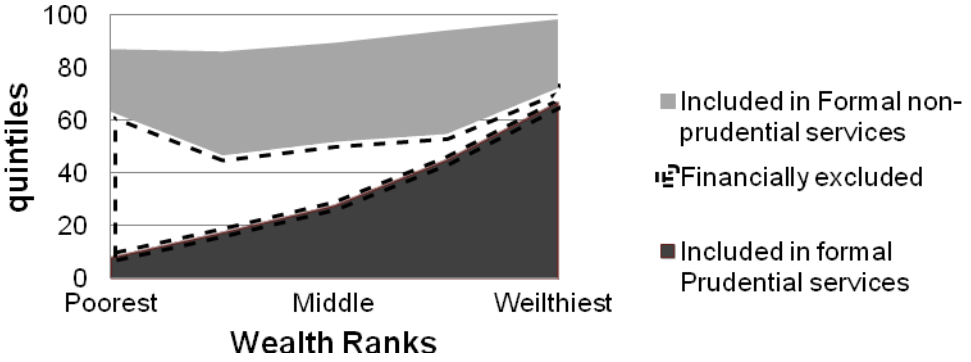
The saving liability to asset ratio grew steadily and reached 41 percent in 2011/12. One of the reasons is compulsory saving policies of MFIs. The sum of capital asset ratio and saving liability to asset ratio touched its highest point of 69 percent (28 percent + 41 percent) in 2011/12 and its lowest point of 58 percent (26 percent + 32 percent) recorded in 2008/09. It is apparent that the remaining balance, 31 percent for 2011/12 and 42 percent for 2008/09, are from grants, subsidized loans and commercial loans. The huge government involvement in Ethiopia's MFI industry and the low MFI lending rate implies that subsidized lending would take higher share, which again indicates that poverty lending is pervasive in Ethiopia.

MFI in Kenya:

Although the 2006 Microfinance Act in Kenya allows deposit taking MFIs, such MFIs in Kenya appeared in 2009 when two of the pioneering MFIs- Faulu Kenya and Kenya Women Finance Trust transformed to deposit-takers. Transformation of microcredit programmes into a bank serving only low income clients is an old story that happened back in 1999 when K-Rep became the first commercial bank in Kenya to serve only low income clients, and the first NGO in Africa to transform into a regulated financial institution (Central Bank of Kenya, 2013).

Financial inclusion remains to be a challenge for Kenya. A financial access survey by the central Bank of Kenya found that over 50 percent of the poorest quintile is financially excluded, while nearly 70 percent of the wealthiest quintile access financial services from formal prudential financial providers. As we move from the poorest to wealthiest, financial inclusion increases significantly (see the region bounded by dotted margins in figure 1).

Figure 1 Comparison of Financial Exclusion in Kenya across Wealth Ranks



Source: Author's construction, data from Central Bank of Kenya's FinAccess National Survey, 2013

Banks are dominant in the Kenya's MFI industry. For instance, the total asset held in the industry grew from USD 1.71 billion in 2009 (over two fold of Ethiopia's) to 2.59 billion at the end of 2011 (Over 4 fold of Ethiopia's), yet, 80 percent of the total asset belonged to the Equity Bank. If we exclude commercial banks from the figure, the asset growth drops significantly. The size of the MFI sector without banks is one-fifth its aggregate size with banks (Kenya AMFI and Microfinance Rating (MFR), 2013).

Regulated MFIs in Kenya are by law restricted to limit loan per borrower not to exceed 2 percent of the MFI's equity. Again, MFIs coerced to direct their mobilized deposits to advancing microfinance loans i.e. from the total deposit mobilized, 70 percent should be allocated to microfinance loans (FSD Kenya, 2012). In the long term, deposit-taking MFIs, now called microfinance banks (MFB), and the regulators will potentially determine depth-of-outreach in Kenya, as more and more credit only MFIs transform into MFBs. By the end of 2013, MFBs in Kenya reached nine.

Table 2 Key outreach and financial indicators of Kenya's MFI Industry (FY 2009 to 2011)

Indicators	Whole MFI Sector			Excluding Banks		
	2009	2010	2011	2009	2010	2011
Average disbursed loan size	1,405	1,242	1,649			
Average outstanding loan per borrower as percent of per capita GDP.	181	157	193			54
Operational Self-Sufficiency	133	147	150	110	105	105
Portfolio Yield		23.8	24.7		34.9	34.2
Debt to equity ratio		4.1	4.3		6.3	5.4
Operating expenses ratio		16.7	15.6		26.7	26.7
Number of active borrowers	1, 395,890	1,433,897	1,475,664			

Source: Author's construction from 2012 Annual Report on Microfinance Sector (AMFI and MFR, 2013:7-9)

Overall, the microfinance average outstanding loan size in Kenya is high. The second row entry in table 2 for the year 2011 shows that for a one currency unit per capita income earned, there is a loan outstanding of 1.93 currency units i.e. a borrower can have a loan size nearly twice his/her share from the total GDP. Excluding microfinance services provided by banks leads the whole MFI sector average outstanding loans a percentage of per capita GDP to fall from 193 percent to 54 percent in 2011. Such fall shows banks involvement in lending to richer clients.

In 2011, the microfinance sector altogether got 58.9 percent of total assets funded from deposits, and the figure takes a completely different picture when MFI service provider banks are excluded: the dominant fund source becomes borrowed money accounting 54.2 percent followed by compulsory deposits (22.5 percent) and voluntary saving (6.32 percent). The debt-to-equity-ratio is near 5 percent, which indicates low equity leverage in the sector.

MFI sector's Operational Self-Sufficiency (OSS) excluding banks was 110 percent, 105 percent, and 105 percent for 2009, 2010 and 2011, respectively. Comparing these figure to the total sector (133 percent in 2009 and 150 percent in 2011), shows non-bank microfinance institutions are performing less than banks. Yet, they have managed to be operationally self-sufficient in aggregate. However, the sector still relies on donations and 73.3 percent of donations are raised from international partners while only 26.7 percent from local entities and bodies. In terms of external funding, the sector reports that 59 percent of its facilities are domestically raised while the remaining 41 percent is raised on international capital markets (AMFI and MFR, 2013)

MFI in Uganda:

The 1993 financial reform was a turning point for financial sector developments in Uganda. The reform included strategies to improve monetary policy effectiveness, revision of financial legislations, restructuring of some insolvent banks and central bank institutional strengthening. Before 1993, formal financial system of Uganda was one of the worst in SSA (small in value and volume of financial transaction, limited number of financial products). Despite the positive developments, the Ugandan financial sector faced tremendous crises between 1997 and 1999. This is due to lack of prudential supervision that led to closure of five banks including the admired Cooperative Bank which suddenly was closed for internal financial problems(Carlton et al., 2001).

The Ugandan internal financial challenges have been overcome by the launch of MFIs in the early 1990s and their growth and expansion after the mid-1990s. FINCA and Uganda's Women Finance Trust (UWFT) are pioneers in Uganda microfinance industry, which were established in early 1990s with limited outreach and recognition until the mid 1990s' MFI, turn to massive growth and expansion. In Uganda, SACCOs are dominant in their number and distribution. The government has a package of incentives for new SACCOs targeting at least one SACCO for a Sub-city. Government extends start-up grants, provides interest-free loans, and subsidizes interest rates. The government support extends to providing rent-free offices and covering staff salaries for the first two years of operation (Linthorst, 2013).

Table 3 Number of Branches of Licensed Financial Institutions

Type of financial institution	Number of Branches		
	2011	**2012**	**2013**
Commercial bank	455	496	542
Foreign exchange bureaus	184	205	248
Money remitters	173	205	186
Microfinance Deposit Institutions	98	99	70**
Credit only institutions	44	47	52

**The decrease was due to Uganda Finance Trust transformation to a commercial bank.
Source: Bank of Uganda, Annual Supervision Report 2013

Table 4 Loans tradition in Uganda compared to Kenya ,SSA and the World in 2011

	Kenya	**Uganda**	**SSA**	**World**
Loan from family or friends in the past year (percent age 15+)	58.2	46.5	39.9	22.7
Loan from family or friends in the past year, rural (percent age 15+)	58.5	46.6	40.3	23.8
Loan in the past year (percent age 15+)	67.4	52.8	46.8	33.8
Loan in the past year, female (percent age 15+)	66.5	52.2	45.3	31.7
Loan in the past year, rural (percent age 15+)	67.2	53.1	46.1	34.0

Source: World Bank's Global Findex database, 2012

Table 5 Financial Exclusion in Kenya and Uganda (percent)

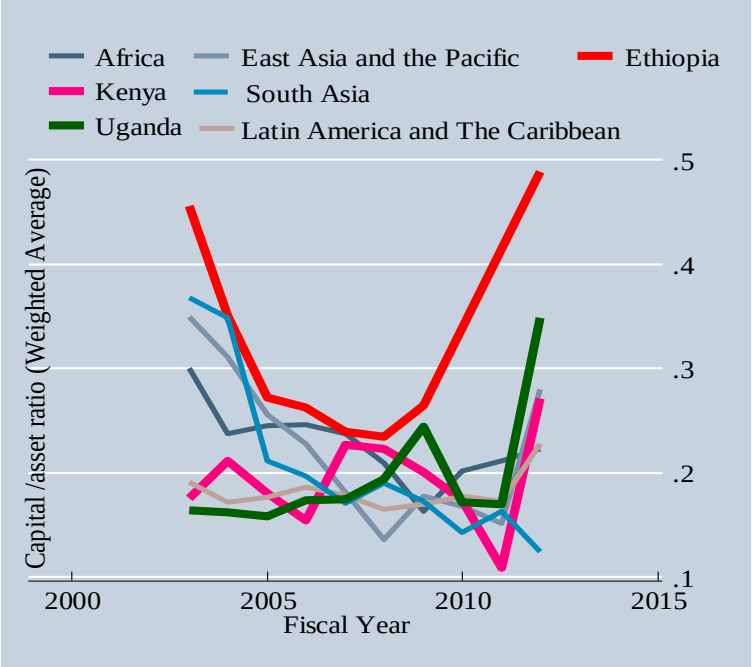
	Formally served	Informally served	Banked	Not served
Uganda	7	42	21	30
Kenya	18	26	23	33

Source: MIX and CGAP Analysis of Key Trends. 2011 SSA Regional Snapshot February 2012.

3.2 Comparison of the Industries

The viability and outreach nexus depends on the ability of MFIs to leverage their equity and to charge interest rates on loans that covers at least the cost of service delivery. The capital-asset ratio comparison of Figure-2 below demonstrates that Ethiopia has over grown the rest of the countries included in the comparison. Kenya and Uganda follow more or less the average trend of the group. The high such ratio for Ethiopia indicates the weakness in the industry to leverage equity. The financial market in Ethiopia is not open to foreign investors unlike the case of Uganda and Kenya, which is a likely explanation for the low capital-asset ratio.

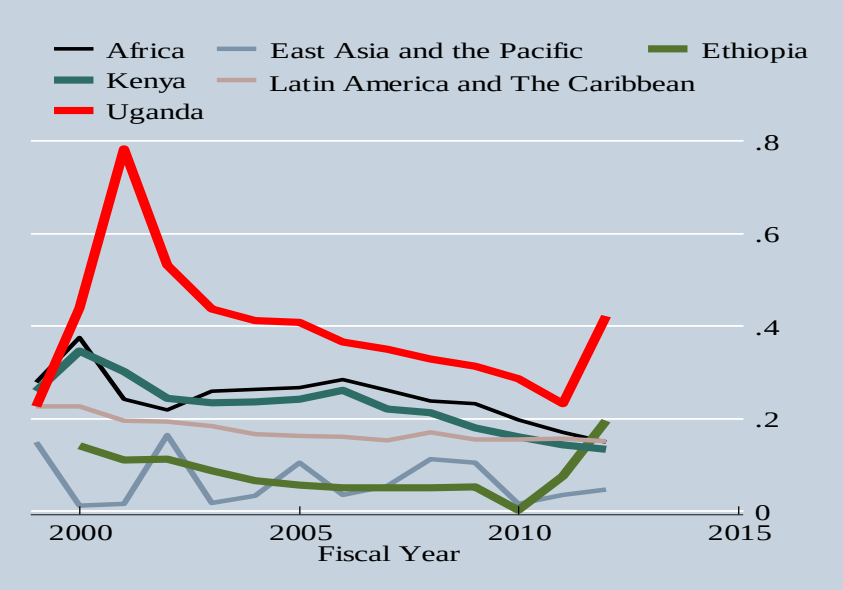
Figure 2 Capital Asset Ration of E-K-U Compared to Countries and Regional Averages



Source: Author's construction from Mix market database, 2013

Uganda is performing the least in reducing its operating expenses per loan portfolio as portrayed on figure-3 below. Ethiopia seems to register the least operating-expense-per-loan portfolio. The long government hand in the MFI industry to the extent of providing free expert and personnel support and the low wage rate in Ethiopian (is one of the lowest in SSA) can justify the low figure.

Figure 3 Operating-Expense-Per-Loan Portfolio Comparison

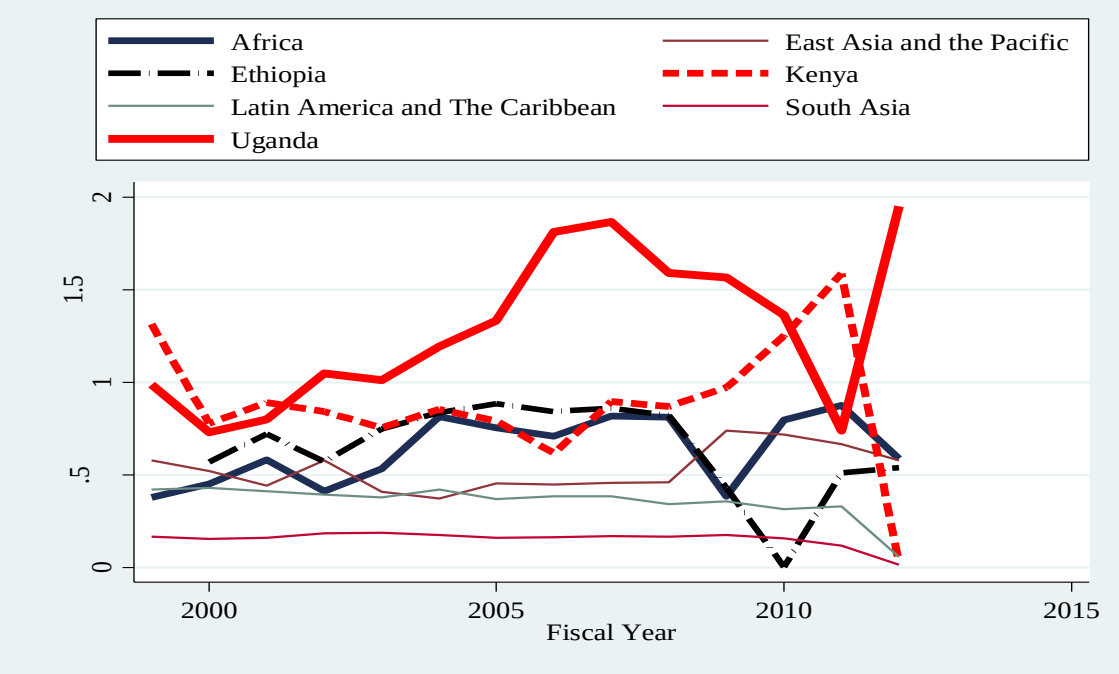


Source: Author's construction, data from Mix market database, 2013

Among MFIs in Kenya that self-reported data to the Mix database (the leading microfinance data source globally), only 20 percent had average loan size per borrower over USD 2,000. Moreover, 90 percent of them serve less than 20,000 loan clients by 2012; the only exception is Equity Bank that reported over 704,249 borrowers. The figure for Ethiopia is far less; the maximum outstanding loan per borrower reported by 'Aggar MFI' is only USD 380. The dominant MFIs in terms of loan size and client outreach in Ethiopia have a maximum of 337 average outstanding loans per borrower. For instance, ACSI's outstanding loan balance is 71 times higher than Aggara's but its outstanding loan balance per borrower is 37 percent less than that of Aggar's. From MFIs in Ethiopia that entered their data to the Mix database, the highest three records in number of loan client are ACSI (766,386 loan clients), OCSSCO (515,890), and DECSI (380,356) in 2012. In Kenya, the lead MFI lender, Equity bank, serves only 704,247 clients with 10 times the Ethiopian ACSI's outstanding loan size.

The comparison can be made more meaningful when the loan sizes are expressed as a percentage of per capita GDP (PCGDP). The PGDP at current price of Ethiopia, Uganda, and Kenya in 2012 were USD 455, USD 551, and USD 943, respectively. This makes the Equity bank and ACSI outstanding loan size comparison above to fall from ten to five times. Although there is large number of MFIs in Kenya, the number of borrowers served by each is significantly lower than in Ethiopia. The same is true for Uganda. BRAC-UGA takes the lead with 124,731 borrowers in Uganda. However, we could expect MFIs as 'Centerna Bank' that has 10 times higher outstanding loan size than BRAC-UGA to have higher number of clients though the figure is not available in the mix database.

Figure 4 Average Loan Size per Borrower per GNI Comparison



Source: Author's construction, data from Mix market database, 2013

IV. ECONOMETRIC APPROACH

4.1 Econometric Model and Estimation Techniques

The literature on outreach and financial viability have predominantly employed cross-sectional analyses with varied scope in terms of countries covered and number of MFIs included while a handful of them used panel datasets. For instance Okumu (2007) for Uganda and Abate et al. (2013) for Ethiopia, (Wagenaar, 2012), Kipesha and Zhang (2013), Bayeh (2012) for Ethiopia, Millson (2013) used panel data estimation techniques to investigate the nexus between outreach and financial viability. Quayes (2012), Cull et al (2007) and a bulk of others used cross sectional analyses.

Theoretically, depth-of-outreach and financial viability are jointly determined by two opposing forces. (i) increased transaction costs emanating from deeper outreach (administration of small loans leads to escalating transaction costs) which compromises financial viability. (ii) increased operational revenue from increased loan portfolio (by allowing more loan clients) contributes positively to viability. The overall effect depends on the relative importance of the two opposing forces.

This piece of work targets to investigate the direct, indirect, and overall effects of depth on viability. First, the financial viability indicator is regressed on depth of outreach indicator, along with control variables, for its direct effect. Then, in the second step, an assumed path from depth of outreach to operational cost and finally to financial viability has been quantified. However, causality is only assumed and the result is interpretable under the assumed path.

Operational Self-Sufficiency (OSS) is chosen as indicator of financial viability. Average loan size per borrower per GNI and proportion of women clients are used as proxies of outreach depth (following the discussion in section II). A model emplying panel data is constructed and a Hausman and Taylor instrumental variable estimation technique is used to capture the direct effect; and Generalized Structural Equation Model (GSEM) is employed as well to quantify the mediation (path). The rationale for using panel data set is because more observations are possible as it takes the time and cross sectional dimensions, it enables to control for correlation among unobserved individual-specific effects to mention some. The Breusch–Pagan LM procedure was conducted to test the poolability and the test result did not support pooled regression. Thus, panel model has been constructed.

4.1.1 Model Specification for the Direct Effect

$$Log(OSS_{it}) = \beta + X_{1it}\delta + X_{2it}\delta + Z_{1i}\gamma + Z_{2i}\gamma + \upsilon_{it} \quad \text{.....Model-1}$$
$$\upsilon_{it} = \nu_i + \mu_{it}$$

$i = 1,2,...N$; *identifying MFI included in the estimation*

$t = 1,2,...T$; *period, in the current case year*

'δ' *and* 'γ' *are time* var*ying and time in* var*iant vectors of coefficients respectively*

$-$ *The error* $[\upsilon_{it}]$ *has two components* ; $[\mu_{it}]$ *is the idiosyncratic error term which is assumed uncorrelated with the left hand side* var*iables and with the unobserved time in* var*iant individual specific effect* $[\nu_i]$

The regressors with subscript 1 are specified to be uncorrelated with v_i and the rest with subscript 2 are correlated with v_i.

$Log(OSS_{it})$	Logarithm of Operational Self-Sufficiency
X_{1it}	Vector of exogenous time variants
X_{2it}	Vector of endogenous time variants
Z_{1i}	Vector of exogenous time invariants
Z_{2i}	Vector of endogenous time invariants

Several panel estimation techniques are compared: fixed effects model, random effects model, Arellano-Bond dynamic panel model (Arellano and Bond, 1991), the Hausman and Taylor instrumental variable model (Hausman and Taylor, 1981).

The fixed effects method could avoid the potential problem of correlation between the explanatory variables and the unobserved individual heterogeneity vi in model-1. However, the time demeaning (transforming the data into deviation from individual means) inherent in the fixed effects model is defective on two grounds. The first, yet serious defect after such transformations is that estimates for the vector of time-invariant coefficients "γ" are impossible as they disappear upon differencing. Secondly, it loses efficiency as it overlooks variations across individuals (Wooldridge,2002; Baltagi,2005; & Green,2003).

The second alternative is to use the random effects model that enables more efficient estimates but this technique gives consistent estimates conditional to all the explanatory variables are uncorrelated with both the idiosyncratic and unobserved individual heterogeneity components of the composite error terms ($\upsilon_{it} = \nu_i + \mu_{it}$) (fulfillment of exogeneity assumption). This is testable using variants of the Hausman test procedure, which tests whether significant deviation between the fixed and random effect estimators exist i.e. significant deviation would mean endogeneity problem and hence random effect estimators are inconsistent. The Hausman test gave evidence against the random effect model.

Thus, two possibilities has remained: accepting the FE estimation despite the loss of estimates for the time invariant variables and tolerating the efficiency loss; or fixing the endogeneity problem of the random effect estimation through revisiting the model to control for omitted explanatory variables (exogenizing); or simply use instrumental variable estimation techniques. Exhausting omitted variables was impossible, as some of the variables are unobservable. Another approach is to use the traditional instrumental variable model (finding exogenous variables out of the model that are uncorrelated with the total error term ($\upsilon_{it} = \nu_i + \mu_{it}$) but correlated with the endogenous variables). Although this can remedy the endogeniety problem, finding appropriate instruments is a challenge.

Therefore, the Arellano-Bond (A-B) and Hausman- Taylor (H-T) instrumental variable estimation procedures that use instruments within the model are compared. These procedures use instruments from regressors of other periods (Cameron and Trivedi, 2010). Aerollano Bond IV estimation technique uses the lagged values of explanatory variables as their own instruments. However, application of the A-B technique led to huge loss of observations as more and more of the lagged values of the explanatory variables are included.

Finally, the Hausman-Taylor instrumental variable estimation technique has been considered. The H-T method assumes the unobserved time-invariant individual specific effect to be correlated with some of the left-hand-side variables but not with all. H-T estimation requires

certain variables (of time variant and/or invariant) to be uncorrelated with individual specific unobserved errors. Initially with prior theoretical knowledge and common sense, such exogenous time invariant and exogenous time variants have been selected. This is testable insofar as the model is over identified. The assumed time variant exogenous variables play two roles: (i) the deviation from their own mean is used to estimate their own coefficients (ii) Their mean (averaged over time) serves to estimate the time invariant endogenous variables (Huasman & Taylor, 1981).

The time and cross-sectional dimensions of $\mathbf{X_{it}}$ variables play two roles in the H-T model. The variables deviation from individual means produce estimates of their own coefficients and the individual means by itself provide valid instrument for the members of $\mathbf{Z_{it}}$ that are correlated with $\mathbf{v_{i.}}$. The over identification restriction test has dictated identification of endogenous variables i.e. the explanatory variables were included into the endogenous variable list initially with rule of thumb and later a step-by-step inclusion of variables were followed observing improvements in the Sargan–Hansen test of overidentifying restrictions. Consistency of the H-T estimators requires all regressors to be uncorrelated with the idiosyncratic errors and subsets of the regressors to be uncorrelated with the fixed effects. It is a strong assumption yet testable using a test for over identification restriction. Rejection implies that some variables of the subset are endogenous or correlated with the fixed effect term (Hausman &Taylor, 1981). Hausman-Taylor method is based on the random-effects transformation that leads to the following model:

$$LOg\left(OS\tilde{S}_{it}\right)=\tilde{\alpha}+\tilde{X}_{1it}\delta_1+\tilde{X}_{2it}\delta_2+\tilde{Z}_{1it}\delta_1+\tilde{Z}_{1i}\gamma_1+\tilde{Z}_{2i}\gamma_2+\tilde{\nu}_i+\tilde{\mu}_{it} \quad \text{... Model-2}$$

Where:

$\tilde{X}_{1it}=X_{1it}-\hat{\theta}_i\overline{X}_{1i}$

α and β are constant terms of the models

The formula for $\hat{\theta}_i$ is given in x thtaylor

$\tilde{\nu}_i=\nu_i(1-\hat{\theta}_i)\neq 0$

$\tilde{\nu}_i$ is correlated with $\tilde{Z}_{2i}$ and $\tilde{X}_{2it}$

$\ddot{X}_{2it}$ is instrument for $\tilde{X}_{2it}$; $\ddot{X}_{2it}=X_{2it}-\overline{X}_{2i}$

$\overline{X}_{1i}$ instrument for $\tilde{Z}_{2i}$

$\ddot{X}_{1it}$ is instrument for $\tilde{X}_{1it}$

Z_{1i} as instrument for $\tilde{Z}_{1i}$

X_1 is used as instrument twice: as $\ddot{X}_{1it}$ and as $\overline{X}_{1i}$. By using, the average of $\overline{X}_{1i}$ in forming instruments data from other periods are used as instruments.

Table 6: Endogenous and Exogenous Variables Included in the H-T Estimation

Exogenous time variants X_{1it}	**Endogenous time variants** X_{2it}	**Exogenous time invariants** Z_{1it}	**Endogenous time invariants** Z_{2it}
- Operating expenses per loan portfolio	- Height of Outreach	-Country dummies	-Regulatory status of MFIs
- Debt-to-equity-ratio	- Outreach to Women		
- Real Yield			
-MFI experience (Age)			

Table 7 Summary of Key Independent Variables

Variable name/ Abbreviation	**Measurement or proxy**	**Data Source**
Operational Self-Sufficiency/OSS	Operating revenue divided by the sum of financial expenses, loan-loss provision expenses, and operating expenses	Mix market Database
Depth of Outreach or its opposite Height of outreach	Average loan balance per borrower divided by GNI per capita measures the depth of outreach. (one of the rational for adjusting average loan size by GNI is to abolish the effect of national differences in cross country comparison).	
	Percent of women from total borrowers	
Age:		
New	1 to 4 years	
Young	5 to 8 years	
Mature	More than 8 years	
Mission/Profit status:		
For Profit	Registered as a for profit MFI	
Not for Profit	Registered in a nonprofit status	

Definition of Selected Control Variables

Lending Methodology: The lending methodology through its effect on operational costs and risk levels of loans could affect viability. Previous studies that took lending methodology as determinant of viability have used dominant lending methodologies. Lending methodology Data that varies in time and cross section and that accounts the relative importance of each lending methodology is imperative to capture the impact of lending methodology on viability. However, such data is rarely available and hence lending methodology is excluded from the model. Although, this variable is dropped for lack of complete data, its effect is somehow captured by variables like operational expenses per borrower per GNI.

MFI Experience: Institutional experience is hypothesized to have positive impact on OSS. Younger institutions usually are characterized by lack of experience, low client base, higher expansion costs without commensurate revenue which makes them lag behind.

Country dummy: Country dummies are included to capture cross-country differences due to factors not controlled in the model. There are cross-country differences in the regulatory environment. "Location contributes to heterogeneity, as MFIs adapt to different national regulations, and operate in countries with diverse access to international capital markets" (Bella, 2011). It is hypothesized that MFIs in Uganda and Kenya are likely to attain financially viability sooner than MFIs in Ethiopia.

Real Yield on Gross Portfolio: The real gross portfolio yield is a proxy for interest rates charged by MFIs following Millson (2013) and Cull et al. (2007).The depth of outreach-viability controversy precipitates whether or not to subsidize interest rate. If poor people are unable to afford the market rate of interest and yet they are taking loans knowing that they would not payback, and if the loss from interest rate induced default is greater than the revenue gain from higher interest rate, then real yield is expected to affect OSS adversely. However, MFIs repayment rates are one of their success stories i.e. MFIs have managed to keep the default risk sufficiently low. It is widely argued that MFIs' clients are able and willing to pay commercial interest rates. And MFIs need capital to widen and deepen their outreach. Enormous empirical works found a significant link between real yield and viability although they differ in their conclusion as to the direction of relationship. It is the interest of this study to include real yield as a determinant of viability. Viability is a prerequisite to attract capital and viability requires sustainable interest rate (yield). Thus, the hypothesis held is a positive relationship between real yield and OSS.

$$\text{Yield . on . Gross. Portfolio.(Real)} = \frac{\text{Yield on gross portfolio(nominal) - inflation rate}}{1 + \text{inflation rate}}$$

Yield on gross portfolio nominal is interests and fees on loan portfolio divided by average gross loan portfolio

Operating expense per loan portfolio *(in percent):* Cost minimization is among the ways to facilitate financial viability. MFIs, in the pursuit of viability, may try to achieve cost efficiency. These could be capital or labor costs. The hypothesis is that higher costs per service delivered, in this case loan service, adversely affects viability. Such costs have been included in the models of several authors (for instance Millson (2013), cull et al, 2007). Poor clients take small loans and administration of small loans requires higher average cost from increased transaction costs. The trade-off between serving the poor and achieving viability has been justified, on one hand, by highest average cost per loan required to serve as poor clients. The reason is poor clients take small loans that require huge transaction costs.

Debt-to-equity-ratio *(in percent):* The use of debts enables MFIs to serve more clients. More debts enables more lending, under better loan portfolio management, a positive relationship between debt-to-equity-ratio and OSS is hypothesized following Esperance et al (2003).

4.1.2 Model Specification for the Indirect Effect (Path or Mediation):

Structural Equation Model (SEM) is a statistical technique for testing and estimating causal relations. Its newest version, the Generalized Structural Equation Model (GSEM) enables to include both continuous and categorical variables in the estimation, which is not possible with the SEM. GSEM fits models to single-level or multilevel data. Latent variables can be included at any level. In this study, GSEM is used to estimate how lending to the poor reflects itself onto increased operational expenses per loan portfolio (OL) (intermediate variable) and thereby affect financial viability. With GSEM, OL has been predicted using its determinants: Dept to equity ratio; age (experience) of the MFI; Height of outreach, outreach to women; country, regulatory status of the MFI, staff salary per GNI, number of loans per loan officer, and number of loans per staff. The estimated value of OL from the GSEM is to be multiplied by the coefficient estimate of OL in the H-T model to find the indirect effect of depth on viability. Maximum likelihood method is used to estimate this model.

Log (OSS) = f(Log (OL), control variables) … Structural equation (equation-1)

Log (OL) = f (Log (HO), control variables)… Reduced form (equation-2)

Where: OSS, OL, and HO are Operational Self-Sufficiency, Operational expense per Loan portfolio, and Height of Outreach, respectively.

4.2 Data Source and Qualities

Microfinance Information Exchange (Mix)[5] market is a source of data for the current research. Among the scholars that used Mix Market database are Quayes (2012); Kipesha and Xianzhi (2013); Millson (2013); Cull et al (2007); Kumar (2011); and many others. Data in the Mix market is self-reported and it is organized in such a way to classify data quality in different levels /Diamond Level's. Mix uses "diamonds" system to indicate an MFI's level of transparency.A higher diamond rank means a more transparent MFI and a more reliable data. MFIs in the sample are those with periodic reports available in the mix database and with three and above diamond rank. It is worth acknowledging the possibility of attrition bias and loss of randomness in a situation when the MFIs are reporting to the MIX.

[5]MIX is a not-for-profit company founded by CGAP. It is the leading source of MFI data, benchmarks and analysis for the microfinance industry. MIX provides detailed financial, operational and social performance data on microfinance institutions

List of MFIs considered for the econometric estimation

	Kenya	Uganda	Ethiopia
	RAFODE	FINCA-UGA	MFI Name
	KADET	MEN-NET	ACSI
	Faulu-KEN	Cetenary Bank	WASASA
	Equity Bank	PRIDE-UGA	PEACE
	K-REP	Opportunity Uganda	Wisdom
	KWET	Finance Trust	SFPI
	Micro Kenya	UGA FODE	
	Oppurtunity Kenya	BRAC-UGA	
	BIMAS	MUL	
	PAWDEP	Madfa	
	MCL	Silver Upholders	
	Juhudi Kilimo		
	ECLOF-KEN		
	UBK		
	SMEP		
Number of MFIs	15	11	5
Number of Panel observations	65	50	35

V. RESULTS AND DISCUSSION

In instrumental variable estimation with overidentifiying restriction, as is the case in this paper, the Sargan–Hansen test of overidentifying restrictions must be conducted and a strong rejection of the null hypothesis of the test (H_0= overidentifying restrictions are valid) is a strong doubt of estimates validity (Baum, 2009). Since the number of instruments in the model are greater than the number of instrumented, overidentifying restrictions, it is possible to undertake an over identification restriction test. The test follows regression of all the residuals from the instrumental variable estimation on all the instruments used in the model. The null hypothesis is, all instruments are uncorrelated with the residual. The test supported no rejection of H_0 i.e. evidence for validity. Table 8 summarizes the estimates of the direct effect coefficient estimates (with H-T procedure) and the indirect effect coefficient estimates (with GSEM procedure) using model-2 of subsection 4.1.1 and equation 2 of subsection 4.1.2. The fixed and random effect estimators presented in Table 8 are worth only for comparison. The H-T estimates are less deviant from the FE estimates for manyof the time varying variables. The closure between the FE estimators and the HT estimates gives clue to the strength of the H-T model in resolving the endogeneity problem existent in the randome effects estimators. Table 9 is simply an extension of column (1) of Table 8 meant to be explicit about the orthogonality characteristics of the variables.

Table 8 H-T, GSEM, Fixed Effects, and Random Effects Robust Estimators (Standard Errors in parenthesis)

	Direct effect using H-T (1)	Indirect effect Using GSEM (2)		Fixed effect robust (4)	Random effect robust (5)
		(2-a)	(2-b)		
Explanatory Variables	[6]Log(OSS)	Log(OSS)	Log(OL)	Log(OSS)	Log(OSS)
[7]Log (OL)	-0.523***	-0.540***		-0.498***	-0.536***
	(0.0519)	(0.0372)		(0.0975)	(0.0548)
[8]Log (DE)	-0.0639***	-0.0492**	-0.000568	-0.0617*	-0.0712***
	(0.0211)	(0.0210)	(0.0256)	(0.0359)	(0.0266)
Real yield	0.00468***	0.00566***		0.00406***	0.00618***
	(0.00132)	(0.00153)		(0.00123)	(0.00134)
New MFI	0.0289	-0.100	-0.0262	0.0142	-0.00445
	(0.0649)	(0.0646)	(0.0811)	(0.104)	(0.0802)
Young MFI	-0.0619	-0.0768**	0.124***	-0.0617	-0.106***
	(0.0380)	(0.0361)	(0.0454)	(0.0436)	(0.0357)
[9]Log (HO)	-0.145***	-0.00193	0.794***	-0.136**	-0.0554*
	(0.0441)	(0.0296)	(0.0488)	(0.0534)	(0.0317)
[10]Log (OW)	0.00357	0.0177	0.0681	0.0137	0.0185
	(0.0480)	(0.0386)	(0.0478)	(0.0426)	(0.0345)
[11]Kenya	0.300**	0.156***	0.312***		0.157**
	(0.153)	(0.0535)	(0.0622)		(0.0662)
[12]Uganda	0.401***	0.239***	0.408***		0.255***
	(0.146)	(0.0817)	(0.0758)		(0.0874)
Regulated MFIs	0.342*	0.0943**	0.0808		0.0813
	(0.184)	(0.0410)	(0.0493)		(0.0571)
Log (salary GNI per capita)			-0.794***		
			(0.0543)		
Log (loans per loan officer)			0.0634		
			(0.0482)		
Log (loans per staff)			-0.972***		
			(0.0733)		
inflation			0.00207		
			(0.00201)		
[13]par90			0.00161		
			(0.00712)		
[14]par30			0.00455		
			(0.00503)		
Constant	6.784***	6.362***	8.393***	7.112***	6.695***
	(0.362)	(0.237)	(0.396)	(0.614)	(0.288)
Observations	150	115	115	150	150
Number of MFIs	31			31	31
R-squared				0.482	

[6] Logarithm of Operational Self-Sufficiency
[7] Logarithm of operating expense per loan portfolio after loan portfolio is converted to percent
[8] Logarithm of debt to equity (the ratio is converted to percentage to be able to calculate logarithms)
[9] Logarithm of Height of outreach (which is inverse of depth of outreach)
[10] Logarithm of outreach to Women(logarithm of percent women from the total loan clients)
[11]MFIs in Kenya compared to the reference category, Ethiopia (Dummy)
[12]MFIs in Uganda compared to the reference category, Ethiopia (Dummy)
[13] Portfolio at risk 90 days
[14] Portfolio at risk 30 days

Table 9: Hausman-Taylor (H-T) Estimates ((Standard Errors in parenthesis)

Dependent Variable is Logarithm of OSS

Explanatory Variable	
TV Exogenous	
Log (OL)	-0.523***
	(0.0519)
Log (DE)	-0.0639***
	(0.0211)
Real Yield	0.00468***
	(0.00132)
MFI Experience (Categorical var.):	
New MFI	0.0289
	(0.0649)
Young MFI	-0.0619
	(0.0380)
Mature MFI (Ref. category)	
TV Endogenous	
Log (HO)	-0.145***
	(0.0441)
Log (OW)	0.00357
	(0.0480)
TI Exogenous	
Country (categorical variable):	
Kenya	0.300**
	(0.153)
Uganda	0.401***
	(0.146)
Ethiopia (Ref. category)	-
TI Endogenous	
Regulated MFIs Dummy	0.342*
	(0.184)
Constant	6.784***
	(0.362)
Observations	150
Number of MFIs	31

The extent MFIs are providing loan services to poor clients is defined in the forerunning sections as depth of outreach. Depth of outreach is measured by the average outstanding loan per client per GNI. The exact inverse of it is 'height of outreach' (HO). For simplicity of interpretation, 'depth of outreach' is represented by its inverse 'height of outreach'. The coefficient estimate for the Log (HO) of -0.145 (significant at 1 percent) implies that for a percent increase in the height of outreach, OSS is estimated to fall by 0.145 percent. It means that the direct effect of targeting richer clients is lowering OSS. The direct effect of depth on viability is the coefficient estimate of Log (OH) in the H-T Model, which is - 0.145.

However, delving deeper into the issue, the study found that depth or height of outreach has an indirect channel to affect OSS via "operating cost per loan portfolio (OL)". The indirect effect is computed by multiplying the coefficients of column (2-b) by the coefficient of Log (OL) in column (1) in Table 8 above. The coefficient estimate of height of outreach in column (2-b) is -0.794 and that of Log (OL) in column (1) is -0.523. Therefore, the indirect elasticity of OSS for a percent increase in height of outreach is (- 0.794) * (- 0.523) = 0.42. The overall effect is the sum of the direct and indirect effects, which is 0.42-0.145= 0.275. Thus, for a percentage increase in height of outreach or decrease in depth of outreach (lending to the opulent), OSS improves by 0.42 percent via its indirect channel. The overall effect favors the trade-off view under cost inefficiency.

Ethiopia, Kenya, and Uganda have dominant commercial banking sector. The truly better off clients can access loan services from the commercial banks for relatively longer terms, and it is less likely for a better-off client to seek for loans from MFIs. Compared to banks, MFIs are less efficient and they often charge higher interest rate on loans and have shorter repayment schedule. Truly wealthier clients rarely become clients of MFIs, instead clients who claim higher loan could rather be those who plan to default (high credit risks). The MFIs are less able to compete with the big banks in providing high size loans to truly wealthier and creditworthy clients. The direct positive relationship between depth and viability lies more on the less fierce competition that a MFI faces when providing small-sized loans. This finding is consistent with Quayes (2012) cross sectional global study; Bayeh (2012) panel study for Ethiopia and it is against the findings of Abate, et al. (2013) panel study for Ethiopia and Okumu, 2007 panel study for Uganda

The other indicator for depth of outreach included in the H-T model was the Logarithm of outreach to women. This indicator measures proportion of women from total loan clients. The transmissions from proportion of women clients to OSS, as argued in the literature, are predominantly two. First, women clients on average are proven to be creditworthy in many countries i.e. loans extended to women are likely to be repaid than loans extended to male clients. Thus, more loans to women leads to less default risk, higher profit and hence improved viability. Secondly, more loan to women means higher operating costs and hence lower viability (as women take small loans). However, the result from the H-T estimation reveals that the effect of being a women client on financial viability is insignificant.

The Logarithm of operating expenses per loan portfolio, Log (OL) with an estimated coefficient of-0.523 is significant at 1 percent, i.e. OSS falls by 0.5 percent for a percent increase in OL. The transmission mechanisms are twofold. First, increase in operating cost per loan portfolio obviously means growth of operational expense components in the OSS financial formula. However, the fact that operational expense increased alone does not necessarily indicate an overall negative impact on OSS. Secondly, it could be that the increased operational expense has also led to increased operational revenue. Untimely what matters is the net effect.

The coefficient estimate for the logarithm of Debt-to-equity-ratio with - 0.064 is significant at 1 percent. The debt-to-equity-ratio does not necessarily indicate the ability of MFIs to leverage their capital through commercial loans and/or deposits. The MFIs are getting subsidized loan from governments or donors. This is likely to lead to less responsible lending and inefficient financial management and thereby cause inverse relationship between debt-to-equity-ratio and OSS. The questions should be how to make the debt sustainable and at the same time use it to generate revenue above its costs.

'Real yield' (a proxy for interest rate), with an estimated coefficient of 0.0047, is significant at 1 percent. A percentage point increase in real yield leads to a 0.47 percent improvement in OSS (0.0047*100) as it is a log-linear model for real yield). Real yield can have two transmission channels to affect OSS. On one hand, increase in real yield could negatively affect clients' borrowing decision; its significance again depends on clients' loan demand elasticity. On the other, increase in real yield means higher income per unit of loan outstanding. The overall impact depends on the extent real yield affects the volume of outstanding loan and the income from a unit of outstanding loan. In the current case, increase in real yield has led to improved OSS i.e. the fall in loan portfolio as a result of increased cost to borrowers is over compensated by the higher earnings per unit of loan portfolio. This conclusion is only valid for the real yield spread currently existent in the three countries. The situation could be reversed as we go on increasing real yield beyond a certain threshold. Estimating such a threshold would be of a question of interest for future research.

The H-T result also indicated MFIs based in Uganda and Kenya are more likely to be financially viable than that of Ethiopia. The coefficient estimate for Uganda (0.4 significant at 1 percent) and for Kenya (0.3 significant at 5 percent) are transformed into marginal effects by a conversion formula ($(e^{\beta}-1)*100$, where β is the coefficient estimates). Thus, MFIs in Uganda and Kenya are 49 and 35 percent more likely to be operationally self-sufficient than those in Ethiopia, respectively.

Lastly, the GSEM suggested negative direct impact of average staff salary on operating expenses per loan portfolio. However, the transmission from increased staff salary-to-staff productivity-to operating expense-to OSS requires further inquiry.

VI. CONCLUDING REMARKS

The study has investigated loan outreach to the poor and financial viability nexus in microfinance institutions of Ethiopia, Kenya, and Uganda. The study uncovered the direct, indirect, and overall effects of outreach to the poor on viability. It has also identified the lead determinants of viability; quantified an assumed path from depth of outreach to viability; and assessed existing challenges of the microfinance industries. In their microfinance operation, Kenya and Uganda, ranked first and second in Africa, fifth and eighth in the world, respectively. Ethiopia is progressing to catch-up. Yet, the industries are highly subsidized, less efficient with limited outreach to the poor.

Huasman and Taylor Instrumental variable procedure and Generalized Structural Equation Models employed on unbalanced data set of 31 MFIs (2003 to 2012) revealed: the direct effect of targeting the poor is improved viability, if operating cost can be contained. However, the GSEM suggested positive association between lending to the poor and loss of cost efficiency (the indirect path). The indirect path supporting trade off, between depth and viability, overgrows the direct path of mutualism between them. Hence, the overall effect seems against lending to the poor. This will not be the case if variations in operating costs required to administer loans of different sizes can be kept minimal i.e. weakening the relationships between decreased loan sizes and increased operating expenses.

Operating expense per loan portfolio, debt-to-equity-ratio, and a MFI being young are control variables with negative connection with depth of outreach. Conversely, real yield and a MFI being in Uganda or Kenya are positive determinants of viability. Although, lending methodology is not included in the model, the huge negative coefficient estimate when OSS is regressed on operational expense per loan portfolio signals the need for rethinking MFIs lending methodologies to reduce operational expenses and thereby increase efficiency.

Thus, microfinance support scheme should recognize the possibility of mutualism between lending to the poor and financial viability, if operating cost differentials across different loan sizes can be kept minimal. Governments and donors support should target empowering MFIs to restructure their operating cost per a unit of loan outstanding.

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ANNEXES

Annex 1 MFIs in Ethiopia recent reports to the Mix database

MFI's name	Report Date	Loans (USD)	Borrowers	Average outstanding loan per borrower
ACSI	2012	194,582,832	766,386	254
DECSI	2012	127,994,418	380,356	337
OCSSCO	2012	91,860,694	515,890	178
ADCSI	2012	51,907,631	204,468	254
OMO	2012	31,222,131	327,888	95
VF Ethiopia	2012	14,609,971	63,024	232
Wasasa	2013	10,797,559	70,630	153
Buusaa Gonofaa	2014	9,877,580	71,579	138
SFPI	2012	5,501,915	35,943	153
Benishangul	2012	4,055,681	35,724	114
PEAC E	2012	3,953,566	22,935	172
Eshet	2012	3,045,805	22,300	137
Aggar	2012	2,736,018	7,199	380
Harbu	2012	2,494,043	21,241	117
Sidama	2012	2,477,938	47,810	52
Meklit	2012	1,602,374	9,579	167
Metemamen	2012	1,091,127	12,318	89
Gasha	2012	1,017,690	5,544	184
Dire	2012	861,544	4,483	192
SEYAMFI	2012	570,984	1,996	286
Letta	2012	560,554	2,312	242
Lideta	2012	270,631	1,499	181
Gambella	2012	62,638	880	71
Tesfa MFI	2012	21,720	269	81
Degaf	2012	19,623	425	46
Ghion	2011	16,760	233	72

Annex 2 MFIs in Kenya recently reports to the Mix database

MFI's Name	Report Date	Loans (USD)	Borrowers (number)	Average outstanding loan per borrower
AAR C redit Services	12/31/2013	9,038,942	11,353	796
AC DF	2012	67,144	1,172	57
Adok Timo	6/30/2012	1,067,155	10,042	106
BIMAS	12/31/2013	5,022,542	11,435	439
C entury DTM	12/31/2013	1,026,050	877	1,170
DRC Microfinance	2006	2,390	18	133
Eb-F	2006	249,882	4,237	59
EC LOF - KEN	12/31/2013	6,885,415	17,168	401
Equity Bank	12/31/2013	1,830,618,785	704,249	2,599
Faulu - KEN	12/31/2013	102,560,994	73,741	1,391
Greenland Fedha	12/31/2013	11,118,045	33,347	333
Jamii Bora	9/30/2013	42,693	18,027	2
Jitegemea C redit Scheme	12/31/2013	4,931,016	12,985	380
Juhudi Kilimo	12/31/2013	5,755,676	14,461	398
K-Rep	3/31/2013	86,600,878	25,802	3,356
KEEF	12/31/2013	2,774,837	10,687	260
Letshego	12/31/2013	9,771,175	15,592	627
Makao Mashinani	2011	412,335	504	818
MC L	2011	2,234,046	15,865	141
Milango Kenya	12/31/2013	759,267	3,136	242
Musoni	12/31/2013	2,776,922	10,531	264
Opportunity Kenya	12/31/2013	6,045,309	11,281	536
PAWDEP	12/31/2013	7,947,464	35,302	225
Platinum C redit	12/31/2013	17,128,033	21,610	793
Rafiki	12/31/2013	20,899,108	4,822	4,334
RAFODE	2011	321,271	2,810	114
Remu	9/30/2013	1,567,863	642	2,442
Rupia	12/31/2013	451,064	1,769	255
Samchi C redit Limited	12/31/2013	451,754	155	2,915
SEED	2005	263,875	1,087	243
SISDO	12/31/2013	3,226,031	6,558	492
SMEP	12/31/2013	22,608,370	52,969	427
Springboard C apital	9/30/2013	872,705	363	2,404
Sumac DTM	12/31/2013	2,203,639	391	5,636
Taifa	2012	251,928	500	504
U & I	9/30/2013	420,102	1,888	223
UBK	2010	126,180	1,429	88
Ufanisi - AFR	2005	125,949	1,200	105
Uwezo	9/30/2013	863,008	203	4,251
VisionFund Kenya	12/31/2013	5,900,227	14,593	404
WEEC	2003	313,299	2,895	108
Yehu	12/31/2013	4,130,788	15,848	261

Annex 3 MFIs in Uganda recent reports to the Mix database

MFI's Name	Report Date	Loans (USD)	Borrowers	Average outstanding loan per borrower
BRAC - UGA	9/30/2013	22,000,409	124,731	176
Centenary Bank	2011	212,816,564	—	-
EBO SAC C O	6/30/2013	1,590,734	3,057	520
ENC OT	2012	178,122	1,404	127
Equity Uganda	2009	46,553,904	58,011	803
Finance Trust	12/31/2013	23,383,755	25,153	930
FINC A - UGA	12/31/2013	24,633,211	56,712	434
FOC C AS	2004	1,142,836	16,412	70
FORMA	2012	89,685	28	3,203
Habitat Uganda	6/30/2013	277,033	987	281
Hofokam	2008	2,395,293	14,259	168
ISSIA	2002	245,670	1,698	145
KSC S	2002	43,541	297	147
KVT	2002	70,300	373	188
KYAPS	2006	377,910	1,232	307
Madfa SAC C O	2010	93,507	1,157	81
MAMIDEC OT	2008	776,877	1,615	481
MFSC	2003	171,077	687	249
MUL	2010	1,659,365	3,419	485
Opportunity Uganda	12/31/2013	13,930,655	31,101	448
PRIDE - UGA	6/30/2013	31,429,966	69,532	452
RED Funds	2008	627,530	2,920	215
RUSC A	2002	100,362	994	101
SC SC S	2002	156,757	1,007	156
Silver Upholders	2012	225,603	2,169	104
TBS	2012	133,587,077	499	267,710
TERUDET	2005	548,375	12,051	46
UGAFODE	3/31/2014	6,943,887	10,000	694
UWESO	2003	778,411	14,233	55
VAD	2002	13,512	198	68
Vision Fund Uganda	2012	3,637,401	16,763	217