FINANCIAL-LINKAGES AND COST EFFICIENCY: LESSONS FROM TANZANIAN MICROFINANCE COOPERATIVES

Esther K. Ishengoma*

ABSTRACT

This paper attempts to examine the effect of financial linkages on cost margin and efficiency of microfinance cooperatives (MCs) in Tanzania. Based on data from six focus group discussions comprising 112 managers from 102 MCs, the paper starts by exploring the nature of linkages between commercial banks and MCs. It further applies quantitative analyses: the stochastic frontier and semi-logarithm regression models to examine the effect financial linkages on cost efficiency and cost margin. The paper reveals that financial linkages increase cost margin and inefficiency of MCs. It therefore enlightens MCs' stakeholders on the possible explanations of the positive effects of financial linkages on cost margin and inefficiency. The findings are useful for policy makers, development institutions, MCs and banks.

Key words: Financial linkages, microfinance cooperatives, cost margin and efficiency

INTRODUCTION

The role played by microfinance institutions (MFIs) in reducing poverty through offering financial services to poor people and facilitation of the achievement of the millennium development goals has been worldwide acknowledged.[i] In Tanzania, a significant number of MFIs are MCs (i.e. Savings and Credit Cooperative Societies). MCs are democratically controlled semi-formal financial institutions (Mlowe and Kaleshu, 2009) formed by associations of persons, who voluntarily join together to achieve common needs, make equitable contributions to the capital required, and accept the risks and benefits of the MCs' undertakings (United Republic of Tanzania - URT, 2004).

In 2009, there were 5,344 MCs reaching 911,873 people (Ishengoma and Kappel, 2011). During 2005 to 2009, the number of MCs and people reached grew by 52 and 74 percent respectively (Ishengoma and Kappel, 2011). The average loan per

Business Management Review 14 pp 1-22 ISSN 0856-2253©January-December 2010, UDBS.

* Dr Esther K. Ishengoma is an Alexander von Humboldt Research Fellow at GIGA-German Institute of Global and Area Studies and a Senior Lecturer at the University of Dar es Salaam Business School (UDBS). Address: UDBS, P.O. Box 35046, Dar es Salaam, Tanzania; Tel. +255 22 2410006, Fax. +255 22 2410510. Email i_esther@yahoo.com; estheri@udbs.udsm.ac.tz or ishengoma@giga-hamburg.de.

member and loanable funds (i.e. the sum of deposits, savings and share) grew from Tshs. 212,605 to 508,193 and from Tshs. 123,281 to 191,501, respectively (Ishengoma and Kappel, 2011).

Despite of their growth, in 2009 around 631 MCs were inactive (Ishengoma and Kappel, 2011). Others were inefficient in collecting loan repayments (Agrisystems-Eastern Africa Ltd., 2003). The utilisation of low skilled personnel, poor internal governance systems (Mvungi, 2010), limited funds to satisfy the increasing demand of credits (see Agrisystems/Eastern Africa Ltd., 2003; Awal, www.bwtp.org), and weak external governance (Ishengoma and Kappel, 2011) are among the challenges limiting MCs' performance.

Despite of their innovative lending approaches, which enable them to reach micro credit borrowers, and attain relatively high repayment rates, their expansion is constrained by limited funds and infrastructure (skilled manpower, information and communication technology - ICT). On the other hand, CBs have excess liquidity and strong infrastructure but their loan design crowd out microcredit clients while their location (i.e. far from rural areas and microcredit clients) increase information asymmetry, and thus, limit their lending to microcredit clients. Therefore, linkages between MCs/MFIs and CBs seem an option to overcome challenges faced by MCs/MFIs and CBs.

Financial linkages are transactions between economic agents, through or outside the market, fully or partially priced (Stewart and Ghani, 1991), coupled with partnerships between formal and less formal financial institutions aiming to offer mutual benefits to partners (Pagura and Kirsten, 2006). Kirsten (www.ilo.org) identifies two types of financial linkages: direct and facilitating financial linkages. The former aim to help less formal institutions to diversify and increase their sources of funding, and/or balance liquidity shortages; while the latter occur when formal financial institutions (FFIs) hire less formal institutions to act on their behalf (Kirsten, www.ilo.org). The fact that facilitating linkages seem informally anchored in direct linkages, this paper does not categorise them. Although the aim of direct linkages is to offer mutual benefits to partners, a partner with high bargaining power is likely to gain at the expense of those with low bargaining power. This is observed in the literature on informal-formal sector linkages (Tokman, 1978) and global value chain and linkages (Humphrey and Schmitz, 2000; Gereffi, et al., 2005).

The government and development institutions (e.g. International Fund for Agricultural Development - IFAD and International Finance Corporation - IFC) have been facilitating MFIs – CBs linkages (Tanzanian Federation of Cooperatives - TFC and Cooperative Development Department - CDD, 2006; www.ifc.org/ifcext/careers.nsf). MCs in Tanzania have embarked on borrowings from FFIs to meet their financing gaps. During 2005 to 2009 MCs' share of

borrowings to total sources of financing increased from 18 to 54 percent (Ishengoma and Kappel, 2011). This experience is reported at worldwide level (Krauss and Walter, 2008, Market Mix 2010a; Deutsche Bank Research--DBR, 2007; Development Alternatives, Inc., 2005).[ii]

The trend of MFIs and CBs linkages has triggered the interest of scholars in assessing the influence of these linkages on MFIs' outreach and sustainability. MFIs linked to CBs are able to extend their scope of outreach (Pagura and Kirsten, 2006), which could strengthen their relationships with borrowers, and therefore, increase repayment rate (Godquin (2004), and reduce their loan collection costs. Awal (www.bwtp.org), Gallardo et al. (2006), and Pagura and Kirsten (2006) argue that financial linkages enhance MFIs' growth, profitability and breadth of outreach. However, a few studies implicitly show that financial linkages increase MFIs/MCs' labour (Ishengoma and Kappel, 2011) operating (Development Alternatives, Inc., 2005) and financing costs (Mlowe and Kaleshu, 2009).

Based on the transaction cost theory, transactions between FFIs and MFIs might be characterised with high opportunism and bounded rationality, given the regulatory environment and governance, and the nature of MFIs/MCs (see Williamson, 1985). In line with the principal-agent theory, FFIs/CBs seem to apply different mechanisms (strict loan requirements, stringent loan terms and covenants, strict control and monitoring) to overcome opportunism and bounded rationality when transacting with MFIs/MCs. Because of their low bargaining power, MFIs/MCs are forced to accept restrictive terms and conditions from FFIs (Pagura and Kirsten, 2006; Development Alternatives, Inc., 2005), which seem to increase their costs.

Studies examining the determinants of MFIs efficiency overlook the role of financial linkages. Ahlin, et al. (2010) and Hermes, et al. (2009a) associate MFIs efficiency to macro-level factors: economic growth, the level of development of the financial sector, the size of the formal sector and foreign direct investment. Hermes, et al. (2009a, 2009b) and Cull et al. (2007) focus on examining the relationship between outreach and efficiency to prove the presence of mission drift. These studies utilised data from Market Mix which exclude small MFIs like MCs as majority of them do not report to Market Mix.

Given the trend in MFIs-CBs linkages and knowledge gap, this paper aims to examine the effect of financial linkages on cost margin and efficiency of MCs while controlling for MCs' specific factors. The findings in this paper enlighten MFIs/MCs' stakeholders on whether financial linkages, which they are encouraging enhance the sustainability of MFIs/MCs through improving their cost efficiency. This information can assist to enhance policies aiming to enhance MFIs/MCs through linkages with FFIs/CBs.

Cost margin is the inverse of operating- or financial-self sufficiency ratio.[iii] It indicates the ability of MFIs to utilise its resources to generate a monetary unit of income. Cost inefficiency is the distance between a bank/MFI's actual cost and a best practice bank/MFI's cost if it produced the same output under the same conditions (Lensink, et al., 2008; Hermes, 2009b; Berger and Mester, 1997). Cost margin is easier to understand but it overlooks the phenomenon that resources such as labour and technology are simultaneously utilised to produce a unit of output.

To meet the above objective, the rest of the paper is organised as follows: Section 2 offers theoretical views and assumptions regarding the relationship between financial linkages and cost efficiency, while Section 3 presents the data and models applied to test the assumptions. Section 4 presents and discusses the results, while Section 5 concludes and offers recommendations.

FINANCIAL LINKAGES AND COST EFFICIENCY OF MFIs: THEORETICAL VIEWS AND POSTULATIONS

Firms establish linkages to overcome resource constraints, minimise transaction costs, acquire new technology and management skills, and build customer royalty by enhancing a product value or gain competitive advantages and market position (see Gallardo, et al., 2006). While MFIs/MCs have the will and innovative approaches to reach microcredit clients, they have a weak infrastructure and inadequate funds to expand their operations. On the other hand, FFIs/CBs have excess funds and strong infrastructure but their loan design crowd out microcredit clients and face information asymmetry, which limit their expansion to reach microclients in a sustainable way. Thus, linkages between MFIs/MCs and FFIs/CBs may enable both parties to overcome their constraints and challenges. Indeed, FFIs linked to MFIs/MCs are able to diversify their investment portfolio, to decrease their loan administrative costs through wholesale lending, and to expand their markets (Seibel, 2005; Awal, www.bwtp.org; Development Alternatives, Inc. 2005; DBR, 2007).[iv]

The effect of financial linkages on MFIs' cost efficiency can be explained by transaction costs theory, principle-agent theory and linkages literature. Since MFIs/MCs' have poor infrastructure as reflected by poor accounting and information systems (Mvungi, 2010), low management and organisation skills (Randhawa and Gallardo, 2003; Seibel, 2005) and inadequate monitoring and evaluation skills (Jaron, 1994), may face the challenges of bounded rationality and opportunism. The external governance of MFIs/MCs, which could facilitate managers' compliance with organisational policies, bylaws, cooperative acts and regulations, is also weak (Ishengoma and Kappel, 2011; Mlowe and Kaleshu, 2009). As a result, MFIs/MCs' managers may try to maximise their utility function at the expense of investors/lenders/shareholders. During the focus group discussions (FGDs), MCs' managers reported that some top management members took larger loans than the limit given their savings and were facing difficulties to

repay them.[v] Based on the transaction cost theory, transactions characterised with high opportunism and bounded rationality lead to high uncertainty and transaction costs, which might force one party (i.e. FFIs) to charge its partners (i.e. MFIs/MCs) high price, hence increased financing costs.

In line with the principal-agent theory, FFIs/CBs may utilise different mechanisms (strict loan requirements, terms and covenants, and close monitoring) to reduce risk related to bounded rationality and opportunism. These mechanisms shape the behaviour of MFIs/MCs and increase their costs in a short-run and reduce them in a long-run. Based on linkages literature, FFIs/CBs and MCs may form vertical linkages' actions to overcome bounded rationality and opportunism.

With respect to loan requirements, FFIs/CBs require MFIs/MCs to attain operating- and financial-self sufficiency (DBR, 2007), utilise trained regular employees (Ishengoma and Kappel, 2011) and invest in ICT. The utilisation of regular employees and ICT might in a short-run increase their costs.

During the FGDs, MCs' managers reported that CBs require them to open a bank account with them, deposit 20 to 33 percent of the loan they apply for as loan security, pay a loan and a lawyer's fees, which are equal to one to three percent of the loan they apply for, and submit audited financial statements to CBs, which forces them to utilise professional accountants and incur service/audit fees. MFIs/MCs borrowing from multiple CBs are forced to operate multiple bank accounts, which are costly to run. In some CBs, the loan security is deposited in a fixed deposit receipt (FDR) earning only one percent per quarter, renewed quarterly, and matures when the loan is completely repaid. In other FFIs, MCs did not know how much they earn. The opportunity costs of funds deposited with CBs as loan security are high.

Some CBs require MCs' top management to pledge their assets when the value of MCs' assets is lower than the required amount. As discussed in principal-agent theory, this strategy can discipline the top management's altitude and increase their commitment in meeting their obligations. However, the FGDs reveal that the use of top management' assets to secure loans might induce them to violate MCs' financial policies and bylaws as indicated by the allocation of loans above the limit to themselves and their poor loan repayments. These might lead to adverse behaviour, whereby other MCs' borrowers might delay in repaying their loans or default.

The application of strict loan requirements to MFIs has been worldwide reported. FINCA/Costa Rica was compelled to accept requirements on interest rates, staffing and equipment purchase decisions; Bank Pembangunan Daerah (BPD) in Bali requires its partner Lembaga Perkreditan Desa (LPDs) to save with them only; ICIC Bank in India requires partner MFIs to open FDRs with the value of 8-15

percent of total value of loans it offers them (Pagura and Kirsten, 2006). CASHPOR was compelled to operate as an agent of ICICI Bank in entering the new market while assuming the risk of loan losses of up to 12 percent before ICICI Bank would share in the risk (Development Alternatives, Inc., 2005).

Regarding terms of loans and covenants, Mlowe and Kaleshu (2009) report that the interest rates, which CBs charge MCs are high. These force MCs to charge their members high interest rates. Indeed, Ishengoma and Kappel (2011) reveal that MCs linked to FFIs charge higher interest rate than those not linked to FFIs. High interest rates may attract risky borrowers or projects, which may lead to high loan delinquency and defaults (Stiglitz and Weiss, 1981). These might increase loan collection costs and decrease income.

The FGDs reveal that FFIs do not offer grace period. The loan period is short (i.e. six to 36 months). Loan provision is sometimes delayed. Sometimes the loans requested from FFIs in November to meet demands for farming during agricultural season (i.e. December – January) are provided after this season. As a result some borrowers decline to take loans while others divert loans from planned (i.e. farming) to unplanned/unproductive uses and face difficulties to repay them. MCs are forced to review loan applications, screening, and approvals, which raise their operating costs. Some MCs remain with idle cash, which forces those located in Dar es Salaam (DSM) to invest in treasury bills and attracts for misappropriation by top management and MCs' staff.

The lack of grace period and short loan period, coupled with delays in loan provision put MCs under pressure to disburse loans immediately after receiving funds from FFIs. This might result in poor selection of borrowers, and hence increased loan delinquency and defaults, which reduce MCs' abilities to meet their obligations and subject them to penalties.

Based on linkages literature, transactions between FFIs and MFIs/MCs may result joint actions: sharing of technology, knowledge, information, close monitoring, supervision and training of MCs to overcome opportunism and bounded rationality.[vi] These might instil good governance practices, which may decrease MCs' costs and increase their incomes. High frequency of reporting to FFIs/CBs might, in a short-run, increase MCs' costs. It may however improve their management systems, which can enable them to make informed lending decisions, and thus, decrease their costs related to loan delinquency and defaults.

Linkages to FFIs/CBs enable MFIs/MCs to offer additional services: money transfer, insurance services, and payment of salaries, pension and bills (Pagura and Kirsten, 2006). Provision of these services may increase customer royalty and attract new clients. These can raise loan repayment performance (Godquin, 2004) and reduce costs per client saved.

Through access to loans from FFIs, MFIs/MCs are said to reduce their financing gabs, liquidity imbalances (Pagura and Kirsten, 2006; Saibel, 2005), offer more number and bigger size of loans (Ishengoma, 2011), maintain progressive lending and reduce the time, which borrowers spend from loan applicant to receipt. These may further increase clients' loyalty, and hence reduce clients' dropout (Gallardo et al., 2006), reduce their transaction costs (Ishengoma and Kappel, 2011; Copisarow, 2000), and thus, encourages loan repayment, which reduces loan collection costs and increase incomes. An increase in the size and number of loans offered might reduce loan administrative costs per monetary unit or per number of loans offered. However, these may increase loan delinquency/defaults (Godquin, 2004; Ishengoma and Kappel, 2011). The increase of number of loans through lending to new borrowers, particularly poor ones, may raise loan monitoring and administrative costs (Hermes, et al., 2009b), and loan portfolio at risk (Basu, et al. 2004). Indeed, the expansion of CASHPOR's operations through linkages with ICICI Bank raised its operating costs and weakened its capital base (Development Alternatives, Inc., 2005).

Through financial linkages, some MFIs/MCs may become distributors of FFIs' services while incurring all risks (Seibel, 2005; Development Alternative, 2005) and accepting lower commissions than the cost they incur (Pagura and Kirsten, 2006). Development Alternatives, Inc. (2005) estimated CASHPOR would take six to seven years to benefit from its linkages with ICICI Bank. During the FGDs, MCs' managers reported that CBs use MCs to clear the market for them. They compared their relationship with CBs as farmers (i.e. CBs) and their cows (MCs).

The above discussions reveal that financial linkages are likely to have positive or negative effects on MCs' cost margin and efficiency. This paper aims to find out the direction of the effects.

METHODOLOGY

Modelling

Financial linkages and cost efficiency

Data envelopment analysis (DEA) and stochastic frontier analysis (SFA) are the main approaches which are used to estimate cost efficiency (see Lensink, et al., 2008; Hermes et al., 2009a, 2009b; Gutierrez-Nieto et al., 2005; Mokhtar, et al., 2006). When assessing the determinants of cost efficiency, the application of DEA follows two stages by first estimating efficiency indicators, and second, relating the indicators to explanatory variables. The exclusion of the explanatory variables from the estimation of cost efficiency indicators is viewed by Coelli (1996) as inappropriate. Furthermore, DEA does not provide for measurement error,

uncontrollable and luck factors since it assumes that inefficiency among the best performing units is negligible and attributes any deviation from the best practice unit to inefficiency (Lensink, et al., 2008).

The paper applies the SFA developed by Batesse and Coelli (1995). SFA provides for measurement errors, uncontrollable variables, estimation of cost function and inefficiency model simultaneously. The stochastic frontier cost function as presented by Coelli (1996) and applied by empirical studies (Lensink, et al., 2008; Hermes et al., 2009a, 2009b; Mokhtar, et al., 2006) focusing on the financial sector is specified bellow.

$$\ln C_{it} = C(Y_{it}, W_{it}, q_{it}, \beta) + u_{it} + v_{it} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (1)$$

Where the terms, C_{it}, Y_{it}, W_{it} and q_{it} are the cost incurred, the output produced, the vector of input prices, and specific factors of the i-th MC (i=1,2,3 …N) at time t. The term, β, is a vector of unknown parameters to be estimated. Equation 1 is further specified as follows.

$$C_{it} = \beta_0 + \beta_1 L_{it} + \beta_2 I_{it} + \beta_3 GLP_{it} + \beta_4 L_{it}^2 + \beta_5 I_{it}^2 + \beta_6 GLP_{it}^2 + \beta_7 L*GLP_{it} + \beta_8 I*GLP_{it} + \beta_9 S_{it} + u_{it} + v_{it} \quad \cdots \quad (2)$$

The term, C is as defined and t stands for year 2005, 2006 and 2007. It is captured as the natural logarithm of an MC's expenditure on labour input, stationery, communication, utilities, transport, and organisation of meetings. The majority of MCs in the data utilised did not report on the amount they provided for bad debt. Employees-based MCs were provided with offices and utilities free of charge. Therefore, the estimation of cost excluded the provision for bad debt, rent and utilities.

The assessment of financial institutions' cost efficiency can be approached from a production or an intermediation perspective. We follow the latter, whereby the institutions' inputs' prices include interest expenses on input, funds, which is used to provide loans to MCs' clients (see also Sealey and Lindley, 1977, Berger and Humphrey, 1997). Funds utilised by sample MCs are from savings and deposits, shares, and loans from FFIs. During the surveyed period (2005-2007) none of the sample MCs paid interest on deposits/savings or dividends to shareholders. Other inputs utilised by institutions to offer services are labour and physical capital (Mokhtar, et al., 2006). Thus, the paper captures the vector inputs' prices as labour (L) and average annual interest rate (I) paid on loans from FFIs. Following Lensink et al. (2008), the paper measures the price of labour as the natural logarithm of the average annual salaries and fringe benefits per worker.

Following Lensink, et al. (2008), Hermes et al. (2009a/2009b) and Gutienrrez-Nieto et al. (2005), we capture output, the gross loan portfolio (GLP), as the natural logarithm of total annual value of loan offered by MCs. The control variable, share (i.e. S in equation 2) captures MCs' differences in risk taking as suggested by

Berger and Mester (1997). It is measured as the ratio of the annual value of shares to the sum of the value of outstanding share, savings, deposits and loans.

The β_0 - β_9 are unknown parameters to be estimated. The term, v_{it}, in equation 1 and 2 captures the deviation of a production unit's cost caused by errors, luck and uncontrollable factors. It is assumed to be iid. $N(0,\sigma_V^2)$ and independent of the u_{it}. The term, u_{it} is a non-negative random variable (for each MC) which is assumed to account for cost inefficiencies. It indicates how far a MC's cost is above the cost frontier. It is assumed to be independently distributed as truncations at zero of the $N(m_{it},\sigma_U^2)$ distribution (Coelli, 1996); where:

$$m_{it} = d_0 + \sum_{j=1}^{n} d_j Z_{j,it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

Equation 3 models inefficiency (m_{it}) as a function of explanatory variables, $Z_{(j=1\ldots n),it}$. The term, j =1, 2, 3, ...**n** stands for the number of explanatory variables included in the inefficiency model. Financial linkages (*LoanFFIs)* is included in the inefficiency model specified below as one of the explanatory variables. It is measured as dummy one if a MC had access to loans from FFIs, and zero otherwise.

$$m_{it} = d_0 + d_1 LoanFFIs_{it} + d_2 \mathrm{Ed}_{it} + d_3 \mathrm{Age}_{it} + d_4 \mathrm{Age}_{it}^{\ 2} d_5 \mathrm{Region}_{it} + d_6 \mathrm{Me}_{it} + d_7 \mathrm{Worker}_{it} \quad \ldots\ldots\ldots \quad (4)$$

MCs' specific factors: managers' education (Ed), age, location, type of MCs and number of members, enter in Equation 4 as controllable variables. Cost efficiency may be associated with these factors in several ways. MCs' managers are involved in making strategic decisions (viz., utilisation of loans from FFIs, types of FFIs to link with, negotiations for better requirements, the application of ICT, type of labour, and loan design). The quality of these decisions, which depends on the level of education of managers, may determine MCs' costs. The paper captures managers' education as dummy 1 if the average years of education of a MC's manager is above 11 and zero otherwise.[vii]

MCs' MCs' workforce may accumulate knowledge by continuously interacting with their clients overtime, which could assist them to design the services (Copisarow, 2000, Christen, 1992), and thus, reduce administrative and transaction costs, loan delinquency and defaults (Ishengoma and Kappel, 2011). However, age may be related to a conservative altitude of the management in avoiding investment in new techniques to reduce costs. Thus, the age of a MC, captured as the natural logarithm of the number of years since it started to offer loans, is incorporated in the analysis. The square of natural logarithm of age is also considered to capture for the possibility for cost inefficiency to increase with age instead of decreasing when age reaches a certain point.

MFIs located in areas characterised with high completion might be forced to reduce their costs, improve the quality of their services (Hermes et al., 2009b) and

charge low interest rate (Ahlin, et al., 2010). These might increase demand of their services (Yaron, 1994) and reduce loan defaults (Stiglitz and Weiss, 1981; Hulme and Mosley, 1996) and administrative costs (Godquin, 2004). However, the presence uncoordinated competing lenders might attract multiple borrowings, which may results in loan delinquency (McIntosh and Wydick, 2005), and high administrative. Since DSM is characterised with high competition than Iringa, the paper considers location (*Region*) captured as dummy 1 for MCs located in DSM and zero otherwise.

MCs in Tanzania are either employees-based or mixed, whereby the shareholders of the former are workers from a specific organisation while shareholders of the latter are mixed (workers, households' members, entrepreneurs and business organisations). Employees-based MCs are characterised by lower loan delinquency and defaults, and loan collection costs than mixed MCs (Ishengoma and Kappel, 2011). Thus, the type of MCs (i.e. *Worker*) is controlled and captured as dummy 1 for MCs which are employees-based and zero otherwise.

The size of MCs is related to cost inefficiency because large MCs may enjoy economies of scale relative to small ones. They may also access loans from FFIs at a relatively low interest rate (Berger and Mester, 1997; Hermes et al., 2009a). Thus, size of MCs ((*Mem/members*) is controlled and captured the logarithmic of the number of MCs' members. The terms, d_0 to d_7, are the coefficients to be estimated.

Financial linkages and cost margin

Cost margin is captured as the ratio of cash expenditure on cost items (i.e. salaries and fringe benefits, stationeries and communication, transport, meetings interest expenses and miscellaneous) to cash-income (i.e. cash-interest plus cash-incomes from other investments). The following semi-logarithmic function is applied to model cost margin as a function of financial linkages, input price (labour per employee), output and MCs' specific factors.

$$CostM_{it} = \beta_0 + \beta_1 Labour_{it} + \beta_2 LoanFFIs_{it} + \beta_3 out_{it} + \sum_{j=4}^{9} \beta_j CV_{jit} + \beta_{10} P_7 + \beta_{11} P_6 + e \quad \ldots\ldots\ldots\ldots \quad (5)$$

CostM refers to cost margin of the i-th MC (i = 1, 2, 3, … n), at time t (t = 2005, 2006, and 2007). The terms, *labour* and *LoanFFIs* are as defined before, while *out* denotes the size of a MC. It is measured as the number of loans, loan size and number of members apart from GLP, which is defined as before. The treatment of outreach indicators to capture output has been applied by other studies: Gutienrrez-Nieto et al. (2005). The output indicators enter in Equation 5, one at a time, which results in the estimation of four models. The number of members is measured as before. Loan size is measured as the natural logarithm of annual GLP divided by the number of loans. The number of loans is expressed in natural logarithm. The

control variables (CV) are managers' education (Ed/education), age, location (region), type of MCs (worker) and proportion of savings and deposits to total funds. The possible relationship between the former four variables and cost margin is as described in relation to cost efficiency and are as measured before. Savings and deposits are the cheapest sources of funding, and therefore, they are expected to have a negative effect on cost margin. The year effects captured by dummy variables, Year7 and Year6, equal to one for year 2007 and year 2006, respectively, and zero for year 2005, are included in the analysis. The term, *e*, is the error term, while the terms β_{0to11} are the coefficients to be estimated.

Data

The paper utilises three year (i.e. 2005-2007) unbalanced data of 102 MCs collected (in 2008- 2009) by means of personally administered structured questionnaire to assess the effect of financial linkages on MCs' outreach and sustainability.[viii] Fifty five percent of MCs were located in DSM and the rest in Iringa. The selection of the two regions was based on the fact that a significant number of MCs in these regions were involved financial linkages (see Piprek, 2008). Stratified random sampling was used to select MCs with at least 3 years in operation. This sampling approach was aided by a directory of MCs operating in Tanzania mainland, which was obtained from the website of the central bank (www.bot-tz.org) and updated by the district cooperative officers in Njombe, Mafinga, Iringa, Kinondoni, Temeke and Ilala.

Due to missing values for some quantitative variables and the way we capture age of MCs, the number of MCs whose data are utilised at different levels of the analysis is 53, while the number of observations are 135. Six FGDs comprising 112 managers of 102 MCs interviewed were also organised to collect qualitative information which could not be collected by means of structured questionnaire. The information from FGDs was used to explore the nature of MCs' operations and their linkages with FFIs.

Table 1 presents the descriptive statistics of the data utilised. MCs' main sources of financing are shares, deposits, savings and loans. Shares accounted for 18 percent while savings and deposits accounted for around 73 percent of total financing per annum. The majority of MCs' financial policies require members to save at least one-third of the loans they apply for. Thus, savings per member grow overtime while share-value may remain constant for a certain period.

Table 1: Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Members	135	5.844	0.952	4.025	8.416
Share	135	0.178	0.241	0.01	1
Save and deposit	135	0.728	0.267	0	0.98
LoanFFIs	135	0.437	0.497	0	1
Cost	135	15.881	1.704	12.214	19.544
Cash-income	117	29,000,000	37,700,000	20,000	150,000,000
Cost margin	112	0.992	1.063	0.012	9.197
Labour	135	12.831	1.249	9.393	15.398
GLP	135	18.387	1.837	1.513	21.679
Number of loans	121	5.363	1.278	0.693	8.39
Loan size	103	13.016	1.063	10.82	16.21
Education	135	0.481	0.501	0	1
Age	135	1.894	0.829	0	3.664
Age-squared	135	4.273	3.357	0	13.422
Region	135	0.325	0.47	0	1
Worker	135	0.333	0.473	0	1
Year7	135	0.392	0.49	0	1
Year6	135	0.318	0.467	0	1

Source: Author's estimations

Note: The variables: cost, labour, GLP, members, number of loans, and loan size are expressed in natural logarithmic form.

Around 44 percent of sample MCs accessed loans from FFIs. The annual average amount of loan offered to these MCs was Tshs. 82.13 million while the maximum amount was Tshs. 1.73 billion. The interest rate charged by FFIs institutions ranged from 7.5 to 18 percent. MCs' average annual cost/expenditure was around Tshs. 7.9 million (Table 1). The annual average labour per worker was around Tshs. 374,000. This wage rate is low because some rural MCs utilise free labour from their members, while others utilise part-time workers. Although the use of free labour and part-time workers may reduce labour cost, it seems to increase loan collection and financing costs. This is because MCs utilising these types of workers have limited opening/working hours, which encourage diversion of savings from loan repayments and savings with MCs to other expenditures when members/borrowers visit MCs' offices and find them closed.

The main source of MCs' income is interest on loans advanced to members. Other sources are investments in treasury bills, shares of other FFIs, office buildings and parking lots. Their average annual cash-income was around Tshs. 29 million, while the maximum was Tshs. 150 million. The average annual cost margin was 0.99,

indicating that a sample MC incurred Tshs. 0.99 to generate one Tshs of cash-income. If expenditures on rent and utilities were included, it is possible that an average MC was unable to generate cash-income to cover its expenditure. The possible sources of cash for spending apart from cash-income are proceeds from sale of shares, pass-books, entry fees, deposits, savings and loan from FFIs.

High cost margin is a result of high expenditure on cost items and low cash-interest income. The latter is related to high loan delinquency and defaults. The sample MCs' average loan delinquency and default was 0.34 (Ishengoma and Kappel, 2011).

MCs' average and maximum amount of GLP were Tshs. 96.7 million and Tshs. 2.6 billion, respectively. Their average and maximum number of loans were around 213 and 4,400, respectively. Their average and maximum loan size were around Tshs. 450,000 and Tshs. 11 million, respectively. The minimum amount was Tshs. 50,000. The average annual membership size of sample MCs was 345; the minimum was 56 while the maximum was 4,520.

Thirty three percent of sample MCs were based in DSM, while the rest were in Iringa. Around 48 percent of MCs' managers had at least 11 years of education. Around 33 percent of sample MCs were employees-based, while the rest were mixed. Their average age was about 7 years.

The average cost efficiency level of sample MCs during 2005 to 2007 was around 23 percent, while the maximum was 56 percent (Table 2). Such a low cost efficiency level of financial institutions has been reported by studies in other parts of the world such as in France, the US and Norway, which attained annual average efficiency ranging from 9 to 100 percent (Berger and Humphrey, 1997).

Table 2: Average annual cost efficiency during 2005-2007

	Efficiency category in percentage					
	< or = 10	10.05 – 20	20.05 – 30	30.05 – 40	40.05 – 60	Total
Frequency	11	16	12	11	3	53
Percent of MCs	20.75	30.18	22.64	20.75	5.66	100

Source: Author's estimations

EMPIRICAL RESULTS AND DISCUSSIONS

Table 3 presents the results on cost function and inefficiency model. The results on the cost function reveal that the cost is positively associated with labour and interest rate (Panel, 1). Although the relationships are as expected, they are insignificant. Cost is negatively and significantly associated with GLP, as a one

percent increase in GLP decreases cost by 0.72 percent. This relationship is contrary to the results by Hermes et al. (2009a) and Lensink, et al. (2008). These studies focused on large MFIs, which could be experiencing diseconomies of scale, while this paper focus on small MFIs which are experiencing economies of scale through expanding their GLPs. The results on the relationship between the square of GLP and cost reveal that beyond a certain point, further expansion of MCs may raise cost. Cost is also negatively and significantly associated with share and the interaction term between labour and GLP. An increase in share relative to other sources of funds reduces risk, and thus decreases cost. This finding complies with the results by Hermes et al. (2009b) and the observations by Berger and Mester (1997).

Table 3: Cost frontier and inefficiency model

Panel 1: Cost model (dependent variable is Cost)		**Inefficience model**	
Variables	Beta (β) coefficient	Variables	Delta (*d*) coefficient
Constant	12.903 (12.088)	Constant	0.397 (11.465)
Labour	0.058 (0.669)	LoanFFIs	0.566** (0.269)
Interest	0.0399 (0.0959)	Education	0.089 (0.131)
GLP	-0.721* (0.412)	Age	-0.546** (0.237)
Labour squared	0.104** (0.044)	Age squared	0.154*** (0.057)
Interest squared	-0.0152 (0.002)	Region	-0.222 (0.140)
GLP squared	0.0715*** (0.023)	Members	0.444*** (0.0684)
Labour*Interest	-0.007 (0.875)	Worker	0.220* (0.112)
Labour*GLP	-0.123** (0.572)		
GLP*interest	0.005 (0.718)		
Share	-0.812*** (0.230)		
Variance Parameters			
sigma-squared ($\sigma^2 = \sigma^2 + \sigma_v^2$)	0.23855*** (0.0293)	Gamma [$\gamma=(\sigma^2/(\sigma^2+\sigma_v^2)$]	0.703867*** (0.129)
log likelihood function	-94.819	LR test of the one-sided error	48.186
Observations	135	Number of MCs	53
Mean efficiency	23.05%		
Generalised likelihood ratio test			
Null Hypothesis		Value	Critical value
H_o: $\gamma = 0 \rightarrow$ firms are fully technically efficient (no inefficient effect)		48.186***	25.548[#]
H_o: $\delta_1=\delta_2=\delta_3=\delta_n = 0 \rightarrow$The coefficients of the explanatory variables in the inefficiency model are simultaneous zero.		48.186***	24.72[##]
H_o: $\beta_{ij} = 0$ for all i≤j =1,2. (Cobb-Douglas frontier		23.998***	18.3[###]

Source: *Author's estimations*

Note: ***, **, and * imply significant at ≤1%, at ≤5% and at ≤10%, respectively. Figures in parentheses are standard error terms.

[#] The critical value for the generalised likelihood ratio test is obtained from table 1 of Kodde and Palm (1986).

[##] The critical value extracted from the Chi-Squared distribution table is at 1 percent level of significance.

[###] The critical value extracted from the Chi-Squared distribution table is at 5 percent level of significance.

Table 3 Panel 2 indicates that the parameter for gamma in the estimated stochastic cost frontier with inefficiency model is significant. This implies that inefficiency effects are significant, and therefore, it is necessary to consider them when estimating cost efficiency of MCs. Based on the results of the generalised

likelihood ratio tests, the null hypothesis that there is no inefficiency effect is rejected. The tests regarding the effects of explanatory variables in the inefficiency models when considered simultaneously reject the null hypothesis that the coefficients of the explanatory variables are equal to zero.[ix] A significant inefficient model implies that the difference between the actual and potential (minimum attainable) cost levels is due to financial linkages and other MCs' specific factors in the model (Table 3, Panel 2).

Table 4 presents the results on financial linkages and cost margin. The results on the adjusted R-squared for all models (i.e. 1 to 4) reveal that the independent variables can explain the cost margin of sample MCs by around 20 percent. The models are also significant.

Table 4: Financial linkages and cost margin

Cost margin	1	2	3	4
Labour	0.163* (0.105)	0.079 (0.096)	0.209** (0.103)	0.118 (0.111)
LoanFFIs	0.447** (0.232)	0.339* (0.236)	0.504** (0.249)	0.482* (0.269)
Education	-0.565* (0.302)	-0.681*** (0. .295)	-0.515* (0.298)	-0.527* (0.323)
Age	-1.472*** (0.468)	-1.499*** (0.481)	-1.505*** 0.478)	-1.712 (0.521)
Age squared	0.309*** (0.112)	0.311 *** (0.116)	0.308*** (1.114)	0.3738 (0.126)
Region	0.531* (0.317)	0 .525* (0.320)	0.446 (0.323)	0.501 (0.351)
Worker	-1.126 (0.227)	-0.171 (0.230)	-0.045 (0.235)	-0.193 (0.264)
Save-deposit	-1.370*** (0.450)	-1.530*** (0.444)	-1.306*** 0.444)	-1.093** (0.569)
Year7	0.366* (0.241)	1.64 0.105	0.328 (0.255)	0.402 (0.274)
Year6	-0.0346 (0.237)	- 0.022 (0.240)	-0.26 0.796	-0.094 (0.273)
GLP	-0.119 (0.083)			
Members		-0.025 (0.137)		
Number of loans			-0.242** (0.111)	
Loan size				0.021 (0.131)
Constant	3.372*** (1.123)	2.680*** (1.022)	1.872* (1.105)	1.412 (1.574)
R-squared	0.282	0.268	0.295	0.2751
Adj R-squared	0.204	0.188	0.213	0.1754
Prob > F	0	0.001	0	0.0044
Number of obs	112	112	106	92

Source: Author's estimations

Note: ***, **, and * imply significant at ≤1%, at ≤5% and at ≤10%, respectively. Figures in parentheses are standard error terms.

The results in Table 3, Panel 2 reveal that cost inefficiency is positively and significantly associated with financial linkages (LoanFFIs). MCs which utilised loans from FFIs had higher cost inefficiency (i.e. lower cost efficiency) than their counterparts (i.e. those which had no access to loans from FFIs). The results in Table 4 also reveal that the former spent between 30 and 50 percent more on cost items to generate a unit of cash-income than the latter, and the difference between them is significant. These findings comply with Development Alternatives, Inc.

(2005) regarding the increase of CASHPOR's operating cost after establishing a partnership with ICICI Bank.

As addressed in Section 2, positive effects of financial linkages on cost inefficiency and margin can be explained by restrictive loan requirements (loan security, opening of bank account with the lenders), terms (interest rates, grace, loan period and frequency of loan repayment), and covenants (penalties) which MCs face when accessing loans from FFIs. The interest rate charged by FFIs is significantly higher than other sources of financing (i.e. deposits, savings and shares) since as noted before, none of interviewed MCs had paid interest on deposits and savings, or dividends to members during 2005-2007.

Shorter loan period and zero grace period coupled with delays in loan provision could result in poor selection of borrowers in case MCs have to provide loans immediately after receiving money from FFIs. This might raise delinquency and defaults, and thus, high loan collection costs and lost income. Those taking some time to make proper review and selection of new borrowers incur interest expenses before they earn interest income. The effect of shorter loan period might result in few number of loans offered by MCs (Ishengoma, 2011), loan delinquency (Gorquin, 2004), and thus, increase in cost margin and diseconomies of scale.

Delay in the provision of loans increases the transaction costs to borrowers (MCs and their clients) (Copisarow, 2000; Derban et al., 2005), which could result in high loan delinquency and default rate (Hulme and Mosley, 1996) hence increased loan collection costs and decreased cash-income. The capacity of MCs to service their loans from FFIs also may deteriorate, and thus make MCs to face penalties, which reduce their cash-income.

The FGDs reveals that the frequency of loan repayment to FFIs ranges between four and twelve times a year. Although high frequency of loan repayment might be used to reduce defaults, it increases operating costs: communication, transport and paperwork. The involvement of loans from FFIs put more pressure on MCs to collect loans from their clients and employ relatively skilled labour (Ishengoma and Kappel, 2011), which might in a short-run increase their costs.

The loan security generates costs (loss) to MCs since the income they forgo by keeping the money with CBs, which is equivalent to the interest rate they charge their borrowers (i.e. 24 percent) (Ishengoma, and Kappel, 2011) is higher than what they receive from FDRs (i.e. 4 percent per annum). The interest rate (i.e. 7.5 to 18 percent) they incur on loan security, which is sometimes deducted from the loan they receive is also higher than what they earn from FDRs. The effect of loan security on cost margin is also reflected by the number and amount of loans forgone, which could have improved cost efficiency and margin through increased

economies of scale. As indicated in Table 4, cost margin is negatively associated with the number of loans offered by MCs.

MCs' specific factors which have significant effects on cost efficiency are age and its square, type (worker) and size (members) of MCs. Those with significant effects on cost margin are age and its square, managers' education, savings and deposits and number of loans. Detailed discussions on the relationships between these factors and cost efficiency or cost margin are presented in another publication.

CONCLUSION

The main objective of the paper was to examine the effects of financial linkages on MCs' cost efficiency and margin. The paper utilised a three years (i.e. 2005-2007) unbalanced panel data of 53 MCs located in DSM and Iringa and six FGDs comprising 112 managers of 102 MCs. The paper employed a SFA to estimate cost efficiency and examine the effect of financial linkages on cost inefficiency. It also utilised a semi-logarithm regression function to examine the effect of financial linkages on the cost margin.

The results reveal that financial linkages significantly increase cost inefficiency and margin. Possible explanations of these findings are high costs and lost income resulting from strict loan requirements (loan security, multiple accounts, the use of managers' assets as collateral, employment of skilled and regular workers), loan terms and covenants (high interest rate, a zero grace and short loan period, high frequency of loan repayment and penalties), and delays in loan provision to MCs. The costs and lost incomes seem to outweigh the benefits from linkages: outreach expansion (Ishengoma, 2011), improved internal governance (Development Alternatives, Inc., 2005), supervision, training, expanded loanable funds, liquidity balancing (Pagura and Kirsten, 2006), and improved clients' satisfaction (Gallardo et al., 2006). The findings corroborate the argument in informal-formal sector linkages (Tokman, 1978) and global value chain literature (Humphrey and Schmitz, 2000; Gereffi, et al., 2005) as having low bargaining power, MFIs/MCs seem to lose more than what they gain from their linkages with FFIs. However, this could be a short-term phenomenon. More studies on the long-term effects of financial linkages on MCs' cost margin and efficiency are required.

REFERENCES

Agrisystems (Eastern Africa) Ltd (2003), "Baseline Data of Microfinance Institutions in 21 Districts Covered by Rural Financial Services Program-Tanzania", A Report Prepared for the URT, Prime Minister's Office and IFAD.

Ahlin, C., Lin, J., and Maio, M. (2010), "Where Does Microfinance Frowlish? Microfinance Institution Performance in Macroeconomic Context", *Journal of Development Economics* doi:1016/jdevco.2010.04.004.).

Awal, A. "Financial Linkages in Bangladesh", www.bwtp.org, (accessed 20. June 2010).

Basu, A., Blavy, R. and Yulek, M. (2004), "Microfinance in Africa: Experience and Lessons from Selected African Countries", IMF Working Paper WP/04/174.

Battese, G. E. and Coelli, T. J. (1995), "A model for Technical Inefficiency Effects in a Stochastic Frontier Production Function for Panel Data" *Empirical Economics*, No. 20, pp. 325-332.

Berger, A.N. and Humphrey, D.B. (1997), "Efficiency of Financial Institutions: International Survey and Directions for Future Research", *European Journal of Operational Research*, Vol. 98, pp. 175-212.

Berger, A.N. and Mester, L.J. (1997), "Inside the Black Box: What Explains Differences in the Efficiencies of Financial Institutions?" *Journal of Banking and Finance*, Vol. 21, pp. 895-947.

CGAP (2006), "Access for All Building Inclusive Financial Systems", www.cgap.org, (accessed 12 October 2010).

Christen, R. (1992), "Formal Credit for Informal Borrowers: Lessons from Informal Lenders", in Adams. D.W. and Fitchett D. A. (Eds.), *Informal Finance in Low-Income Countries*, Westview Press, USA, pp. 281-292.

Coelli, T. (1996): "A Guide to FRONTIER Version 4.1: A Computer Program for Stochastic Frontier Production and Cost Function Estimation", CEPA Working Paper 96/07, Centre for Efficiency and Productivity Analysis.

Copisarow, R. (2000), "The Application of Microcredit Technology to the UK: Key Commercial and Policy Issues", *Journal of Microfinance*, Vol. 2 No. 1, pp. 13-41.

Cull, R., Demirguec-Kunt, A. and Morduch, J. (2007), "Financial Performance and Outreach: A Global Analysis of Leading Microbanks", *Economic Journal*, Vol. 117 No. 517, pp. 107-133.

Deutsche Bank Research – DBR (2007), "Microfinance: An emerging Investment Opportunity: Uniting Social Investment and Financial Return", www.dbresearch.com (accessed 02 September 2010).

Development Alternatives, Inc. (2005): "Opening Markets Through Strategic Partnerships: The Alliance between ICICI Bank and CASHPOR", microREPORT No. 39, USAID.

Gallardo, J. Goldberg, M., and Randhawa, B. (2006), "Strategic Alliance to Scale Up Financial Services in Rural Areas", World Bank Working Paper No. 76.

Gereffi, G., Humphrey, J. and Sturgeon, T. (2005), "The Governance of Global Value Chain", *Review of International Political Economy*, Vol. 12 No. 1, pp. 78-104.

Godquin, M. (2004), 'Microfinance Repayment Performance in Bangladesh: How to Improve the Allocation of Loans by MFIs', *World Development* Vol. 32 No. 11, pp. 1909-1926.

Gutierrez-Nieto, B., Serrano-Cinca, C. and Molinero, C. M. (2005): "Microfinance Institutions and Efficiency", Omega, 35, 131-142.

Hermes, N., Lensink, R. and Meesters, A. (2009a), "Financial Development and the Efficiency of Microfinance Institutions", www.solvay.edu/EN/Research, (accessed 20 July 2010).

Hermes, N., Lensink, R. and Meesters, A. (2009b), "Outreach and Efficiency of Microfinance Institutions", Working Paper, University of Groningen.

Hulme, D. and Mosley, P. (1996), *Finance Against Poverty*, Vol. 1, Routledge, London.

Humphrey, J. and Schmitz, H. (2000), "Governance and Upgrading: Linking Industrial Cluster and Global Value Chain Research", IDS Working Paper 120, IDS.

Ishengoma, E. K. and Kappel, R. (2011), "Financial linkages, Institutional Factors and Loan Repayment Performance: The Case of Microfinance Cooperatives in Tanzania", Paper Presented at the 8th African Finance Journal Conference, 14th – 15th April, Windhoek, Namibia.

Ishengoma, E. K. (2011), "Do Informal-Formal Financial Sector Linkages Boost Outreach of MFIs? Lessons from the Savings and Credit Cooperative Societies in Tanzania", Paper Submitted for Publication to Development and Change.

Kirsten, M, "Linkages between Formal and Informal Financial Institutions to Extend Financial Services to Poor People', www.ilo.org, (accessed 20 June 2010).

Krauss, N. and Walter, I. (2008), "Can microfinance reduce portfolio volatility?", Working Paper, NYU, February 18.

Lensink, R., Meesters, A., and Naaborg, I. (2008), "Bank Efficiency and Foreign Ownership: Do Good Institutions Matter", *Journal of Banking and Finance*, Vol. 32 No. 5, pp. 834-844.

Market Mix (2010a), "2009 Asia microfinance Analysis and Benchmarking Report", www.thermix.org, (accessed 02 September 2010).

Market Mix (2010b), "2009 Africa microfinance Analysis and Benchmarking Report", www.thermix.org (accessed 02 September 2010).

McIntosh, C. and Wydick, B. (2005), "Competition and microfinance", Journal of Development Economics, Vol. 78, pp. 271-298.

Mlowe, L. and Kaleshu, J. (2009), "Njombe District Microfinance Strategic Development Plan", A Consultant Report Submitted to Njombe Local Government Authority (Halmshauri za Mji, Njombe), Njombe.

Mvungi, I.S. (2010), Institutional Factors Affecting Loan Repayment Performance in Tanzania: A Case of Selected SACCOS in Kilombero and Kilosa, A Dissertation Submitted in Fulfilment of the Requirement for the Degree of Masters of Business Administration, University of Dar es Salaam.

Pagura, M. and Kirsten, M. (2006), "Formal-informal financial linkages: Lessons from developing countries", *Small Enterprise Development*, Vol. 17 No. 1, pp. 16-29.

Piprek, G. (2008), "Linking with Savings and Cooperatives to Expand Financial Access in Rural Areas: a Case Study of CRDB Bank in Tanzania", in Pagura, M.E. (ed), *Expanding Frontier in Rural Finance: Financial Linkages and Strategic Alliances*, Practical Action Publishing/FAO, UK, pp. 217-245.

Randhawa, B and Gallardo, J. (2003), "Microfinance Regulation in Tanzania: Implications for Development and Performance of the Industry", Africa Region Working Paper Series No. 51.

Mokhtar, H. S. A., Abdullah, N., and Al-Habshi, S. M. (2006), "Efficiency of Islamic Banking in Malaysia: A Stochastic Frontier Approach", *Journal of Economic Cooperation*, Vol. 27, No. 2., pp. 37-70.

Sealey, C.W. jr., Lindley, J.T. (1977), "Inputs, Outputs, and a Theory of Production and Cost at Depository Financial institutions", *Journal of Finance*, Vol. 32, pp. 1252-1266.

Seibel, H. D. (2005), "Linkages Between Banks and Microfinance Institutions in Mali: A Case Study", Working Papers, aef, Universität Köln, www.econstor.eu (accessed 20 June 2010).

Stewart, F. and Ghani, E. (1991), "How Significant are Externalities for Development", *World Development*, Vol. 19 No. 6, pp. 569-594.

Stiglitz, E.J., & Weiss, A. (1981), "Cresit rationing in markets with imperfect information". *American Economic Review*, Vol. 71, pp. 393- 410.

TFC and CDD (2006), "Cooperatives and Development in Tanzania: A Simplified Guide to the Cooperative Development Policy and the Cooperative Societies Act of Tanzania Mainland", www.hakikazi.org (accessed 12 August 2010).

Tokman, V.E. (1978), "An Exploration into the Nature of Informal-Formal Sector Relationships", *World Development*, Vol.6 No. 9/10, pp. 1065-1075.

UNDP (2009), *Bringing Small-Scale Finance to the Poor for Modern Energy Services: What is the Role of Government?* UNDP New York.

URT (2004), *The Cooperative Societies Act 200*, URT Dar es Salaam.

URT (2008), "National Social Protection Framework", Ministry of Finance and Foreign Affairs, Dar es Salaam, www.tzdpg.or.tz (accessed 16 October 2010)

William K. Derban, Jane M. Binner and Andy Mullineux (2005), "Loan repayment Performance in Community Development finance Institutions in the UK", *Small Business Economic*, Vol. 25 No. 4, pp. 319-332.

www.bot-tz.org, (accessed 16 October 2010).

www.tzonline.org, "Ten Pillars of Kilimo Kwanza: Implementation Framework", (accessed 16 October 2010).

Yaron, J. (1994), "What Makes Rural Finance Institutions Successful?", *The World Bank Research Observer*, Vol. 9 No. 1, pp. 49-70.

APPENDIX

Correlation matrix

Variables		1	2	3	4	5	6	7	8	9	10	11
Cost	1	1										
Cost margin	2	0.1138	1									
Wage per worker	3	0.7294	0.0898	1								
GLP	4	0.8575	-0.0737	0.6605	1							
Members	5	0.7621	0.0344	0.5043	0.7145	1						
Number of loans	6	0.7418	-0.1125	0.4958	0.7778	0.7957	1					
Loan size	7	0.589	0.0076	0.521	0.7059	0.2805	0.1674	1				
Age	8	0.2263	-0.1459	0.2429	0.203	0.0352	0.1045	0.2174	1			
Age squared	9	0.173	-0.0778	0.1928	0.1559	-0.061	0.0457	0.198	0.9634	1		
Share value	10	-0.2218	0.1098	-0.1276	-0.1454	0.0014	0.1142	-0.3649	0.0393	0.0401	1	
Save and deposit	11	-0.1026	-0.1381	-0.0595	-0.0871	-0.1219	-0.2432	0.1332	-0.0987	-0.0835	-0.7217	1

ENDNOTES

[i] In 2006-2007 MCs were used by the government and international institutions to channel credits to marginalised households, to facilitate the implementation of the national strategy 'agriculture first', and to offer consumer loans for investment in solar energy (UNDP, 2009; URT, 2008; www.tzonline.org).

[ii] MFIs' borrowings had increased from 20 to 30 percent of their total financing during 2003-2008 (in Asia) and from 16 to 19 percent during 2006-2008 (in Africa) (Market Mix, 2010a; 2010b). Foreign investment in MFIs had increased from USD 1.7 to 4.4 billion during 2004 to 2006 (CGAP Brief April 2006). Loans from Developing World Markets to MFIs operating in Latin America, Asia, and Eastern Europe had increased from USD 40 to 60 million during 2004 to 2006 (Krauss and Walter, 2008).

[iii] Operational- and financial-self sufficiency are defined as MFIs' ability to generate adequate income to cover operating and financial costs (Ahlin, et al., 2010; Cull et al., 2006).

[iv] Since BNDA in Mali became a wholesaler to MFIs, it attained a 100 percent repayment rate of loans to MFI sector (Seibel 2005). CRDB Bank Plc. in Tanzania reached around 80,000 new rural clients through 157 MCs; AVIVA in India managed to offer insurance services to 200,000 clients through rural MFIs (Pagura and Kirsten, 2006). Through CASHPOR, ICICI Bank in India reached 23,739 new active clients (Development Alternatives, Inc. 2005).

[v] FGDs are among the sources of the data which we utilise. More description of the data is presented in Section 3.

[vi] ICICI Bank in India (Development Alternatives, Inc. 2005) and CRDB Bank Plc. in Tanzania (as revealed by the FGDs) closely monitored their partner MFIs/MCs. See for example, the provincial bank (Bank Pembangunan Daerah – BPD) in Bali, Indonesia, the apex organisation owned by the government in the Philippines, K-Rep Bank in Kenya and Covelo Foundation in Honduras (Pagura and Kirsten, 2006) have been offering advices, supervision and training to partner MFIs/MCs.

[vii] The paper utilise a dummy variable because some MCs' managers had studied for at least 13 to 16 years, which is equivalent to an advanced secondary school, ordinary or advanced diploma/degree, while others had studied for 7 to 11 years (i.e. primary to secondary basic education).

[viii] The author was a principle researcher in this project.

[ix] This assumption is tested using the generalised likelihood ratio statistic λ: $\lambda = -2[\ln\{L(H_0)\} - \ln\{L(H_1)\}]$; where $L(H_0)$ is the value of the likelihood function for the frontier model in which parameter restrictions specified by the null hypothesis H_0 are imposed, and $L(H_1)$ is the value of likelihood function for the general frontier model.