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Production and Intermediation Efficiency of Microfinance Institutions in Tanzania

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Abstract

This study aims at evaluating technical efficiency of microfinance institutions operating in Tanzania, as both the producer of loans to poor clients and as intermediary institutions for the poor clients. The study used unbalanced panel data for three years 2009-2011 with a sample of 29 Microfinance institutions. The findings of the study indicate higher average technical efficiency under production efficiency and lower technical efficiency under intermediation efficiency. The average technical efficiency scores were 0.7796, 07731 and 0.8586 under production efficiency and 0.05, 0.1321, 0.2531 under intermediation efficiency for the three years respectively. Most of inefficiencies in MFIs were a result of inappropriate allocation of inputs or operating at inappropriate scale as the average efficiency scores were high under pure technical efficiency as compared to scale efficiency while most of the inefficient firms were operating under decreasing return to scale. The results by status show that NGOs and NBFIs were the best performers in both production and intermediation efficiency contrary to most of the empirical findings. The study recommends that MFIs in Tanzania should reduce their operating cost, increase their revenues and improve their resource allocation in order to improve their intermediation efficiency since it present their main objective which is outreach to the poor and low income household.

Keywords: Production Efficiency, Intermediation Efficiency, Microfinance Institutions

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1. Introduction

Microfinance institutions are important sources of finance to the poor and constrained people who are not reached by formal financial institutions, due to their inability to meet formal lending requirements and standards (Robinson, 2003). These institutions provide a broad range of services such as deposits, loans, payment services and insurance services to the poor and low income households who are excluded by formal financial systems, using informal lending mechanisms (Kneiding & Mas, 2009). The major objective of these institutions is poverty alleviation by financially empowering the poor and low income households to enable them sustain living, engage in productive activity and operate their tin businesses (Lazer, 2008).

Financial sector in Tanzania is dominated by informal and semi formal financial service providers who serve about 31.6% of the total population leaving, 12.4% being served by formal financial providers while 56% of the population is still excluded and unreached (FinScope, 2009). Microfinance sector as the major provider of semi formal and informal financial services in Tanzania has recently gained importance and popularity as an important source of finance to the poor, low income individual and SMEs in both urban and rural areas. Since financial sector reforms which started in 1990s, microfinance sector has been fast growing in terms of size of institutions, number of service providers and the number of people served by the sector (Triodos Facet, 2011). The major players on microfinance services in the country include NGOs, Microfinance companies, SACCOs and few commercial banks which also provide microfinance services (BOT, 2010). With exceptional of commercial banks offering microfinance services, most of the remaining institutions depends on public funds from government, donors and development partners for their entire operations. Studies conducted in the country show that, most of the Microfinance institutions are not financially sustainable as they do not cover their operating costs using their operating revenue. Other Microfinance institutions have poor funds management, poor repayment collection and low outreach to the poor due to entirely dependence on subsidies (Marr & Tubaro, 20011, Nyamsogoro, 2010). On the other hand, FinScope survey (2009) on demand and barriers of access of financial services in the country show that, more than half of the population is excluded from both formal and informal financial service due to lack of knowledge and poverty and ignorance.

Although microfinance sector in the country has gained importance as a key tool for fighting poverty and ensure the realization of millennium goals (Triodos Facet, 2011), the outreach to the poor and low income household is still low, as more than half of the population has not been reached yet (FinScope, 2009, Marr and Tobaro, 2011). This brings question about the performance of these institutions especially on their efficient use of the public funds received from the government and donors. The need for efficient Microfinance institutions is not a question of focus in Tanzania only but also among different microfinance stakeholders around the world. They all require better allocation of public funds that are channeled to microfinance institutions, to ensure the provision of financial services to the poor on efficiency and sustainable basis (Basu et al, 2004). This study aims at evaluating the technical efficiency of microfinance institutions in Tanzania, as both the producers and providers of financial services to the poor and low income households and as the intermediary institutions that mobilize funds and channels them to the poor.

2. Literature Review

Efficiency refers to the better use of resources to maximize the production of the goods and services of the firms, it concerns with the relationship between the input resources such as labor costs, capital and equipment and the output produced using the inputs (Farrell, 1957). Efficiency measures indicate how well organizations use their resources to produce goods and services, and the rate at which the input resources are used to produce or deliver the outputs. According to Farrell (1957) economic efficiency of any firm has two main components, technical efficiency and allocative efficiency, technical efficiency refers to the ability and willingness of a firm to maximize output with a given set of inputs, it describes production that has the lowest possible opportunity cost with no waste of materials in the production of goods or services. Firm's technical efficiency can further be divided into scale efficiency and pure technical efficiency. Scale efficiency refers to the firm's ability to work at its optimal scale while pure technical efficiency refers to the firm's ability to avoid waste by producing as much output as input usage allows or by using as little input as output production allows. Allocative efficiency in the other hand refers to the ability and willingness of a firm to use the inputs optimally given the input prices.

Efficiency in microfinance institutions refers to how well microfinance institutions allocate the input resources such as asset, subsidies and personnel to produce output measured in terms of the loan portfolio and poverty outreach (Bassem, 2008). Efficiency of Microfinance institutions was not an area of focus for a long time due to a number of reasons. First, microfinance was initially designed as credit delivery system that provide financial services to the poor by removing the need for collateral and creating banking system based on mutual trust, accountability, participation and creativity. With the primary objective of poverty alleviation, Microfinance institutions only focused on outreach to the poor and social impact through microfinance projects. Second, most microfinance projects were entirely donor funded who only required social impact as the measure of the achievement of the project objectives (Christen et al, 2004; Brau & Woller, 2004). Lastly, it was due to institutional characteristics of Microfinance firms which make them inefficient firms as compared to the larger financial institutions (Brandt et al, 2003). According to Hulme & Mosley (1996) the unit cost for small loans to the poor customers by microfinance institutions is higher as compared to unit cost of larger loans. Furthermore, making small loans to customers involves high transaction costs in terms of screening, monitoring and administration costs per loan (Conning, 1999; Paxton & Cuevas 2002; Lupenu & Zeller 2002).

Recently MFIs were confronted with a number of challenges which have affected their operations and the way of doing business (Rhyne & Otero, 2006). With increased number of institutions offering microfinance services and involvement of commercial banks in microfinance services, competition has dramatically increased in which microfinance institutions not only compete for customers but also for scarce donor funds to finance their operations (Hermes et al, 2009). This resulted into the need for efficient microfinance institutions with better allocation of input resource in the production of output. Efficient operations in Microfinance institutions is a the key to financial sustainability and improved performance, according to (Nieto et al, 2007), an efficient microfinance firm allocate better its resources and minimize wastes which in turn lead to both improved financial performance and social performance. Bassem (2008) argues that, the fact that microfinance institutions do not operate in the same way as commercial banks, does not mean that efficiency and profitability is not important, rather these institutions have to strike a balance between efficiency, financial sustainability and profit seeking in one hand and social effort through improved economic and living conditions of rural and urban poor on the other hand. Due to this double bottom line of Microfinance institutions, they can only be declared efficient when they optimize their resources to satisfy both financial and social outputs. An efficient financially viable microfinance institution is also able to develop scale and financial leverage which enables it not only to reach more poor people but also to multiply contributions from donors by trapping more funds from commercial

sources (Fox, 1995).

Evidences from empirical studies have shown the presence of inefficiency among microfinance especially when they are compared to other financial institutions. The findings reported by Kabedea &Berhanu (2013) show that on average Ethiopian microfinance institutions are 33.5% less efficient as compared to commercial banks. The major reasons for such inefficiency being the provision of small size loans, focus on outreach only and reliance of non commercial sources of funds. Servin et al (2012) on the other hand reports that, in Latin America NGOs and Cooperatives which are major providers of microfinance services are less efficient compared to banks and non bank financial institutions. The comparison of performance and efficiency of microfinance institutions with commercial banks in India has shown that banks by far outperform microfinance institution in both efficiency and overall performance (Bi & Pandey, 2011). The reasons for such setback in microfinance efficiency and performance being the business model used, which is associated with high staff training costs, high operating costs and provision of short term smaller loans. The findings from Peru also show that on average microfinance institutions operating in the country were inefficient in terms of cost efficiency, the reasons being the asset levels and market concentration. Microfinance institutions with large asset base and which operate in less concentrated areas were more efficient than their counterparts while the size of loan and the use commercial funds was also found to contribute to cost efficiency level of microfinance institutions. Inefficiency of Microfinance institutions is also witnessed in several countries around the global such as South Africa (Baumann, 2005), Pakistan (Ahmad, 2011), Bangladesh (Islam et al, 2011), Ghana (Abayie et al, 2011) and in Mediterranean Zone (Bassem, 2008). The findings show that most of the microfinance institutions inefficiency was technical in nature, with microfinance banks outperforming traditional microfinance institutions (Haq et al, 2010).

3. Methodology

The measurement of technical efficiency of microfinance institutions involves two major approaches, production approach and intermediation approach. Production approach considers microfinance institutions as producers of deposits and loans using input resources such as assets, capital and personnel (Haq et al, 2010; Bassem, 2008). Production approach measures how efficiency microfinance institutions use the input resources in the production of output. Unlike in manufacturing firms, there no physical products produced rather the output is measured in terms of the loan portfolio, financial revenue or the number of loans channeled to the clients (Nieto, et al, 2009). Intermediation approach on the other hand considers microfinance institutions, as a financial intermediary mobilizing funds in terms of deposits and borrowings from surplus units and channels them to the poor clients with deficits. Although intermediation approach is more appropriate for financial institutions as it measures the efficiency to which deposits and loans are intermediated with severs and borrower, its application in microfinance institutions is limited. Most of Microfinance institutions do not mobilize funds in terms of deposits and do use commercial funds in terms of debts which have resulted into dominance of production approach in the measurement of microfinance technical efficiency (Ahmad, 2011, Bassem, 2008). Among the empirical studies which employed intermediation efficiency include, Hermes et al (2011) which uses operating expenses, financial expenses and total expenses as a proxy for funds mobilized and loan portfolio as output and Haq et al (2010) which estimates intermediation efficiency of microfinance institution in Vietnam using cost per borrower, cost per saver and operating expenses as input proxy for funds mobilize to produce gross loan portfolio. Estimation of production efficiency on the other hand has used asset, personnel and operating costs as inputs variables used to produce loan portfolio (Bassem, 2008; Nieto et al, 2009).

The estimation of both production and intermediation efficiency in Microfinance institutions is dominated by the use of data envelopment analysis model (DEA) and stochastic frontier analysis model (SFA). Unlike SFA, DEA is non parametric approach which estimates the relative efficiency of firms by comparing all firms to the best performer using the identical inputs and outputs (Coelli et al, 1998). DEA is the most widely used tool in the estimation of Microfinance institutions efficiency as compared to SFA. This is due to its ability to handle multiple inputs and outputs which is important characteristics of microfinance institutions, as they use multiple input resources (assets, capital, personnel) to produce multiple output such as loan and financial revenue (Ruggiero, 2005). DEA also is useful for microfinance institutions since it does not require prices for inputs and output which are difficult to estimate as most of the microfinance inputs are not obtained at market rates (Drake & Hall, 2003). This study also uses DEA model input oriented to estimate intermediation efficiency and production efficiency of MFIs in Tanzania. Input oriented model was chosen based on the assumption that MFIs have more controls on inputs resources as compared to outputs; hence we seek to estimate the extent to which they can adjust inputs variables in the production of outputs. Efficiency scores were estimated basing on both CCR model (Charnes et al, 1978) and BCC model (Banker et al, 1984) in order to capture efficiency scores

under both constant returns to scale, variable return to scale and scale efficiency. To specify the efficiency model for microfinance institutions, assume we have n Microfinance institutions each using m inputs to produce s outputs, we can represent technical efficiency (TE) using input orientation CCR model as,

$$TE = \sum_{j=1}^{s} (u_r y_{ro}) \div \sum_{i=1}^{m} (v_i x_{io}) \quad \text{----------(1)}$$

$$\text{Subject to } \frac{\sum_{r=1}^{s} \mu_r y_{rj}}{\sum_{r=1}^{s} v_i x_{ij}} \leq 1 \qquad u_r, x_i \geq 0, i = 1, \ldots, m, j = 1, \ldots, n, r = 1, \ldots, s$$

Where: TE is the technical efficiency ratio of the MFIo, V_i, μ_r are the weights for the i^{th} inputs and r^{th} outputs, m is the number of inputs variables, s is the number of output variables, n is the of MFIs, χ_{io} and r_o are values of input i and output r for MFIo. The above equation is the fractional linear programming equation with an infinite number of solutions, in order to enable easy solving; the equations can be converted into DEA linear problem by adding an additional constraint,

$$\sum_{i=1}^{m} (v_i \chi_{io}) = 1$$

The equations for input minimization would then be

$$\text{Min } TE - \theta_0 - \varepsilon \left(\sum_{i=1}^{m} S_i^- + \sum_{r=1}^{s} S_r^+ \right) \quad \text{----------(2)}$$

$$\text{Subject to } \sum_{j=1}^{n} v_{ij} \lambda_j + S_i^- = \theta \chi_{i0}$$

$$\sum_{j=1}^{n} y_{rj} \lambda_j - S_r^+ = y_{r0}$$

$$\lambda_j, S_r^+, S_i^- \geq 0, \varepsilon > 0, i = 1, \ldots, m, j = 1, \ldots, n, r = 1, \ldots, s$$

Where: Ɛ is a non Archimedean quantity which is smaller than any positive real number, Ɵo is the proportion of MFIo input which is needed to produce a quantity of output equivalent to the best performer MFIs **λ**j, S- and S+ are input and output slack variables respectively, **λ**j is a (nx1) column vector of constants indicating benchmarked MFIs for MFIo. The above model gives efficiency estimation under constant return to scale, in order to estimate efficiency score under variable return to scale; we modify CCR model by adding another constraint as proposed by Banker et al (1984).

The BCC minimization model can be presented as

$$\sum_{j=1}^{n} \lambda_j = 1 \quad \text{----------(3)}$$

The BCC minimization model can be presented as

$$\text{Min } TE = \theta_0 - \varepsilon \left(\sum_{i=1}^{m} S_i^- + \sum_{r=1}^{s} S_r^+ \right) \quad \text{----------(4)}$$

$$\text{Subject to } \sum_{j=1}^{n} v_{ij} \lambda_j + S_i^- = \theta \chi_{i0}$$

$$\sum_{j=1}^{n} y_{rj}\lambda_j - S_r^{+} = y_{r0}$$

$$\sum_{j=1}^{n} \lambda_j = 1$$

$$\lambda_j, S_r^{+}, S_i^{-} \geq 0, \varepsilon > 0, i = 1, \ldots, m, j = 1, \ldots, n, r = 1, \ldots, s$$

The efficiency score ranges from 0 to 1, MFIs with efficiency score of 1 are the efficient ones and the best performers among others, while MFIs with <1 efficiency score are inefficient one hence need to improve their resources allocation in order to reach the efficient frontier line. The BCC model decomposes technical efficiency into pure technical efficiency and scale efficiency; the scale efficiency is computed as the ratio of technical efficiency to pure technical efficiency.

The study uses three input variables, and two output variables in the estimation of production efficiency, the input variable used are total assets, personnel and operating costs while output variables used are gross loan portfolio and financial revenues. In the estimation of intermediation efficiency, the study uses one input variable and one output variable, the input variable used is the total funds mobilized which is the sum of total deposits mobilized and total borrowings while gross loan portfolio is used as the output variable. The study uses total funds mobilized as the sum of deposit and borrowing because some MFIs do not mobilize deposits while others do not use debts, but they use at least one of the two, the total funds from the two sources was then a good proxy for commercial funds mobilized by MFIs. The choice of input and output variables is based on their frequency of uses in MFIs empirical studies.

4. Results

The findings of the study show that MFIs in Tanzania have high average technical efficiency under production approach for both constant return to scale (CRS) and variable return to scale (VRS). The average technical efficiency under constant return to scale was 0.7796, 07731 and 0.8586 for the three years while the average pure technical efficiency was 0.8544, 0.8441 and 0.9039 for 2009 to 2011 respectively (Table 1). The efficiency results imply that less than 30% reduction in the average inputs used was needed, for all MFIs in order to be efficient on average terms without affecting the output levels. The average scale efficiency was also higher (0.8793, 0.9123, 0.9497) indicating that most of MFIs in the country operate at their most productive scales while the sources of inefficiency were mostly due to misallocation of inputs resources as scales efficiency was higher than pure technical efficiency in all three years.

Table 1: Efficiency Results Summary

Production Approach (Input Oriented)	2009	2010	2011
Number of Firms	30	29	29
Number of Efficient MFIs (CRS)	8	8	10
Number of Efficient MFIs (VRS)	13	13	13
Average Technical Efficiency (CRS)	0.7796	0.7731	0.8586
Average Pure Technical Efficiency (VRS)	0.8544	0.8441	0.9039
Average Scale Efficiency	0.8793	0.9123	0.9497

Although average production efficiency was high, the findings show only 8 MFIs were at the efficient frontier (2009, 2010) and 10 firms in 2011. This implies that the majority of MFIs reviewed were not at the frontier line; hence they were relatively inefficient and needed to reduce their inputs while maintaining the output levels to reach the frontier line. The results on production return to scale show, 72.73%, 57.14% and 63.16% of the inefficient MFIs operated at increasing return to scale while 27.27%, 42.86% and 36.84% of inefficient firms were at decreasing return to scale for the three years respectively. Although most of the MFIs reviewed were operating at increased return to scale which indicates possibilities of improving efficiency performance in the future, the trend was not positive. The number of MFIs operating at increasing return to scale was high in 2009 as compared to 2011, indicating the possibilities of increases in inefficiency, unless there operational changes among the MFIs.

Unlike on production efficiency, the results on intermediation technical efficiency were on average very low, showing high inefficiency on MFIs intermediation role. The average technical efficiency scores were 0.05, 0.1321 and 0.2531 under constant return to scale and 0.3527, 0.3997 and 0.4945 under variable return to scale, for 2009 to 2011 respectively (Table 2).

Table 2: Efficiency Results Summary

Intermediation Approach (Input Oriented)	2009	2010	2011
Number of Firms	29	29	29
Number of Efficient MFIs (CRS)	1	1	1
Number of Efficient MFIs (VRS)	4	4	6
Average Technical Efficiency (CRS)	0.0500	0.1321	0.2531
Average Pure Technical Efficiency (VRS)	0.3527	0.3997	0.4945
Average Scale Efficiency	0.2000	0.5596	0.5775

Although the efficiency trend was positive in the three years, the efficiency scores were very low requiring a decrease of more than 75% of overage inputs while maintaining the output levels to attain efficiency in average terms. Alternatively this can be explained as a low outreach to the poor, results show that although MFIs mobilize more funds inform of savings and borrowings, the loan portfolio is still low. The average gross loan portfolio was supposed to be created by only 5%, 13.21% and 25.31% of the average funds mobilized under constant return to scale, as well as 35.27%, 39.97% and 49.45% under variable return to scale for the three years respectively. This imply that on average MFIs are not channeling most of their funds to the deficit units which are poor clients and they operate with high costs, at least when they are compared to the best performer of the intermediation efficiency.

Efficiency by status shows that Microfinance companies, NGOs and NBFIs, have higher average technical efficiency than commercial banks, community banks and cooperative banks in both intermediation efficiency and production efficiency. Among the efficient firms under production efficiency, 3 were NGOs, 2 were Commercial banks, 2 were MFC and 1 was NBFI in 2009. In 2010, the efficient firms were 3 NGOs, 2 NBFIs, 2 Commercial banks and 1 MFC while in 2011 efficient firms were 5 NGOs, 3 Commercial banks, 1 Cooperative and 1 MFC Table (3).

Table 3: Average Technical Efficiency by Status

		Intermediation Approach			Production Approach		
		2009	2010	2011	2009	2010	2011
Commercial BANK	CRS	0.0071	0.0526	0.1153	0.6159	0.7299	0.8096
	VRS	0.4932	0.4997	0.5071	0.7547	0.7875	0.8831
	SCALE	0.0253	0.3738	0.3162	0.7188	0.9178	0.9172
Community Bank	CRS	0.0221	0.0665	0.1888	0.8433	0.5976	0.8693
	VRS	0.2490	0.1560	0.2616	0.9484	0.7851	0.9227
	SCALE	0.1948	0.6339	0.7664	0.8937	0.7829	0.9414
Cooperative Bank	CRS	0.0101	0.0562	0.1359	0.7879	0.6359	0.7457
	VRS	0.0257	0.0673	0.1775	0.8400	0.7432	0.7732
	SCALE	0.3894	0.8006	0.7949	0.9401	0.8521	0.9627
Microfinance Companies	CRS	0.3476	0.4166	0.3834	0.8979	0.9161	0.9012
	VRS	0.6566	0.6021	0.5650	0.9882	0.9977	0.9791
	SCALE	0.3671	0.6186	0.7682	0.9064	0.9179	0.9179
NBFI	CRS	0.0182	0.1058	0.2872	0.7340	0.7929	0.7813
	VRS	0.0632	0.1357	0.3719	0.7344	0.7995	0.7865
	SCALE	0.3861	0.8113	0.7382	0.9993	0.9834	0.9938
NGO	CRS	0.0239	0.1779	0.4145	0.8911	0.8779	0.9650
	VRS	0.3507	0.5261	0.7062	0.9134	0.9267	0.9852
	SCALE	0.1950	0.5339	0.5874	0.9708	0.9484	0.9798

The average technical efficiency scores under intermediation technical efficiency were Microfinance companies

(34.76%, 41.66%, 38.34%), NGOs (2.39%, 17, 79%, 41.45%), NBFIs (1.82%, 10.58%, 28.72%), Commercial banks (0.71%, 5.26%, 11.53%), Community banks (2.21%, 6.65%, 18.88%) and Cooperative banks (1.01%, 5.62%, 13.59%) for the three years respectively. Although the overall intermediation efficiency was low, microfinance companies, NGOs and NBFIs outperformed banks while commercial banks were the least performers among the banks offering microfinance services. The low intermediation efficiency of banks could be a result of less involvement of banks in microfinance services unlike to NGOs, NBFIs and Microfinance institutions whose major activity is microfinance services. The result show that Banks in average were supposed to generate the current level of output using less than 20% of their average input resources they had used as compared to Microfinance companies, NGOs and NBFIs which needed less than 50% of their average input resource to generate the current level of the output. Production efficiency also reveals that Microfinance companies were the best performers as compared to other institutions although on average, the relative efficiency results were high. The level of inefficiency was found to be less than 20% in all firms for the three years, and scale efficiency was higher than pure technical efficiency in both types of Microfinance institutions.

Efficiency performance of individual Microfinance institutions shows that Blue Finance Ltd was the only best performer under intermediation efficiency constant return to scale. Under variable return to scale, CRDB, Blue Finance Ltd, IDYDC and Blue finance were at efficiency frontier line. Under production efficiency, Blue Finance Ltd, CRDB, DCB and YOSEFO were relatively efficient in all three years.

5. Conclusion

The study evaluates technical efficiency of Microfinance institutions operating in Tanzania, as both the producer of loans to poor clients and as intermediary institutions mobilizing funds from surplus units and channeling them to the deficit poor clients. The study used unbalanced panel data for three years 2009-2011 with 8 NGOs, 3 NBFIs, 3 Microfinance companies, 3 Cooperative banks, 3 Community banks and 9 commercial banks offering microfinance services. The study used DEA model input oriented to compute efficiency score under both constant and variable return to scale.

The findings of the study indicate higher average technical efficiency under production efficiency and lower technical efficiency under intermediation efficiency. The average technical efficiency were 0.7796, 07731 and 0.8586 CRS and 0.8544, 0.8441 and 0.9039 under variable return to scale for three years respectively, indicating low inefficiency of less that 30% in all three years of review. The average scores in intermediation efficiency were 0.05, 0.1321, 0.2531 under constant return to scale and 0.3527, 0.3997, 0.4945 variable return to scale indicating high intermediation inefficiency among MFIs reviewed. Most of inefficiencies in MFIs were found to be a result of inappropriate allocation of inputs or operating at inappropriate scale, as the average efficiency scores were higher under scale efficiency as compared to pure technical efficiency while most of the firms were found to operate under decreasing return to scale. The results by status show that NGOs and NBFIs were the best performers in both production and intermediation efficiency as compared to while performance by individual MFIs show that Blue Finance Ltd, CRDB, DCB and YOSEFO were relatively efficient for three years under production efficiency, and only Blue Finance was efficient for three years under intermediation efficiency.

The findings of this study are somehow different from findings in most of efficiency studies in MFIs which report the presence of higher inefficiency in both production and intermediation efficiency (Abaiye et al, 2011; Islam et al, 2011). The findings on production efficiency indicate higher efficiency among MFIs indicating better allocation of input resources in the production of outputs. On the other hand, the study finds higher efficiency among NGOs and NBFIs as compared to commercial banks, cooperative banks, and community bank contrary to most of the empirical findings which report banks to outperform traditional microfinance institutions (Haq, 2010; Servin et al, 2012; Biz & Pandey, 2011). The results on scale efficiency were higher than pure technical efficiency, indicating that most of inefficiencies are either due to improper allocation of input resources or operation at inappropriate scale contrary to most empirical results which indicate that most of inefficiencies in MFIs were technical in nature (Qayyum & Munir, 2006; Haq et al, 2010).

From findings of the study it is recommended that MFIs in Tanzania should reduce their operating cost, increase their revenues and better allocate their resources in order to improve their intermediation efficiency since it present the main objective of MFIs which is outreach to the poor and low income household.

6. References

Abayie, E., Amanor, K., & Frimpong, J. (2011). The Measurement and Determinants of Economic Efficiency of

Microfinance Institutions in Ghana: A Stochastic Frontier Approach. *African Review of Economics and Finance*, 2(2), 149-166.

Ahmad, U. (2011). Efficiency Analysis of Micro-finance Institutions in Pakistan, *Report No. 34215*, MPRA.

Banker, R. D., Charnes, A., & Cooper. (1984),Some Models for Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis. *Management Science*, 30(9), 1078-1092.

Barres, I., Curran, L., Nelson, E., Bruett, T., Escalona, A., Norell, D., et al. (2005). *Measuring Performance of Microfinance Institutions: A Framework for Reporting, Analysis and Monitoring*. United States of America: The SEEP Network and Alternative Credit Technologies, LLC.

Bassem, S. B. (2008). Efficiency of Microfinance Institutions in the Mediterranean: An application of DEA. *Transit Stud Rev* 15, 343-354.

Basu, A., Blavy, R., & Yulek, M. (2004). Microfinance in Africa: Experience and Lessons from Selected African Countries. *IMF Working Paper*, African Department.

Baumann, T. (2005). Pro poor Microcredit in South Africa: Cost Efficiency and Productivity of South African pro-poor microfinance institutions. *Journal of Microfinance*, 7(1), 95-118.

Bi, Z., & Pandey, S. (2011), Comparison of Performance of Microfinance with Commercial Banks. *Australian Journal of Business and Management Research*, 1(6), 110-120.

BOT. (2010). *Microfinance Institutions in Tanzania*: Bank of Tanzania.

Brandt, L., Park, A., & Sangui, W. (2003). Are China's Financial Reforms Leaving the Poor Behind? , from http://ihome.ust.hk/~albertpark/papers/findist.pdf

Brau, J. and Woller, G.M. (2004). Microfinance: A Comprehensive Review of the Existing Literature, *Journal of Entrepreneurial Finance and Business Ventures* 9, 1 – 26.

Charnes, A., Cooper, W., & Rhodes, E. (1978), Measuring the efficiency of decision making units. *European Journal of Operational Research*, 2(429-444).

Christen, R, Rosenberg, R, Jayadava, V, (2004), Financial Institutions with a Double Bottom Line: Implications for the Future of Microfinance, *Occasional Paper No. 8*, CGAP, Washington, DC.

Coelli, T. A. (1998). *Guide to DEAP Version 2.1*: A Data Envelopment Analysis (Computer Program). Australia.

Conning, J. (1999), Outreach, Sustainability and Leverage in Monitored and Peer-monitored Lending. *Journal of Development Economics,* 60, 51-77.

Drake, L., & Hall, M. (2003). Efficiency in Japanese banking: An empirical analysis. *Journal of Banking and Finance* 27(5), 891–917.

Farrell, M. J. (1957), The Measurement of Productive Efficiency. *Journal of the Royal Statistical Society Series A (General)*, 120(3), 253-290.

FinScope. (2009), *A Survey of the Demand for financial Services in Tanzania*. Dar-es-salaam, Tanzania: Financial Sector Deepening Trust (FSDT).

Fox, J (1995), Maximizing the Outreach of Microenterprise Finance: Emerging Lessons of Successful Programs, *Report No. 2*, CGAP, Washington, DC.

Haq, M., Skully, M., & Pathan, S. (2010). Efficiency of Microfinance Institutions: A Data Envelopment Analysis. *Asia-Pacific Financial Markets* 17, 63–97.

Hermes, N., Lensink, R., & Meesters, A. (2011),Outreach and efficiency of microfinance institutions. *World Development*, 39, 939-948.

Hulme, D., & Mosley, P. (1996). *Finance Against Poverty*. London: Routledge.

Islam, K., Bäckman, S., & Sumelius, J. (2011). Technical, Economic and Allocative Efficiency of Microfinance Borrowers and Non-Borrowers: Evidence from Peasant Farming in Bangladesh. *European Journal of Social Sciences*, 18(3), 361-377.

Kabedea, H., & Berhanu, W. (2013). How Efficient are Ethiopian Microfinance Institutions in Extending Financial Services to the Poor? .A comparison with Commercial Banks. *Journal of African Economies*.22(1),112-135

Kipesha, E. (2010). Global Financial Crisis: Impact on Bank's Financial Intermediation Role, Evidence from

Commercial Banks in Tanzania. *The Accountant Journal*, 26(3), 22-34.

Kneiding, C & Mas, I (2009). *Efficiency Drivers of MFIs: The Role of Age*: Consultative Group to Assist the Poor (CGAP) Brief, Washington, DC.

Lapenu, C., & Zeller, M. (2002), Growth, and Performance of the Microfinance Institutions in Africa, Asia and Latin America: a recent inventory. *Savings and Development*, 1(XXVI), 87 -111.

Lazer, D. (2008), *Microfinance and Poverty Eradication: Indian and Global Experience*. New Delhi: New Century.

Marr, A., & Tubaro, P. (2011). *Escape the Low Growth Trap?: Microfinance in Tanzania*. UK: The University of Greenwich.

Nieto, B., Serrano Cinca, C., & Mar Molinero, C (2009), Social Efficiency in Microfinance Institutions. *Journal of the Operational Research Society*, 60(19), 104-119.

Nieto, G., SerranoCinca, C., & MarMolinero, C. (2007),Microfinance Institutions and Efficiency. *International Journal of Management Science*, 35(2), 131-142.

Nyamsogoro, G. (2010). Microfinance Institutions in Tanzania: A Review of Growth and Performance Trends. *The Accountant Journal*, 26(3), 3-16.

Paxton, J., & Cuevas, C. (2002), *Outreach and Sustainability of Member-Based Rural Financial Intermediaries*. In: Zeller, M., and R. L. Meyer (eds). 2002. The triangle of Microfinance: Financial sustainability, outreach, and impact Baltimore and London: Johns Hopkins University Press.

Qayyum, A., & Ahmad, M. (2006), Efficiency and sustainability of microfinance Institutions. Retrieved July,22, 2012, from: http://mpra.ub.uni-muenchen.de/11674

Robinson, M. (2003). *The Microfinance Revolution: Sustainable Finance for the Poor* (Vol. 1). Washington DC: World Bank.

Ruggiero, J. (2005), Impact assessment of input omission on DEA. International *Journal of Information Technology & Decision Making,* 4(3), 359-368.

Rhyne, E., & Otero, E. (2006), *Microfinance through the Next Decade: Visioning the Who, What, Where, When and How*, ACCION International, Washington, DC

Servin, R., Lensink, R., & Berg, M. (2012). Ownership and Technical Efficiency of Microfinance Institutions: Empirical Evidence from Latin America. *Journal of Banking and Finance*, 36(7), 2136-2144.

Triodos Facet, (2011), *Tanzania Microfinance Country Survey Scan.* The Netherlands: Triodos Facet

Abbreviations: MFIs-Microfinance Institutions, TE= Technical Efficiency, CRS= Constant return to scale, VRS= Variable return to scale, TZ1 -Access B, TZ2-Akiba B, TZ3- CRDB B, TZ4-DCB B, TZ5- Efatha B, TZ6-Mkombozi B, TZ7-NMBB bank, TZ8-Postal bank, TZ9-Women bank, TZ10-Mbiga C, TZ11- Mufindi C,TZ12-Tandahimba C,TZ13- Kagera Cp, TZ14-Kilimanjaro Cp, TZ15- Mwanga Cp, TZ16-Belita, TZ17-Blue Finance, TZ18-WEDAC, TZ19-Opportunity TZ, TZ20- SELFINA, TZ21-Tujijenge TZ, TZ22 Brac TZ,- TZ23-ECLOF TZ, TZ24-FINCA TZ, TZ25-IDYDC, TZ26-PRIDE, TZ27-PTF, TZ28-SEDA, TZ29-YOSEFO, C-Community bank, Cp- Cooperative bank, B-commercial bank

Appendix1. Efficiency Scores (Production Approach)

	2009				2010				2011			
MFIs	CRS	VRS	Scale	RTS	CRS	VRS	Scale	RTS	CRS	VRS	Scale	RTS
TZ1	0.7873	0.8314	0.9469	drs	0.6158	0.6548	0.9404	drs	0.7573	0.8376	0.9041	drs
TZ2	0.8331	0.8725	0.9549	drs	0.6903	0.7707	0.8957	drs	0.8139	0.8186	0.9942	drs
TZ3	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs
TZ4	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs
TZ5	0.0664	0.4230	0.1569	irs	0.4723	0.5582	0.8460	irs	0.6446	0.9812	0.6569	irs
TZ6	0.1294	0.3600	0.3593	irs	0.4399	0.5390	0.8162	irs	0.5769	0.7988	0.7223	irs
TZ7	0.9110	1.0000	0.9110	drs	0.8887	1.0000	0.8887	drs	1.0000	1.0000	1.0000	crs
TZ8	0.7208	0.7426	0.9706	drs	0.7753	0.8513	0.9108	drs	0.7382	0.7383	0.9998	irs
TZ9	0.0952	0.5625	0.1692	irs	0.6872	0.7137	0.9628	irs	0.7558	0.7731	0.9776	irs
TZ10	0.8410	0.8542	0.9845	irs	0.4496	0.5397	0.8331	irs	0.9223	0.9249	0.9972	irs
TZ11	0.8660	0.9911	0.8738	irs	0.7626	0.8156	0.9350	irs	0.9023	0.9380	0.9620	irs
TZ12	0.8229	1.0000	0.8229	irs	0.5807	1.0000	0.5807	irs	0.7831	0.9052	0.8651	irs
TZ13	0.7953	0.9088	0.8752	irs	0.5630	0.6146	0.9160	irs	0.5763	0.5785	0.9962	drs
TZ14	0.6260	0.6471	0.9675	irs	0.4722	0.6152	0.7675	irs	0.6608	0.7410	0.8918	irs
TZ15	0.9425	0.9641	0.9776	irs	0.8727	1.0000	0.8727	irs	1.0000	1.0000	1.0000	crs
TZ16	0.6938	0.9645	0.7193	irs	0.7757	0.9932	0.7811	irs	0.7466	0.9374	0.7964	irs
TZ17	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs
TZ18	1.0000	1.0000	1.0000	crs	0.9725	1.0000	0.9725	irs	0.9571	1.0000	0.9571	irs
TZ19	0.3525	0.3530	0.9985	irs	0.3787	0.3985	0.9503	irs	0.4757	0.4777	0.9958	irs
TZ20	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs	0.9724	0.9832	0.9890	drs
TZ21	0.8495	0.8501	0.9993	drs	1.0000	1.0000	1.0000	crs	0.8956	0.8986	0.9967	irs
TZ22	0.4760	0.5414	0.8793	drs	0.7635	0.9049	0.8437	drs	0.9665	1.0000	0.9665	drs
TZ23	0.9084	1.0000	0.9084	irs	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs
TZ24	1.0000	1.0000	1.0000	crs	0.8629	0.9672	0.8922	drs	0.8741	1.0000	0.8741	drs
TZ25	0.9793	1.0000	0.9793	irs	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs
TZ26	1.0000	1.0000	1.0000	crs	0.8679	1.0000	0.8679	drs	1.0000	1.0000	1.0000	crs

TZ27	0.9210	0.9210	0.9999	irs	0.7840	0.7854	0.9982	drs	0.8796	0.8816	0.9977	drs
TZ28	0.8439	0.8447	0.9991	irs	0.7450	0.7560	0.9854	drs	1.0000	1.0000	1.0000	crs
TZ29	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs

Appendix 2: Efficiency Scores (Intermediation Approach)

	2009				2010				2011			
MFI	CRS	VRS	Scale	RTS	CRS	VRS	Scale	RTS	CRS	VRS	Scale	RTS
TZ1	0.0130	0.3359	0.0388	drs	0.0654	0.2617	0.2498	drs	0.1341	0.4722	0.2841	drs
TZ2	0.0104	0.7387	0.0141	drs	0.0532	0.5054	0.1053	drs	0.1187	0.4484	0.2648	drs
TZ3	0.0093	1.0000	0.0093	drs	0.0506	1.0000	0.0506	drs	0.1085	1.0000	0.1085	drs
TZ4	0.0138	1.0000	0.0138	drs	0.0825	0.9607	0.0859	drs	0.1611	0.6078	0.2650	drs
TZ5	0.0014	0.0806	0.0173	irs	0.0325	0.0405	0.8025	irs	0.0897	0.1183	0.7581	drs
TZ6	0.0003	0.0044	0.0627	irs	0.0339	0.0352	0.9634	irs	0.0934	0.2495	0.3743	drs
TZ7	0.0073	0.7791	0.0094	drs	0.0497	0.9796	0.0507	drs	0.1266	1.0000	0.1266	drs
TZ8	0.0067	0.4661	0.0143	drs	0.0528	0.6609	0.0799	drs	0.0967	0.4144	0.2334	drs
TZ9	0.0016	0.0335	0.0481	irs	0.0525	0.0538	0.9759	irs	0.1092	0.2530	0.4315	drs
TZ10	0.0064	0.0611	0.1046	irs	0.0457	0.0634	0.7213	irs	0.3014	0.4476	0.6734	drs
TZ11	0.0107	0.0263	0.4053	irs	0.0578	0.0643	0.8981	irs	0.1373	0.2029	0.6769	drs
TZ12	0.0491	0.6597	0.0744	irs	0.0961	0.3402	0.2824	irs	0.1275	0.1344	0.9488	drs
TZ13	0.0082	0.0290	0.2842	irs	0.0452	0.0597	0.7562	irs	0.1058	0.1173	0.9019	drs
TZ14	0.0068	0.0192	0.3542	irs	0.0249	0.0337	0.7388	irs	0.0890	0.1150	0.7737	drs
TZ15	0.0152	0.0287	0.5298	irs	0.0985	0.1086	0.9068	irs	0.2129	0.3003	0.7090	drs
TZ16	0.0044	0.0759	0.0584	irs	0.0207	0.0370	0.5580	irs	0.0412	0.0435	0.9458	drs
TZ17	1.0000	1.0000	1.0000	crs	1.0000	1.0000	1.0000	crs	0.6423	1.0000	0.6423	drs
TZ18	0.0382	0.8940	0.0428	irs	0.2291	0.7694	0.2978	irs	0.4667	0.6515	0.7164	irs
TZ19	0.0230	0.1050	0.2193	irs	0.1044	0.1720	0.6069	irs	0.4910	0.5655	0.8683	drs
TZ20	0.0142	0.0215	0.6616	irs	0.0854	0.0903	0.9454	irs	0.1758	0.2704	0.6500	drs
TZ21	0.0175	0.0631	0.2773	irs	0.1276	0.1447	0.8817	irs	0.1949	0.2799	0.6963	drs
TZ22	0.0072	0.2309	0.0311	drs	0.0761	0.5519	0.1379	drs	0.2368	0.8434	0.2807	drs
TZ23	0.0290	0.1642	0.1767	irs	0.4615	0.5706	0.8088	irs	0.9176	1.0000	0.9176	drs

TZ24	0.0436	0.3940	0.1106	drs	0.1318	0.7617	0.1730	drs	0.1913	0.6528	0.2931	drs
TZ25	0.0480	1.0000	0.0480	irs	0.3581	1.0000	0.3581	irs	1.0000	1.0000	1.0000	crs
TZ26	0.0129	0.8891	0.0145	drs	0.1034	1.0000	0.1034	drs	0.2645	1.0000	0.2645	drs
TZ27	0.0236	0.0445	0.5311	irs	0.1306	0.1456	0.8973	irs	0.3000	0.4185	0.7167	drs
TZ28	0.0077	0.0250	0.3088	irs	0.0954	0.1029	0.9274	irs	0.2712	0.5517	0.4916	drs
TZ29	0.0195	0.0576	0.3388	irs	0.0660	0.0763	0.8652	irs	0.1345	0.1830	0.7349	drs