Trade-off between outreach and sustainability of microfinance institutions: evidence from sub-Saharan Africa

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The changing landscape of the microfinance industry, which is characterized by a decline in donor funding, has reignited debates regarding the ability of microfinance institutions to serve the poor while remaining sustainable. In this study, we examined the relationship between outreach and sustainability in the context of sub-Saharan Africa (SSA) and analysed the determinants of sustainability using data from 71 microfinance institutions (MFIs) across 10 countries. By applying correlation analysis and fixed effects regression, we found mixed evidence of a trade-off between the depth of outreach and operational self-sustainability. Furthermore, the results show that interest rate is a major determinant for MFI sustainability, which is consistent with the institutionalist view. Factors that significantly influence the sustainability of MFIs in SSA are the average loan size as a percentage of gross national income, gross loan portfolio, portfolio at risk, operating expenses to assets ratio, governance effectiveness, and the interest rate on loans granted to clients. The study recommends that managers of MFIs and decision makers in the region closely monitor their cost-side variables and improve productivity by adopting measures such as information communication techniques that enhance outreach at low cost. In addition, stepping up monitoring and incentivizing hard working staff could help improve both deposit mobilization and loan recovery.

Keywords: microfinance institutions, outreach, sub-Saharan Africa, sustainability, trade-off

POVERTY REMAINS A REALITY in most developing countries and lack of economic diversity, inequality in assets and income distribution, and poor governance is its root cause (Andy, 2004). Access to finance can expand opportunities for all and stability in the financial system can promote efficient savings and investment which is crucial for a thriving market economy (World Bank, 2008). Financial access is important to poor people as it qualifies how easily they can make use of financial services for improved livelihoods. Intuitively, this means that financial services even in small amounts and in diverse forms could make positive changes in the economic conditions of the poor. However, financing poor people has remained a major concern globally due to failures associated with formal credit

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markets (Hulme and Mosley, 1996) and the high repayment risks and general lack of acceptable collateral, which continue to exclude poor people from accessing financial services (Hermes and Lensink, 2007).

In sub-Saharan Africa (SSA), the evolution of the microfinance sector can be traced to two interlinked factors: 1) exclusion of the poor from the formal financial sector as a colonial legacy where financial services were channelled through large-scale, export-led projects in urban areas; and 2) donor support in the form of concessionary loans which were channelled to certain political colonies and specific cash crops development and managed by government officials (De Haan and Lakwo, 2010). Such forms of donor support relied heavily on external strategies with limited product diversification and were characteristically unsustainable (De Haan and Lakwo, 2010). According to the Microfinance Information Exchange, and the Consultative Group to Assist the Poor (MIX and CGAP, 2012), approximately 22,900 MFIs are operational in SSA with an outreach of 12.6 million active borrowers, 21.6 million depositors, and a gross loan portfolio of US$14.9 bn as at December 2010. Despite this, dealing with the problem of higher transaction costs and access to finance for poor people remains a major concern in the industry (World Bank, 2008; Cull et al., 2009; African Union, 2009).

Despite the high priority placed on microfinance interventions by both national and international development agencies as a means of alleviating poverty, the performance of MFIs in terms of financial sustainability, outreach, and efficiency is increasingly being questioned by various authors (Buckley, 1997; Morduch, 1999; Cull et al., 2007). For instance, Morduch (1999) asks 'whether microfinance can meet the full promise of poverty reduction without subsidies'. Buckley (1997) in his survey of micro-enterprises in Ghana, Kenya, and Malawi, asks whether MFIs are in any way different from the rural and credit cooperatives in the 1970s, implying they may be unsustainable. Ledgerwood and White (2006) observed that despite the scale of outreach, MFIs reach only a small percentage of their potential market and ask, 'what can be done to extend financial services to the poor sustainably?' Besides the numerous questions being raised, high-interest rates charged by some MFIs are a key debate in the microfinance literature with some people calling for total commercialization of the industry. For instance, Armendàriz et al. (2010) note that commercialization is one of the most contentious issues in the microfinance industry today owing to the trade-off debate of fighting poverty and driving sustainability. Hudon and Traca (2011) found that, regardless of the type of commercialization, a vast majority of MFIs still rely on subsidies, and these seem to improve efficiency up to a certain threshold. In contrast, Mersland and Strøm (2009) found that the commercialization of microfinance has not led to mission drift since the search for profits seems to have been accomplished by a drive to cut costs. From the perspective of suppliers, high interest rates are necessary to cover high fixed expenses associated with small, individual loans (Robert, 2013).

MFIs face the challenge of achieving the dual goals of sustainability and outreach. Hermes and Lensink (2007), in their study of MFIs, expressed the need for further evidence on the specific mechanisms that account for performance differentials in MFIs. Currently, there is limited cross-sectional investigation to show whether

pursuing sustainability comes at the expense of MFI outreach. Adongo and Stork (2005), in their study of MFIs in Namibia, found that the institutions were unsustainable largely because of the Usury Act of 1968 that places a cap on the interest rate. Over-indebtedness of microfinance clients in Ghana (Schicks, 2013), South Africa (Hurwitz and Luiz, 2007), Nigeria, and other parts of the world has threatened MFI sustainability and profitability owing to delinquency and worsening portfolio quality. Schicks (2013) shows that even though portfolio quality may seem good, over-indebtedness can be a problem because of the abnormal sacrifices that people have to make. In SSA, few studies (Makame and Murinde, 2006; Kipesha and Zhang, 2013) have explored empirically the sustainability and outreach trade-off despite the numerous discussions on this in the microfinance literature. Besides the limited geographic focus of these earlier studies, analysis has either been less rigorous (see Olivares-Polanco, 2005) or based largely on country-level case studies focusing on sustainability strategies adopted by organizations. Empirical evidence of a trade-off between microfinance outreach and sustainability, therefore, remains limited especially in the context of SSA. The primary objective of this paper, therefore, was twofold: 1) to examine the presence of a trade-off between outreach and sustainability; and 2) to analyse the determinants of sustainability. The findings from this study not only contribute to the microfinance literature but are relevant to managers of MFIs who are constantly searching for ways to improve the productivity, sustainability, and profitability of their institutions. The remainder of the article is structured as follows: the next section provides a review of related literature. This is followed by a description of the data and methodology. Results of the determinants of sustainability are then presented, as well as a trade-off between sustainability and outreach. Brief conclusions end the article.

Literature review

This section discusses previous work done on MFI sustainability and outreach. The review is categorized into three areas: the concept of sustainability and its relevance, determinants of sustainability, and the trade-off between outreach and sustainability.

Sustainability of MFIs: does it really matter?

Poverty is explained partly by the absence of economic opportunities, and microfinance is seen as a sustainable path towards providing viable economic alternatives. The importance of microfinance sustainability, therefore, goes beyond poverty reduction to cover the sustainable supply of microfinance services on a long-term basis (Balkenhol, 2007). However, various studies on microfinance interventions across the globe have recorded controversially mixed findings. The generalization of the positive impacts of microfinance has not been universally accepted and some leading scholars (Morduch, 1998; Coperstake et al., 2005) have expressed concerns about mission drift. The general lack of depth of outreach of microfinance schemes has also been raised as a problem.

Outreach is the ability of an MFI to provide high-quality financial services to a large number of clients. It is aimed at improving the welfare of the poor and two main components are commonly measured: depth and breadth. Depth of outreach reflects how deep within the poor population an MFI is able to serve and how average loan size has been used as a proxy measure in the literature, although it has been described as unsatisfactory (Cull et al., 2007; Mersland and Strøm, 2010). For instance, an increase in average profit or average cost tends to increase average loan size. The assumption is that, the smaller the size of the loan, the deeper the outreach. Breadth of outreach is the number of poor people recorded by an MFI, and the number of active borrowers has been used as appropriate measure. The proportion of females served by an MFI has also been used to assess breadth of outreach since women constitute the bulk of microfinance clients with good loan repayments. However, Boehe and Cruz (2013) suggested that women's debt repayment performance increases in weak and adverse institutional environments. Outreach, therefore, covers the social performance dimension of MFIs and is vital in enabling access to financial services to many poor people in geographically dispersed locations, contributing to MFI profitability and sustainability.

Generally, sustainability is defined as 'the ability of a program to continuously carry out activities and services in pursuit of its statutory objectives' (Rosenberg et al., 2009). In the context of MFIs, it involves generating sufficient profits to cover all expenses without dependence on any form of subsidy (Tucker and Miles, 2004). According to Khandker and Khalily (1996), it reflects the ability to deliver services continuously to rural populations as a development financial institution. The issue of subsidy, therefore, is vital in expanding outreach since a one-off subsidy could help reduce the fixed costs of an MFI and enable it to establish firmly in the rural sector. However, reducing transaction costs and offering better products and services that meet clients' needs on a continuous basis (achieving financial sustainability) through subsidy is challenged by the growing dynamics observed in most microfinance markets such as over-indebtedness. It thus features a trade-off between poverty alleviation being pursued by donors (social impact) and financial self-sufficiency. The idea of mission drift is however rooted in MFIs striving to achieve the double bottom line of financial and social sustainability.

The importance for MFIs to achieve financial sustainability has been highlighted by various authors. Hollis and Sweetman (1998) note that financial sustainability is integral to institutional sustainability. Schreiner (2000) argues that unsustainable MFIs would not be able to carry on supporting the poor in future because they would cease to exist. Nyamsogoro (2010) notes that the absence of MFIs is much better than having unsustainable ones. Extra efforts are needed for MFIs to attain sustainability for two reasons: 1) to qualify the institutions to borrow from external sources (capital markets and banks) to augment their operations (Gibbons and Meehan, 2000); and 2) to enable them to achieve their long-term goal of poverty alleviation (Otero, 1999). However, Morduch (1999) calls for more quantitative empirical research into MFI performance, asserting that most of the earlier studies

on MFI performance have been constrained by inadequate and unreliable data at the firm level.

Sustainability remains a key area of debate in the microfinance literature. The implications for financial self-sufficiency on the depth of outreach have received attention in the microfinance literature by two competing schools of thought: the welfarists and the institutionalists. While the welfarists propagate the dominance of the outreach goal by MFIs (Hulme and Mosley, 1996; Ditcher, 1997; Montgomery and Weiss, 2005; Hashemi and Rosenberg, 2006), the institutionalists emphasize the need for more sustainable and efficient institutions as the viable route for reaching out to many poor borrowers, leading to greater breadth of outreach (Otero and Rhyne, 1994; Morduch, 2000; Christen, 2001; Bhatt and Tang, 2001; Robinson, 2001; Isern and Porteous, 2005).

Determinants of sustainability

Several factors influence the sustainability of MFIs. Broadly, the macroeconomic environment and the management structure of the MFI can greatly influence their level of sustainability. The financial spread of MFIs depends on their viability and sustainability. To be able to supply services on a sustainable basis, MFIs must maintain high repayment rates. Failure to do so can affect organizational efficiency and financial viability due to the need to provide for bad debts. Minimization of administrative expenses is therefore vital for MFI sustainability. Well-managed MFIs that adhere to optimal lending practices should be able to maintain administrative expenses expressed as part of gross portfolio of 15–25 per cent (Christen and McDonald, 1997). Personnel expenses constitute the bulk of administrative costs and they range from 50 to 70 per cent of the total amount of MFI administrative expenses (Gibbons and Meehan, 2000).

Hollis and Sweetman (1998) compared six microcredit organizations in 19th-century Europe to identify institutional designs that were a prerequisite for financial sustainability. They found that organizations that derived their funding from deposits were more reliable than those depending on charitable sources, which tended to be more fragile without focus. Hollis and Sweetman (2001) further showed that MFIs were financially sustainable for decades due to their adaptation to the local economic and social environment.

Ayayi and Sene (2010) examined the key drivers of microfinance sustainability using data from 101 countries for the period 1998–2006. They reported that portfolio quality, higher interest rates and prudent management are critical enablers of MFI financial sustainability. Similarly, Tehelu (2013) found loan intensity and loan size to be significant positive determinants of financial sustainability in East Africa. However, management inefficiency and portfolio at risk had negative impacts on sustainability. Furthermore, Bogan (2012) found that the increased use of grants by large MFIs decreases their level of operational self-sufficiency. Cull et al. (2007), in their study on sustainability outreach trade-offs, posit that MFIs which offer individual-based loans are more profitable than institutions that provide group-based loans. This suggests that the type of loan influences profitability and sustainability of MFIs.

Trade-off between sustainability and outreach

The trade-off between outreach and sustainability stems from the high transaction cost involved in making small loans to poor clients, particularly in remote and inaccessible locations. The general absence or lack of collateral owned by poor people to help mitigate risk does not help in forecasting *ex ante* positive repayment rates. The literature on trade-off is not extensive in the microfinance field and is largely anecdotal. Empirical evidence on whether outreach focus complements institutional sustainability has presented mixed findings. Though most studies have found and reported a trade-off between outreach and sustainability, others have observed the absence of a trade-off. Several studies provide evidence of a trade-off between financial performance and outreach to the poor (Crawford et al., 2011; Hermes et al., 2011; Galema and Lensink, 2009; Cull et al., 2007; Adongo and Stork, 2005). In this regard, MFIs that perform well financially do so at the expense of their outreach to the poor. Conversely, other studies report a positive relationship between profitability and sustainability with outreach to the poor, hence the absence of a trade-off (Adhikary and Papachristou, 2014; Makombe et al., 2005; Brau and Woller, 2004; Schreiner, 2000). Kar (2013) explored the impact of profitability on the depth of outreach and found a significant positive relation between MFI size and average loan amount, suggesting mission drift.

However, in the microfinance literature, the nature, extent, size, and implications of trade-offs remain contentious. Few rigorous studies have been carried out in these areas, with the majority coming from regions outside Africa. Cull et al. (2007) found evidence of a trade-off between sustainability and outreach and laid emphasis on the role of institutional designs in determining the existence and size of such trade-offs. Cull et al. (2009) show that serving the poor could be profitable but that higher fees imposed do not necessarily translate into profits and that it is not cost-effective in serving better-off clients; their study, however, did not incorporate country fixed effects into the analysis. Similarly, Hermes et al. (2011) reported a trade-off between sustainability and outreach, using cost efficiency as a measure of sustainability. Outreach was found to be negatively related to MFI efficiency.

Galema and Lensink (2009) explored the size of the trade-off using a sample of 25 MFIs to estimate the extent to which social investors are willing to accept a decrease in returns to achieve higher outreach. Their results show that the trade-off is not large for an average loan of $180 or more, but rather more for average loans below this level, suggesting a significant trade-off around the lower end of the poverty distribution. Adhikary and Papachristou (2014) empirically examined the trade-off between financial performance and outreach in a panel of 133 South Asian MFIs from 2003 to 2009, using random effects modelling and generalized method of moments estimation. The study found that depth of outreach is positively related to financial performance, implying that a financially sustainable microfinance expansion can achieve social goals at an acceptable credit risk level. Similarly, Quayes (2012) found a positive complementary relationship between financial sustainability and depth of outreach in his study of 72 MFIs across 82 countries.

A few empirical studies in SSA have analysed the sustainability–outreach trade-off. Makame and Murinde (2006), in their study of 33 MFIs in East Africa, found strong evidence of a trade-off between outreach and sustainability. Similarly, for the same

region, Kipesha and Zhang (2013) found negative impacts of a focus on profitability on outreach to the poor while outreach was positively related to both sustainability and profitability. Annim (2012) reported that only MFIs which were operationally self-sufficient were reaching poorer clients in Ghana. Formal institutions (banks) that relied on their own funds were found to actually target non-poor clients, suggesting complementarity in development efforts regardless of the source of funds. This means that, while serving poor clients, the banks also profit from it.

Empirical models

The fixed effects (FE) and random effects (RE) models are the most widely applied models for panel data analysis (Green, 2003). We employed the FE model in our analysis of unbalanced panel data for the period 2003–2013. Various diagnostic tests were performed prior to estimation and this informs our choice for the model. The Fisher-ADF test was conducted on each variable used in the model to check panel unit roots but the results were insignificant. The variance inflation factor (VIF) test was carried out on each independent variable and the results show the absence of multicollinearity. We also conducted the Hausman test for the model specification for the FE and RE models. The test results favoured the use of the FE model as against the RE model, as depicted in Table 1. To avoid biased results, the restrictions imposed by the FE model on parameter estimates were tested.

Mundlak (1961) and Wallace and Hussain (1969) were the earlier proponents of the FE model. The model allows for the endogeneity of all the regressors with individual effects and has been applied in most empirical studies with satisfactory results. The method is useful when controlling for variables that are fixed over time (Brooks, 2008) with a large number of observations, and our data fit well into this.

Table 1 Hausman specification test for FE and RE models

Variable	*Coefficients*		
	Fixed effects (b)	*Random effects (B)*	*Difference (b – B)*
Average loan size (ALS)	0.0540	0.0286	0.0254
Portfolio at risk (PAR)	–0.0531	–0.0523	–0.0008
Cost per borrower (CPB)	–0.0144	–0.0229	0.0085
Age of institution (AGE)	0.1253	0.0458	0.0512
Gross loan portfolio (GLP)	0.0574	0.0622	–0.0048
Operating expense to assets ratio (OEA)	–0.0437	–0.0475	0.0038
Debt equity ratio (DER)	0.0004	0.0004	–0.0000
Yield on gross loan portfolio (YLD)	0.0309	0.0319	–0.0011
Governance effectiveness (GOE)	0.0363	0.0308	0.0055

Note: Ho: difference in coefficients not systematic; chi2 (9) = (b – B)'[(V_b – V_B)^(–1)]
(b – B) = 27.67; prob>chi2 = 0.0005

Since the FE approach requires within transformations, it has the potential to suffer from a degrees of freedom problem.

The general form of the theoretical model used is specified as:

Equation (1)

$$y_{it} = \alpha + \beta x_{it} + \mu_i + \nu_{it}$$

where y_{it} is the dependent variable, α is the intercept term, β is a ($k \times 1$) vector of parameters to be estimated on the explanatory variables, and x_{it} is a ($1 \times k$) vector of observations on the explanatory variables, t =1, 2…, T; i = 1, 2…N, and k represents the number of slope parameters to be estimated. μ_i is the unobservable individual-specific effects and ν_{it} is the unexplained portion of ν_{it}. The trade-off between sustainability and outreach was established using correlation analysis. All variables were taken in logs; and the two empirical models estimated using operational self-sufficiency (OSS) and return on assets (ROA) as dependent variables for sustainability are captured in Equations (2) and (3). OSS is the most commonly used indicator for measuring sustainability, although it has been criticized for being less rigorous. We expect OSS to have a positive coefficient in the sustainability model and a negative one in the outreach model. ROA is a standard industry measure for sustainability and profitability. Other accepted commonly used measures of sustainability in the literature are return on equity and financial self-sustainability.

Equation (2)

$$InOSS_{it} = \alpha_0 + \alpha_1 InDER_{it} + \alpha_2 InGLP_{it} + \alpha_3 InGOE_{it} + \alpha_4 InALS_{it} + \alpha_5 InYLD_{it} + \alpha_6 InPAR_{it} + \alpha_7 InNAB_{it} + \alpha_8 InOEA_{it} + \alpha_9 InCPB_{it} + \alpha_{10} InAGE_{it} + u_{it}$$

Equation (3)

$$InROA_{it} = \beta_0 + \beta_1 InDER_{it} + \beta_2 InGLP_{it} + \beta_3 InGOE_{it} + \beta_4 InALS_{it} + \beta_5 InYLD_{it} + \beta_6 InPAR_{it} + \beta_7 InNAB_{it} + \beta_8 InOEA_{it} + \beta_9 InCPB_{it} + \beta_{10} InAGE_{it} + u_{it}$$

where α_0 and β_0 are the intercepts, α_1 *to* α_{10} and β_1 *to* β_{10} are the coefficients of the parameters to be estimated, u_{it} is the error term which is assumed to be normally distributed, and u_{it} ~ is independent and identically distributed $(0, \sigma^2)$. Estimation of the above equations was done using the Stata version 14 software program.

We used a number of proxies for outreach, sustainability, and efficiency in this study, similar to those used in previous studies (Zerai and Rani, 2011; Kipesha and Zhang, 2013; Adhikary and Papachristou, 2014). The main variables used, their measurement, and their expected effects are summarized in Table 2, based on a literature search.

Three outreach variables are used in this study. Average loan size (ALS) serves as a proxy for outreach depth to characterize the poverty level of target clients. Smaller size loans with shorter repayment periods have been found to favour the poor, but higher costs are involved due to screening, monitoring, and administration (Lapenu and Zeller, 2001; Hulme and Mosley, 1996). Hence, we expect small loan size to relate negatively with sustainability due to the cost involved. The other outreach

Table 2 Measurement of variables (dependent and independent) and a priori expected sign on explanatory variables

Variable and notation	*Definition*	*Measurement*	*Expected sign*
Operational self-sufficiency (OSS)	Ability of MFI to cover its cost through operating revenues	Total operating financial income / fixed cost Total operating cost + loan loss provision	+
Return on assets (ROA)	MFI's ability to deploy its assets profitably	Net operating income– taxes / average total assets	+
Operating expense to assets ratio (OEA)	Measure of the cost-effectiveness of an MFI and adjusted operating expenses / records of non-financial operating expenses	Adjusted average gross loan portfolio	–
Yield on gross loan portfolio (YLD)	Nominal interest rate charged on loans without adjustments for inflation, opportunity and transaction costs for inflation, opportunity and transaction costs	Institutional level rate of interest	+
Gross loan portfolio (GLP)	MFI's outstanding loans, including current, delinquent and rescheduled loans, but excludes loans written off, and interest receivable	GLP adjusted for write-offs	+
Age (AGE)	Number of years of operation of an MFI	Complete years of MFI service delivery to clients	+
Return on equity (ROE)	Measure of the returns produced by owners' investment	Net operating income– taxes / average total equity	+
Number of active borrowers (NAB)	Number of clients actively accessing financial services at a given point in time	Total active borrowers / country's population × 1000	+
Portfolio at risk (PAR)	Quality of an MFI's loan portfolio beyond the specified the number of days	Outstanding principal balance of all loans more than 30 days / Outstanding principal balance of all loans	–
Average loan size (ALS)	Reflects client poverty level reached by an MFI and is used as a proxy for depth of outreach	Average loan balance per borrower / GNI per capita	+/–

Variable and notation	*Definition*	*Measurement*	*Expected sign*
Percentage of female borrowers (PFB)	Share of women as a total percentage of the total number of borrowers	Number of active women borrowers / Total number of active borrowers	+/–
Debt to equity ratio (DER)	Debt level of a lending institution to its own capital	Total debt / total equity	+
Loan loss provision (LLP)	Amount of money set aside by MFIs against potential default in loan repayments	The percentage of an MFI's loan portfolio set aside against annual defaults based on cash flows	–
Capital to assets ratio (CAR)	Capital to assets of the institution	Total equity / total assets	+
Cost per borrower (CPB)	Measure of efficiency / productivity of an MFI employing its personnel to turn out loans	Operating expenses / Average number of borrowers	–

Source: Based on review of literature

variables are the percentage of female borrowers (PFB) and the number of active borrowers (NAB), both of which measure the breadth of outreach. According to Hermes et al. (2011), the focus on women clients increases the chances of lower rates of loan repayments, which affects the sustainability of MFIs. In contrast, other studies have shown that focusing on women augments outreach and sustainability since it is easier to recover loans from them (Mersland and Strøm, 2010; Boehe and Cruz, 2013). D'Espallier et al. (2011) argue that having more female borrowers reduces portfolio at risk and is associated with fewer write-offs and provisions. Hence, we expect PFB to have a negative impact on sustainability and relate positively to outreach. To achieve the needed scale, MFIs are required to have a larger portfolio which is managed at minimized risk. Gross loan portfolio (GLP) is included to capture loan portfolio size of MFIs. Portfolio at risk (PAR) at 30 days past due measures the credit risk of MFIs, with higher values curtailing lending efforts by the institution to more clients. Similarly, loan loss provision (LLP) is a portfolio quality variable that helps to offset loan defaults. We anticipate that both PAR and LLP will relate negatively to sustainability.

Operating expense to assets ratio (OEA) and cost per borrower (CPB) are cost-side variables included to capture MFI operations. Good cost management is a necessary ingredient for sustainability. A well-managed MFI should produce loans at a lower cost and keep other operating costs to the barest minimum. Hence, we expect CPB and OEA to increase with outreach to the poor and decline with sustainability. Another cost-related variable used as an independent variable is the nominal yield on gross loan portfolio (YLD), a proxy measure for interest rates charged

by MFIs to clients. The interest rate on loans is tied to the cost of funds. It has been argued that the poor cannot afford market rates of interest (bank lending rates on loans granted to clients) so we expect rising interest rates to decline with outreach and increase with sustainability. Interest rate, therefore, affects both MFI outreach and sustainability.

Finally, the debt – equity ratio (DER) is a good indicator in assessing the extent of utilization of commercial funds by MFIs and is included as the capital structure variable. The availability and use of debts by MFIs helps to expand their capital base and outreach. Debts also propel MFIs towards achieving sustainability and efficiency. The increased use of debts, however, often results in higher financing costs and lower investments in gross loan portfolio (Esperança et al., 2003). Hence, we expect DER to relate negatively to both the outreach and sustainability dimensions of MFI performance.

Data sources

The study data came from the Microfinance Information Exchange (MIX) Market database, commonly referred to as MixMarket. MixMarket provides information about MFIs covering standard financial performance indicators and audited financial statements globally. It is reliable, comparable, and publicly available. All data posted to the site are reviewed and validated against a set of business and audit rules (MIX, 2010). Previous studies (Quayes, 2012; Hermes et al., 2011; Ayayi and Sene, 2010; Cull et al., 2007) in microfinance have used this data source. Data on 71 MFIs across 10 countries (Ghana, Nigeria, Benin, Cameroon, South Africa, Ethiopia, Kenya, Tanzania, Burkina Faso, and Uganda) have been used in this study. Country selection was based on data availability as reported to the database, while MFI selection was based purely on data completeness and quality, as measured by the diamond rating used by rating agencies (only MFIs rated 3 to 5 were considered). However, this data source is not without criticism as MFIs self-report and the data do not capture all MFIs globally.

Results and discussion

This section presents the results of both correlation and regression analysis. We first examine some basic descriptive statistics obtained from the data, followed by the correlation and regression results.

Trade-off analysis

Descriptive statistics of the variables used in the estimation are presented briefly, followed by correlation analysis. The means of most variables are interpreted as a percentage of firms in the category. For operational self-sustainability (OSS), values below 1 indicate that the respective MFI is not covering costs from operating revenues. The OSS value (1.065) shows that on average the MFIs are operationally self-sustainable. The average loan size (ALS) for the institutions is about 31 per cent of the respective country's GNI per capita. The institutions demonstrate a

low level of portfolio quality, with an average portfolio at risk over 30 days of 8.9 per cent. This suggests a worsening situation in loan recoveries with negative impacts on outreach efforts. The average amount spent by MFIs to maintain a client (cost per borrower) is $177. This cost is high compared with the global average of $89 reported in 2003. Also, the data show that MFIs charge on average 53.8 per cent interest on loans. The asset allocation of all MFI types shows that gross loan portfolio represents 66.9 per cent of assets. This can be said to be fairly good compared with the average of 56.7 per cent reported for SSA in 2005, with potential impacts on MFIs' social and financial performance. However, the institutions are not profitable and could collapse since the average return on assets is negative (85 per cent). The negative profitability supports the findings of Mori et al. (2015) for MFIs in East Africa. This could be due to the diverse nature of the industry, as most MFIs in SSA are dominated by cooperatives and NGOs with dominant social performance goals. MFIs on average also post negative returns on equity (8.3 per cent). The mean age of 12.3 years shows that the institutions are experienced and can be considered to be mature.

Table 3 reports the partial correlation results. Section A presents correlation results for outreach, while section B focuses on sustainability. We find that portfolio at risk, gross loan portfolio, the yield on the gross loan portfolio, and operating expenses – assets ratio are significant factors that influence MFI outreach efforts in SSA. The results show that a negative correlation exists between sustainability (OSS) and depth of outreach (ALS) but is not statistically significant. However, a positive association exists between breadth of outreach and sustainability. Furthermore, the results are robust and consistent using both number of active borrowers (NAB) and percentage of female borrowers (PFB) as dependent variables in the estimation. Similar results are found in section B. Operational self-sustainability

Table 3 Partial correlation results of outreach and sustainability

A Outreach				*B Sustainability*		
	ALS	NAB	PFB		OSS	ROA
Variable	Corr	Corr	Corr	Variable	Corr	Corr
ROA	–0.0992	0.0409	–0.1680***	NAB	–0.0180	0.0122
PAR	0.1319***	–0.2945***	–0.0899**	ALS	–0.0376	–0.1180***
CAR	–0.0577	–0.0164	0.0803**	PFB	0.0327	–0.1966***
ROE	0.0209	–0.0092	0.0422	PAR	–0.1858***	0.0090
YLD	–0.0713**	–0.0560	0.0587	CAR	0.0160	0.0654
GLP	0.2882***	0.5531***	–0.0369	ROE	0.0712**	0.1300***
OEA	–0.1205***	–0.0233	0.2011***	YLD	0.0520	0.0475
OSS	–0.0564	0.0070	0.0126	GLP	0.2363 ***	–0.0245
				OEA	–0.1699 ***	0.0621

Note: Significance level: *** significant at 1%, ** significant at 5%, * significant at 10%

relates negatively to both depth and breadth of outreach as measured by ALS and NAB, respectively, but is not statistically significant. This suggests the absence of a trade-off. However, using ROA as a measure of sustainability, we find a significantly negative association between MFI sustainability and depth of outreach. The trade-off between sustainability and outreach from our analysis, therefore, depends to a large extent on the variables used and also probably the model specification. This finding is consistent with Kipesha and Zhang (2013), who reached a similar conclusion in their analysis of the relationship between MFI outreach and sustainability in East Africa.

Furthermore, gross loan portfolio (GLP) has a significant positive correlation with both breadth and depth of outreach. This suggests that an increase in GLP will probably lead to better outreach to poor clients if the institutions decide to curtail investments in other assets. Also, portfolio at risk (PAR) is significant and relates both positively to the depth and negatively to the breadth of outreach. Intuitively, improvements in MFI loan recovery will enhance their outreach to poorer segments. The portfolio yield (YLD) and operating expense – assets ratio (OEA) are significant and negatively related to the depth of outreach. This highlights the cost involved in serving poorer clients as raised in previous studies (Conning, 1999; Lapenu and Zeller, 2001) with implications for MFI performance. The results also show a significantly negative correlation between outreach to females (PFB) and their return on assets. This tends to support the notion that even though women constitute a greater share of MFI clients, the financial impacts of the programme on their welfare are less sustainable.

Moreover, from section B, a significantly negative relation is seen between OSS and PAR. This suggests that a rise in the portfolio at risk hampers sustainability efforts pursued by institutions. Thus, institutions that face challenges in the timely recovery of loans face higher credit risk. Also, the significantly negative association between OEA and OSS further strengthens the finding of higher operating costs incurred by MFIs in the region, which affects their sustainability. Finally, we find gross loan portfolio (GLP) and return on equity (ROE) playing a positive role in the financial sustainability drive of institutions in SSA.

Determinants of sustainability

Table 4 depicts the split regression results for four models using OSS and ROA as the dependent variables. Models 1 and 3 serve as the base models for OSS and ROA, respectively, through which additional variables were incorporated to help check the robustness and sensitivity level of the variables that were found to significantly influence MFI sustainability. The joint Wald test shows significant firm effects. The assumption of the MFIs being homogeneous is rejected and an appropriate fixed effects model estimated. The results show that models 1 and 2 produce the best results, while models 3 and 4 performed poorly. Hence, we concentrate discussions on models 1 and 2 with OSS as the predicted variable.

The coefficient of average loan size (ALS) is positive and is statistically significant at the 5 per cent level. This suggests mission drift since an increase in average loan size will lead to an increase in the sustainability of the MFI. For instance,

Table 4 Regression results conducted to investigate the determinants of sustainability of MFIs in SSA

Variable	*Coefficients*			
	Operational self-sufficiency (OSS)		*Return on assets (ROA)*	
	Model 1	*Model 2*	*Model 3*	*Model 4*
Average loan size (ALS)	0.0540** (2.15)	0.0553** (2.02)	–0.3437 (–1.36)	–0.3671 (–1.34)
Portfolio at risk (PAR)	–0.0531*** (–5.49)	–0.0533 *** (–5.51)	0.0648 (0.67)	0.0694 (0.71)
Cost per borrower (CPB)	–0.0144 (–1.26)	–0.0144 (–1.26)	–0.0392 (–0.34)	–0.0394 (–0.34)
Gross loan portfolio (GLP)	0.0574 *** (4.84)	0.0565*** (4.16)	–0.0613 (–0.52)	–0.0449 (–0.33)
Operating expense to assets ratio (OEA)	–0.0437*** (–3.57)	–0.0435*** (–3.56)	–0.1306 (–1.07)	–0.1329 (–1.08)
Debt – equity ratio (DER)	0.0004 (1.24)	0.0004 (1.23)	–0.0008 (–0.28)	–0.0008 (–0.28)
Yield on gross loan portfolio (YLD)	0.0309** (1.99)	0.0364** (1.99)	0.1678 (1.08)	0.1660 (1.06)
Governance effectiveness (GOE)	0.0363** (1.92)	0.3632* (1.92)	0.1997 (1.05)	0.1991 (1.05)
Age of MFI (AGE)	0.1253 (0.36)	N/A	–2.6320 (–0.76)	N/A
Number of active borrowers (NAB)	N/A	0.0014 (0.14)	N/A	–0.0259 (–0.26)
R-squared	0.1607	0.1518	0.0226	0.0191
Number of observations	619	619	619	619
Constant	–0.5364 (–1.41)	–0.4012*** (–4.79)	2.5393 (0.67)	–0.2996 (–0.36)
F-test	F(67, 542) = 10.48 ***	F(67,542) = 10.60 ***	F(67, 542) = 1.43**	F(67, 542) = 1.47**

Note: t-statistics are presented in parentheses and significance at 1%, 5%, and 10% levels denoted by ***, **, and *, respectively.

model 1 of Table 4 shows that a percentage point increase in depth of outreach will lead to a 0.0540 percentage point increase in operational self-sustainability of MFIs. Intuitively, this means less outreach to poorer clients in favour of wealthier clients, aimed at attaining sustainability. The coefficient for the portfolio at risk (PAR) is negative, as expected, and statistically significant. Model 1 shows that a percentage point increase in portfolio at risk will lead to a decline in MFI operational self-sustainability by 0.0531 per cent. PAR typically reflects the efficiency of loan collection by MFIs. Higher PAR values imply lower loan recoveries, and hence less sustainability of the institution. As shown by Agier and Szafarz (2013),

this could also arise from discrimination in terms of loan size based on the scale of the project. An earlier study by Nyamsogoro (2010) supports this negative relationship. Furthermore, operating expense – assets ratio (OEA) recorded a negative coefficient, as expected, in both models, and is statistically significant at 1 per cent. This suggests that an increase in OEA decreases the operational sustainability of MFIs in SSA and vice versa. Management of operational expenses is, therefore, central to attaining microfinance sustainability and this result supports earlier findings by Kosmidou (2008) who found poor expense management as a factor that impedes MFI profitability.

Furthermore, gross loan portfolio (GLP) had a positive and statistically significant coefficient. Model 2 of Table 4 shows that a percentage point increase in gross loan portfolio will lead to a 0.0565 percentage point increase in MFI sustainability. GLP is the main income source for most MFIs. A higher loan portfolio therefore, if well managed, with improved loan recovery, should lead to increased profits and hence sustainability of the institution. This finding is consistent with Tehelu (2013) but contradicts that of Okumu (2007) who found a negative impact of loan portfolio on MFI sustainability. The positive and significant coefficient for yield on gross loan portfolio (YLD) suggests that the MFIs in the sample charge competitive interest rates in an effort to cover their cost of operations. The 53.8 per cent average rate of interest revealed by the sample MFIs in this study is indeed high. The intervention by various national governments in creating a conducive environment for MFIs to operate is vital. The effectiveness of governance index (GOE) from the analysis had positive and significant effects on MFIs. For instance, model 2 shows that a percentage point increase in governance effectiveness will lead to a 0.3632 percentage point increase in MFI sustainability. This finding is consistent with Okumu (2007) who, in his study of MFIs in Uganda, found the efforts of the government to be supportive in promoting the development of MFIs.

Other variables found not to have an influence on sustainability in both models are the cost per borrower, the age of MFI, debt – equity ratio, and number of active borrowers. The observed positive coefficient for debt – equity ratio, which is not statistically significant in our results, contradicts earlier studies (Rajan and Zingale, 1995; Fama and French, 2002) that found a negative relationship between a firm's debt level and profitability. Age of MFI has a positive, but not significant, coefficient indicating that learning curve effects have no notable impact on MFI sustainability.

Conclusions

This study aimed to examine the presence of a trade-off between sustainability and outreach and establish the key determinants of MFI sustainability in SSA. The study used MIX market data covering 71 MFIs across 10 countries in SSA. Using the institutionalists' framework, the study tested the presence of trade-offs through correlation analysis. The determinants of sustainability were analysed using the fixed effects regression approach with operational self-sufficiency (OSS) and return on assets (ROA) as dependent measures for sustainability. We explored two dimensions of

outreach (depth and breadth) using average loan size as a percentage of GNI per capita and the number of active borrowers, respectively.

We found a negative correlation between sustainability (OSS) and depth of outreach (ALS), though statistically insignificant. Intuitively, this suggests the absence of a trade-off between sustainability and depth of outreach. However, a positive association exists between breadth of outreach and sustainability. Furthermore, the results are robust and consistent using both number of active borrowers (NAB) and the percentage of female borrowers (PFB) as dependent variables in the analysis. Using ROA as an alternative measure of sustainability, we found a significantly negative relationship between sustainability and depth of outreach, suggesting the existence of a trade-off. To conclude, the empirical evidence on the mission drift debate for MFIs in SSA is mixed and therefore it is hard to have a real opinion on the issue. Other trade-offs that emerged from our analysis are those between OSS and PAR and between OSS and OER. Both are statistically significant at 1 per cent. The nature of the trade-off between sustainability and outreach from our analysis, therefore, depends heavily on the variables used. This shows how sensitive it is to the way the mission drift reality is measured.

From the regression results, the main determinants of sustainability of MFIs in SSA are average loan size as a percentage of GNI, gross loan portfolio, portfolio at risk, operating expense – assets ratio, governance effectiveness, and interest rate. Average loan size had the highest coefficient in absolute terms and also significantly and positively influences sustainability. Targeting clients via larger loan size with competitive rates of interest, therefore, could contribute to MFI sustainability. However, this has greater implications for the social goals of the organization. Furthermore, the results show that age of MFI, cost per borrower, debt – equity ratio, and number of active borrowers do not significantly influence MFI sustainability. Learning curve effects on MFI performance in SSA are yet to be translated into sustainable operations in a statistical sense.

The study recommends that managers of MFIs and decision makers in the region should focus more on improving productivity and adopting cost-effective and efficient strategies. This can be achieved by strengthening staff appraisal systems, incentivizing hard-working staff, stepping up monitoring to improve on loan collections, and adopting appropriate information communication technologies such as M-Pesa to help increase outreach and reduce the cost of operations.

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