International Journal of Public Administration and Management Research (IJPAMR), Vol. 2, No. 5, March 2015.
Website: www.rcmss.com. ISSN: 2350-2231 (Online) ISSN: 2346-7215 (Print)
Kiran Bibi and Habib Ahmad, 2014,2(5): 23- 36

PRODUCTIVITY CHANGE IN MICROFINANCE INSTITUTIONS IN SARRC REGION: A DEA APPROACH

Kiran Bibi
Department of Business Administration (finance)
Foundation University new lalazar Rawalpindi, Pakistan
Kiranbb_89@yahoo.com

&

Sir Habib Ahmad
Department of Business Administration (finance)
Foundation University new lalazar Rawalpindi, Pakistan
Habib.ahamd@fui.edu.pk

ABSTRACT

Microfinance Institutions (MFIs) play vital role in developing countries. This study is dedicated to inspect the productivity change in microfinance Institutions (MFIs) in the SAARC region. A panel of 85 MFIs with five diamond information status from 2003 to 2011 with annual frequency is investigated in the analysis. Inputs and outputs used in the study are selected on the basis of double bottom line objective of MIF; s. the methodology which we adopt is Malmquist index through DEA software. The study will be helpful to find that whether the MFIs of SAARC countries effectively manage cost efficiency, technical efficiency and scale efficiency? Also the study will guide the MFIs to remove the deficiency (If any) in the above said forms of efficiencies. Also the total productivity change with respect time and country is investigated in the analysis. On average a positive TFP growth of MFIs in the SAARC region is documented except from 2005 to 2006 and 2007 to 2009. The efficiency of these MFIs will be helpful for completion of the financial sector and will improve the overall competence and growth. The study will be helpful for both welfarist and institutionalisms to achieve their objectives.The found many articles related to measure the productivity change in different regions but there are limited articles and research work on SARRC region. This study was carried out to find whether Micro finance institutions are working efficiently or not.

Key Words: Productivity change, Malmquist Productivity index, Technological change, Technical Change.

INTRODUCTION

Microfinance organizations (MFIs) are considered important especially for developing countries. They give a variety of monetary (financial) facilities to the world low income family units and entrepreneur persons. This not only fills the gap in the financial sector but also provide credit access to the ignored segment of society. MFIs two fold objective of welfare and sustainability **(Bassem, 2014)**, which revolve around two approaches or paradigms first is institutionist paradigms and other one is welfarist paradigms. The "institutionist paradigm", which encourage MFIs to produce enough returns to cover their operational and financial expenses (sustainability) and on other side welfarist paradigm which stick to the objective of poverty reduction and depth of outreach and attaining financial sustainability (**Musa A. Olasupo, 2014**). In the same context, **(Otero, 1998)** argues that MFIs need to generate high profit, but at the same time, they are required to balance the social objectives of reaching low-income entrepreneurs with generating an effective return for their investors.

There are three type financial sources such as formal institution like rural banks, informal institutions like shopkeepers, money lender and co-operatives are nongovernmental organizations (NGO, s) which work for the welfare of people. Microfinance offers duel services which are financial services and nonfinancial services. Financial services comprise of saving, microcredit, money transfer, micro insurance etc. Non-financial services consist of training, counselling, education, health etc. But both types of microfinance services have common objective to create employment opportunity as well poverty reduction. It is observed that microfinance is an important vehicle to reduce the poverty rate. An increasing proportion of the poverty in many developing countries microfinance institutions provide lone to needy people.

Financial Institutions are institutions that deal with savings, investments, assets, loans, deposits etc of the people and the issues related to them. Financial institutions that is operating in

developing countries are Public Sector Banks, Private banks, development financial institutions (DFI,s), foreign banks, investment banks, and Islamic banks As their name suggests Microfinance banks are financial institutions which extend small amounts of loans and similar other financial services to poor people.

Many significant studies are conducted by different researchers to estimate the performance of MFIs in different region , in recent years some studies are conducted by (Ahmad A. Q., 2006), (Ahmad T. M., 2010), (Anne-Lucie Lafourcade, 2005), (Annim, 2010), (Bassem, 2008), (Baumann, 2005), (Ferdousi, 2013), (Gebremichael B. Z., 2012), (Hidenobu Okudaa, 2014), (Ines Ben Abdelkader, 2014), (Jayamaha, 2009), (Sanchez, 2009), (Kipesha, 2012) etc.

However according to our knowledge very limited literature is available to investigate the productivity change in micro finance institutions in SARRC countries but as a whole SARRC region we never found any single study so far, so this study is aimed at filling this gap by investigating the productivity change in MFIs of SAARC region during the time period of 2003 to 20011 by applying Malmquist index and aiming that it is valuable contribution to literature in areas of MFIs.

The remaining paper is arranged in different sections. In Section 2 gives brief Overview of origin of microfinance industry in SAARC region, Section 3 consist of literature review, Section 4 describe the data and methodology, Section 5 presents results and discussions. Finally, Section 6 ends up with conclusions.

OVERVIEW OF ORIGIN OF MICROFINANCE INDUSTRY IN SAARC REGION

The origin of **'modern'** micro-finance in developing countries started in the mid-1970s by Muhammad Yunus, who developed it as a way to get rid of poverty in his home country Bangladesh. In 1983, he Founded Grameen Bank, the first institution which introduced this concept and started to Operate in the micro finance business in the proper sense. The Grameen Bank project, which translates literally as **"Village Bank",** was born, and today works in over eighty-thousand villages with more than six million borrowers. In 2006 both Yunus and Grameen were awarded the Nobel Peace Prize for their work with the poor. Although there have been many other organizations engaged on offering loans and saving opportunities to needy people before, Grameen Bank is known for successfully implementing the system of group lending. In particular, it has proposed a number of indicators to measure the impact of poverty elimination methods. These consider primarily basic needs similar to the definition of the International Labour Organization in 1976 and the financial situation of the poor. Together, Yunus and Grameen Bank were awarded with Nobel Peace Prize in 2006 for their efforts through Microcredit to create economic and social development from below" **(The Norwegian Nobel Committee, 2006)**.

The idea of micro finance institutions meets the two bottom line concept requirements. They provide access to capital on smallest scales, and ideally act as social businesses realizing economic behaviour improved by social preferences. They enable poor people to engage in productive economic activities and thus contribute to development in low income population but still to measure the performance of MFIs is very critical in order to provide continuous financial and social support to the poor. Despite social goals attempted by the MFIs, the self-sustainability objective is to exit from the permanent subsidies recipient group (Yaron, 1994). This objective can be achieved through good performance practice, critical to ensure nonstop operations of MFIs in providing services.

The performance of MFIs is therefore very critical in order to provide continuous financial and social support to the poor. Despite social goals strived by the MFIs, the self-sustainability objective is key to exit from the permanent subsidies recipient group ***(Yaron, 1994)***. This objective can be achieved through good performance practice, critical to ensure continual operations of MFIs in providing services.

LITERATURE REVIEW:

Based on a longitudinal and geographical wide study from 1995-2010 by ***(Goswami, 2013)*** Introduce a new conceptual model of performance assessment for MFIs. Eight dimensions of performance (efficiency, productivity, sustainability, social, institutional characteristics, outreach governance and financial) are proposed to be the more holistic view of MFIs performance. ***(Tahrim, 18 June 2014)***

Our study will focus two dimensions suggested by ***(Goswami, 2013)*** which are productivity and efficiency. Efficiency analysis will provide information specifically related to use of resources and magnitude of wastes while Productivity analysis will provide information specifically relate to a vital

performance indicator which help the institutions to restructure its operations by calculating its cost of output .in MFI, s its is calculated in terms of loan officer productivity (work load lone officer ratio and loans per officers). Credit officers involve field faculty or line officers whose interface with the customer, however not authoritative staff or investigators who move ahead advances without immediate customer contact or communication. This proportion demonstrates the productivity of the MFP's credit officers, higher the degree will lead the more productive the foundation. This paper looks at efficiencies of MFI, s in South Asia. Efficiency means the capacity which delivers maximum output at a given level of minimum input and it is the most effective way to provide small loans to the very poor in microfinance context. The main focus is on cost minimization and income maximization at a given level of operation (double bottom line) and it has a lasting impact on financial sustainability of microfinance institutions. Thus, efficiency can be measured by its productivity (for instance, number of borrowers per staff) and cost management (for instance, cost per borrower) dimensions.

Traditionally, to evaluate the performance of MFI,s there are different accounting ratios which provide information but that is not as much use full because its provide only partial measures of efficiency and remaining partial efficiency may be ambiguous When we describe conclusion on the overall efficiency of MFIs. Some of Studies that follow ratio analysis to measure the efficiency are (***Baumann, 2005)***, ***(Farrington, 2000)*** and ***(Anne-Lucie Lafourcade, 2005)***.but on the other way (begone gutierrez, 2007), ***(Hong Son Nghiem, 2006)***, ***(Bassem, 2008), (Ahmad A. Q., 2006), (Lamberteb, 2003***), ***(Mahmood, 2009), (Niels Hermes, 2008), (Mamiza Haq M. S., 2010), (K.M. Zahidul Islam, 2011), (Ahmad T. M., 2010), (Eric Fosuoteng Abayie, 2011)*** have applied frontier efficiency measures either the Data Envelopment Analysis or Stochastic Frontier Analysis.

Baumann (2005) uses borrower per staff and saver per staff to check efficiency level and recommended that in MFI, s high productivity level of the staff help in achieving MFI, s double bottom line objective. ***(Farrington, 2000)*** identifies a number of accounting variables to reflect the efficiency of MFIs. These accounting variables are administrative expense ratio, number of loans per loan officer and loan officers to total staff, portfolio size, loan size, lending methodology, source of funds and salary structure as the efficiency drivers and hence as the measurements for MFI efficiency.

By utilizing cost per borrower and cost per saver as a measure of effectiveness ***(Anne-Lucie Lafourcade, 2005)*** find that formal micro finance institution have greater efficiency then semi formal MFI,s in African and in formal MFI,s, cooperative MFI,s are the least effective. Also, ***(Anne-Lucie Lafourcade, 2005)*** differentiate on the basis of efficiently cost management (cost for every borrower and expense for every saver.) Africa is the most beneficial MFI, s region then different areas.

Mamiza Haq M. S.(2009)examine the efficiency of micro financial institution in Africa Asia and Latin America by using production approach and result revile that non-governmental MFI,s are working most efficiently than others to achieve dual objective . On the other way, bank micro finance institutions also outperforming efficiently under intermediate approach .so in financial intermediaries banks have access to the local market. Most probably in future bank also performs as a non-governmental micro finance institution.

Kipesha (2012 using both production and intermediation approach .so by status show that NGOs and NBFIs were the best performers in both production and intermediation efficiency and improvement in efficiency depend on reduce their operating cost, increase their revenues to achieve their main objective which is outreach to the poor and low income household. The findings of this study is different from findings in most of efficiency studies in MFIs which report the presence of higher inefficiency in both production and intermediation efficiency.

The findings on production efficiency indicate higher efficiency among MFIs which means that in production of output allocation of inputs are well managed. On the other hand, the observation 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.

Ahmad A. Q.,(2006) measures the efficiency and sustainability of Micro Finance Institutions in South Asia and concluded that when the scale efficiency were superior than the pure efficiency its indicate that most of inefficiencies are either due to improper allocation of input resources or operation at inappropriate scale opposite to most empirical results which indicate that most of inefficiencies in MFIs were technical in nature (***Mamiza Haq M. S., 2010).***

In same context ***(Sanchez, 2009)*** examine micro financial institutions (MFI) technical and scale efficiency and comment that formal MFI, s (bank &credit unions) pure technical in nature. non

financial MFI,s like non profit organization and non financial institutions the inefficiency is pure technical then scale which indicate that MFI,s are not utilizing their resources efficiently to produce output that means that they are not able to increase their funds, improve their loans and attract more borrower. So with scale efficiency they have to make effort to Improve their pure technical efficiency by utilizing there resources at optimal level. ***Annim (2010)*** Focus on MFIs efficiency measure through parametric Stochastic Frontier Analysis (SFA) and nonparametric (DEA) technique instead of production and intermediation approach, there is two main points in this study, first is microfinance scope with respect to financial and operation activities and second is to meet the MFIs objectives which is outreach and sustainability. And result identify element which effect the the sustainability of microfinance institutions ***(Kimando, 2012).***

Ahmad A. Q. (2006) uses combination of input and output and result indicate that MFI, s is specialized (technical) in nature which is essential requirement for any micro money related establishment achievement. ***Begone Gutierrez (2007*** Which revealed that the classical ratio analysis is not efficient like DEA efficiency, by examining the performance and productivity changes of MFBs, the study noticed a steady growth in the operations of the MFBs but there are lots of opportunities for progress? The performance indicators of the MFBs shows that return on assets (ROA) and return on equity (ROE) of the MFIs were beneficial indictor for any MFI but at high interest rates. The Malmquist productivity index showed variation in the technical and technological changes as the MFIs had more distinct changes in their technical productivity changes than their technological productivity changes. It was revealed that the MFBs experienced technological productivity decline. Overall, the MFBs had alternating progress and deterioration all over forms of the constituents of their Total Factor Productivity Changes but had the best tendency in their scale efficiency change. ***(Musa A. Olasupo, 2014)***

(Tahrim, 2013) investigate the efficiency and productivity change of microfinance institutions by data envelopment approach **(DEA)** with dynamic malmquist productivity index (MPI) and concluded that technological change have strong impact on the productivity change which eventually improve the efficiency.

(Gebremichael B. Z., 2012) Using the malmquist productivity index **(MPI)** to calculate the productivity of MFI, s and result of study indicated that MFI, s have practiced an augmentation of pure technical efficiency (advancement in management practices) instead of a change in ideal size. So in order to meet double bottom line objective they need to seek a technological advancement.

(Ahmad T. M., 2010)Examines the specialized productivity level of microfinance establishments result demonstrates that there few microfinance foundations are working effectively and its show Experience (Age) of the microfinance institution is imperative determinants of effectiveness level yet estimate does not make a difference. Additionally mean proficiency of microfinance establishments are low which demonstrates that microfinance foundations can build their yield by the same measure of inputs and Innovation. Besides come about demonstrates that there is no trade-off in the middle of effectiveness and effort in the event of specimen of microfinance establishments included in the study. It has been observed that huge measure of local variety exist in proficiency level of microfinance institutions. ***(Siti Nurzahira Che, 2003)*** Examine the effectiveness of microfinance organization by Using a nonparametric methodology which empowers to recognize technical efficacy along with pure and scale efficiencies. Result shows that the Technical efficiency of the microfinance institutions is moderately higher than the other counterpart. Then again, amid this study pure technical efficiency is lower than the scale efficiency that shows the microfinance institution has been inefficient in controlling their expenses as opposed to working at the wrong scale. However interestingly, a few MFI, s shows unadulterated specialized effectiveness is higher than scale productivity demonstrating that microfinance establishments which are working at the wrong scale of operation instead of delivering beneath the production frontier.

(KABLAN, 2012) Examine the role of MFIs and banks in outreaching, the study make effort to find out that either this change support sustainability or outreach. Social efficiency and financial efficiency of the MFIs are examined through DEA .The evidence shows that sustainability exist and financial efficiency and social efficiency have inverse relation. MFIs which focus on outreach is low efficiency, when one regard as their intermediation role. Development have dual impacts on both efficiency, a negative on social efficiency but a positive on financial efficiency and prudential ratios and accounting standards help MFIs in their intermediation role.

(Ines Ben Abdelkader, 2014) Assess the execution of microfinance organizations by applying non parametric DEA methods. The assessed results demonstrate that efficacy level in most of countries decreased during the study period and it indicated that the efficiency level in NGO, s are greater than Nonbank financial institutions NBFIs.

As indicated by ***(Jayamaha, 2009)*** assess the general proficiency by utilizing Data envelopment analysis (DEA). All of these efficiencies (Technical, Pure Efficiency and Scale Efficiency) are build by diverse models on basis of size as well as location And result conclude that the geographical locations have significant differences in their efficiency. And an interesting face is observed that the efficiency of banks is closely associated with size of the banks. Finally, the findings of this study may convince industry decision makers to set up more inclusive policies for promoting CRBs activities in the financial sector and survival of the institutions.

While contradictory to this statement ***(Hidenobu Okudaa, 2014)***Use operating and the value added approach and Malmquist productivity index technique and make statement that the technical Efficiency was greater in large banks than in small banks. These observations indicate that large banks made better use of operational resources than small banks while examining technical efficiency and productivity of domestic and foreign financial institution. No doubt size of MFI,s have strange impact on efficiency of MFI,s but the fund mobilization capability of financial institutions cant neglect so result shows the efficiency level of domestic institutions was more effective than foreign corresponding institutions. When operational approach is applied which focused on the income earning capacity of institutions which is also major factor on which MFI,s efficiency depend so result shows that there was no major difference in technical efficiency between domestic and foreign institutions . It was also observed that financial institutions suffered a slight drop in total factor productivity FTP during the research time frame in Cambodia. So these result suggested that technical efficiency must b enhance in Cambodian financial institutions to improve their operational capacity of individual institutions, advanced banking technologies and skills.

(Lamberteb, 2003) have used stochastic frontier analysis, a parametric technique to measure the Philippines of cooperative rural banks efficiency level .so conclude that governance have great impact on MFI,s efficiency and according to their finding the cooperative rural bank who are working under good governance were more efficient then the other who are facing bad governance.

Similarly, ***(Ahmad T. M., 2010)*** applied a stochastic frontier model to measure the productivity level of Indian MFI, s amid period 2005–2008. And found that the efficiency level is not attractive but during study period its shows increasing trend. Further, the study found that age of MFI, s has a positive impact on productivity but size did not really effect.

Moreover ***(Eric FosuotengAbayie, 2011)*** use stochastic frontier approach to gauge the economic effectiveness of microfinance organization and reasoned that the main source of inefficiencies in the microfinance division are because of the variety in administration practices and specialized limits (both in training and portfolio quality).Along these lines proposed that experts enhance technical efficiency and firms should try to work broadened funds items to enhance portfolio quality and ensure sustainability; as opposed to depending enormously on subsidies fund from donor agency or on lending credit offices from government agencies and other second tier organization .We additionally require an adaptable approach that will take into account all micro finance foundations to have the capacity to get deposits from clients.

To find out the answer, is there any trade off between outreach to poor people and efficiency of MFI, s? ***(Niels Hermes, 2008)*** Use stochastic frontier analysis SFA and concluded that efficiency and outreach of MFI, s are negatively correlate with each other. Furthermore, when we take both of these as a depth to reach measure it is found that more female as borrowers are least effective for MFI, s and they have low average loan balance. So study recommended that efficiency can be increased when MFI,s are stick to least focusing on poor people as well female borrower .but keep in mind that our result not necessarily imply that strong focus on efficiency badly effect the poverty reduction.

In the same way, ***(Oteng-Abayie, 2011)*** applied a Cobb–Douglas Stochastic frontier model for Ghana MFIs for the period from2007 to 2010. They found an average economic efficiency of average; And identify some of key significant determinants of economic efficiency which are cost per borrower and age and saving are key indicator of outreach and productivity.

Ahmad A. Q., 2006) use the DEA efficiency analysis and consider 25 MFIs, that is functioning in Pakistan, India and Bangladesh which is part of SAARC region on efficiency scores and result concluded that most of inefficiency is technical in nature so MFI, s related to these three SARRC

nation should enhance the managerial expertises and technology utilized as a part of offering service in order to improve their efficiency level.

Similarly, ***(Ferdousi, 2013)*** Findings exposed that among the three countries, MFIs in Bangladesh are enjoying comparatively greater economies of scale. On the other hand average source of inefficiency was purely technical in nature than to the scale inefficiency for all the countries. Therefore, improved management skills are required in order to ensure the efficiently utilization of available input resources to enhance increased outreach and performance of MFIs. However, size of MFI, s are also vital factor for determination MFIs efficiency. Secondly MFIs return on assets (ROA) should be positive, otherwise it becomes inefficient.

The assessment of effectiveness of MFI, s in the Mediterranean nations ***(Bassem, 2008)*** utilizing Malmquist productivity index approach. The determination of inputs and output are on the premise of the dual objectives concept of MFIs achieving self-sufficiency by taking care of its expenses and arriving at numerous poor customers (outreach).The result demonstrated that MFIs have encountered mainly an addition of pure technical efficiency (improvement in management practices) Instead of a change in ideal size. Overall, an essential strategic implication for the micro finance industry is that they need innovative progress to meet the double objective reaching the poor people and financial sustainability.

(K.M. Zahidul Islam, 2011) using DEA analysis to examine the efficiency of agricultural microfinance borrowers in rice farming in Bangladesh and concluded that that inefficiency is caused by farm-specific and institutional variables And the result shows that in estimation models technical TE and scale efficiency SE are high then allocative efficiency AE and economic efficiency EE .so it is suggested that they have to develop some indicative policy guideline to minimize cost to improve their efficiency.

(Mamiza Haq M. S., 2010) using DEA ansylsis to examine cost efficiency of MFI, s in Africa, Asia and Latin America under both production and intermediate approches.so result shows that under production approach non-governmental institute are more efficient and under intermediate approach banks MFI, s are more efficient and its is possible in long run banks may performing as non-governmental microfinance institution in lone run.

(Hong Son Nghiem, 2006) Use both parametric and nonparametric methodology. The usage of the two methodologies prompts comparative assessments/ scores of the MFI, s productivity.

(Kipesha, 2012) evaluate the efficiency of microfinance institutions (including banks, NBFIs, NGOs and Cooperatives) which operating in East African countries and result found that East African MFI,s are highly efficient and average efficiency shows positive trend. Furthermore result shows that bank and non bank institutions are working more efficiently then NGO, s and cooperatives. To identify reason behind the failure of the microfinance schemes under poverty alleviation ***(Khatoon, 2014)*** make their effort and indicate that low recovery process, high rate of interest, multiple loans and corruption in the government sector was some major Obstacles of microfinance institution .These obstacles automatically lead to low repayment rates, as a result microfinance institutions face losses and the MFI,s that are more dependent on bank as funding source, have to face liquidation crunch when they stop lending money to them but Still there is few private micro finance institutions are running based on the same rate of interest and proper recovery strategies. Indian microfinance market is the most evolved and developed market in the world.

The growth strategy is key factor for any MFI, s success. So the impact of growth strategy on performance of the microfinance sector should be examined to strike the two bottom line concept and create a balance between outreach and poverty alleviation. So result suggested that in initial stage of development intensive growth strategy is more effective in term of cost efficient ether then extensive strategy which involves huge investment in infrastructure as well branch network. This will help us to enhance productivity, efficiency and performance. Although the microfinance sector adopted an extensive growth strategy which indicate improvement in outreach and performance indicator but the negative point is it will raise overall cost per borrower as a result the productivity ratios will drop. The most likely reason for weak financial position of the sector is the wrong and costly growth strategy of over expansion which badly affected the cost and productivity of the sector ***(Mahmood, 2009)***.

(Marek Hudon, 2011)Examine the subsidies affect on MFI, s efficacy and results recommend that subsides have positive effect on MFI, s productivity, but over-subsidization harmful for MFI, s growth. In sample MFI, s which get subsides they have greater productivity level than the MFI, s that are not subsides.

Furthermore ***(Balkenhol, 2007)*** idea that the impact of subsides relies on upon their intensity. On one hand, the subsides play very important role to increase MFI,s efficiency, by providing the liquidity to develop the human and physical infrastructure .This effect dominant at lower levels of subsidy intensity which in turn lend to uphold the "smart subsidies" idea, that take into account the intensity and magnitude of the subsidies.

The most notable researches conducted on MFIs and Non-Bank Financial Institutions (NBFIs) productivities are by ***(Gebremichael B. R., 2007)*** and ***(Sufian, 2007)***using the Malmquist productivity index approach and suggesting that pure technical efficiency has largely contributed to MFI and NBFI technical efficiency progress. By using production approach with combination of three input and two output variables.

DATA AND METHODOLOGY

MFIs in the SAARC region are investigated in the study. In SAARC region most of the countries are developing where the poor is in need of microfinance. Also the idea of microfinance is originated from SAARC region which makes it a more localized concept. So the selection of SAARC region will be sagacious criteria for sample selection. The MFIs level variables are gathered from MIX data base ***(www.mixmarket.org)***, a nongovernmental association whose objective is to advance the exchange of information on the microfinance sector around the world. This database gathers data on 85 MFI, s working according to international standards from six countries of SAARC .We chose 85 MFI, s with the most elevated amounts of information transparency. The specimen is made out of Afghanistan Bangladesh, India, Nepal, Pakistan and Sri Lanka. It covers six SAARC nations. The most recent information for the selected MFI, s dates from 2003 to 2011.

The Malmquist productivity index

In the academic financial literature, there are number of different methods like Fisher index, Tornqvist index and the Malmquist Index are adopt to compute the productivity changes but The Total Factor Productivity (TFP) Index is commonly used to evaluate the productivity and efficiency level.

(Lovell, 1996) Identify that the Malmquist index has three fundamental benefits as compare to the other index. Firstly, the institutionist paradigm approach (profit maximization, or the cost minimization, assumption) is not compulsory. Secondly, information related to input and output prices are not required. Finally, in this index researcher use panel data, it allows the decomposition of productivity changes into two components firstly technical efficiency change, and secondly technical change. Its main disadvantage is it's required to compute the distance functions.

However, the Data Envelopment Analysis (DEA) technique can overcome this problem efficiently. Due to following three basic reasons, we have selected the malmquist productivity index (MPI) to examine productivity change in SAARC MFIs and also estimation the productivity change of decision making units (MFI, s examined) between two time periods. It is combination of catch-up and frontier-shift terms. Catch-up or recovery is a term which related to decision making unit (DMU) improves or worsens efficiency; frontier shift or innovation is a term which show the change in the efficiency its frontiers between the two time periods ***(CooperWilliam, 2007)*.**

The malmquist productivity index has one interesting feature that is split into technical efficiency change index and a technical change index. Therefore, the MFI's productivity change can be credited to either change in technical Efficiency (whether MFIs are getting closer to the production frontier over time) or change in the technology (whether the production frontier is moving away over time), technological progress in the industry, or both. The Malmquist index also interpreted as an index of total factor productivity. The total factor productivity change (TFP) is the product mix of technical efficiency change and technological change (TC). It considers whether firms are endeavouring exertions for productive use of resources to create products and services and whether the current technology has been supplanted with most recent technology for well maintained production. A quality that is more noteworthy than one demonstrate increments in profit, while a value less than one indicates diminishes in productivity over time. Technical efficiency change (TEC) further separation into unadulterated pure technical efficiency (TE) which alludes to the MFI's capacity to dodge squander by producing as much output as input usage permits, or by utilizing as limited input for maximum output generation and scale efficiency change (SE) which alludes to the MFI's capacity to work at its ideal scale with respect to the frontier .The Malmquist productivity index was engaged in to quantify the

productivity change of MFI,s between two data point by computing the proportion of the distances of every data point relative toward a typical technology of one time period with the technology of an alternate time period by blending inputs and output of both time period.

Selection of Input and Output:

Production function basic purpose is to indicate the maximum amount of output firm can deliver from by use a defined set of inputs efficiently and other applicable variables that may clarify the amount of output produced. In the literature of MFI, s efficiency, researchers view as three broad methodologies which are intermediation, production and assets approach. The first one methodology is intermediation approach which considers financial institution as intermediaries of funds among depositors and investors. Under this methodology, deposits are working as inputs (raw material) which convert into lone and funds ***(Ashton, 1998), (Günter Lang, 1996) (Lindley, 1977)***.The second one is the production approach which considers financial institution as loans producers as well services provider to account holders. Therefore, deposit considered as output in light of the fact that they include the formation of value added associated with liquidity, safekeeping and provide instalment service to investor ***(Benston, 1982), (Hunter, 1986)***. At long last third approach is the assets approach which means that financial institution purpose is to create loan (advance). In this methodology estimate of financial institutions be a sign of output.

We adopt ***(Fare, 1994)***, output-oriented Malmquist Productivity Change Index, which emphasize on the equi-proportionate increase of input and output. This methodology is select on the basis of dual objective which is depth to outreach and financial stability by offering loan to the poor people and collect revenue from the lender which not only fulfil their social objective as well their organizational objective (financial stability).Additionally they not only take up an imperfect economic environment as the markets for MFIs but also developed as the conventional banking sector and these MFI, s have limited resources (money, human resource) which they spend on commercial banks to generate revenue from shareholders ***(Ahmad N. , 2010)***.

On the basis of literature and Pattern (which we followed of **(begone gutierrez, 2007)** and ***(Bassem, 2014))*** we select two input and two output which are the number of employees, operating expense, gross loan portfolio, and number of loans outstanding.

RESULTS AND DISCUSSIONS

By following ***(Fare, 1994)*** the Malmquist total factor of productivity (FTP) change index has been calculated. The basic rule that is followed for evaluation is if the total factor of productivity index is more than one it means micro finance institution are working efficiently But if the value of TFP is less than one that means efficiency is declining during the study period. When we are talking about the productivity its is product of technical efficiency and technological efficiency which express as TFP = TC × TEC. Technical efficiency means that how efficiently an input are transformed into output without waste and technological efficiency change means and its is split into two component scale efficiency change (SE) and pure efficiency change (TE) expressed as TEC = TE × SE and it shows overall productivity change in the micro-finance industry of the SAARC countries.

The table summary of annual means and chart of TFP shows that overall, microfinance industry has reported general productivity regress during the study period despite the fact that all the SAARC MFI,s have positive TFP development except for the year 2005-2006,2007-2008,2008– 2009. Furthermore, the result shows that the average technical efficiency annual rate is 3.9% while there is alarming indication for technological change so attention is required. furthermore, table of malmquist index summary of firm means result demonstrate that 65 out of 85 MFI,s (around 76%) has indicated change in specialized productivity changes. interestingly, just 21 out of 85(25%) MFI,s have indicated change in innovative (technological) change and study recommended that there has been a decline in the execution of the best rehearsing micro fund organizations and overall only 45 out of 85 microfinance institutions shows positive total factor of productivity index(TFP) growth. Now If the technical efficiency change is decompose into pure technical efficiency and scale efficiency result illustrate that during study time frame , pure technical efficiency increased by 0.7%while scale efficiency Contributed on average 0.11% increase and subsequently recommended that amid the study period the SAARC MFI,s have encountered predominantly an augmentation of pure technical efficiency improvement in management practices) instead of change in optimum size (scale efficiency change).

CONCLUSION

The current study was conduct to examine productivity change in south Asian MFIs over the period of 2003–2011 using the Malmquist productivity index and a balanced panel dataset of 85 MFIs. The inputs and outputs are selected on the basis of dual objectives of MFIs: achieving self-sufficiency by covering its costs and reaching many poor clients (outreach). Therefore, we specify number of employees, and operating expenses as inputs and gross loan portfolio and as number of loans outstanding. The exact discoveries of the study demonstrate that the microfinance business has reported general productivity regress in the study period despite the fact that all the SAARC MFI,s have positive TFP development except for the year 2005-2006,2007-2008,2008– 2009.

Furthermore, our study indicates that the main wellspring of total factor of productivity TFP development for the MFI,s was ascribed to the technical efficiency change (3.9 percent increment) as the result demonstrate that 65 out of 85 MFI,s (around 76%) has indicated change in specialized productivity changes. Interestingly, just 21 out of 85(25%) MFI, s has indicated change in innovative (technological) change and study recommended that there has been a Decline in the execution of the best rehearsing micro fund organizations. furthermore the result demonstrated that pure technical efficiency by 3.1 percent while scale effectiveness helped generally 0.8 percent expansion and subsequently recommended that amid the study period the SAARC MFI,s have encountered mostly an augmentation of unadulterated specialized productivity(change in administration hones) instead of a change in ideal size(scale productivity change). For the most part, a paramount ramification for the SAARC micro money industry is that they have to seek after a mechanical advancement to meet the double bottom line objective of reaching many poor people and budgetary maintainable quality.

Our discovery lends solid backing to past studies directed by ***(Geeta Krishnasamy, 2004)*** , ***(Sufian, 2007)***, ***(Bassem, 2014)***, ***(Hidenobu Okudaa, 2014), (Musa A. Olasupo, 2014)*** and ***(Bereket Zerai Gebremichael, 2012)***purposing that Generally, a vital implication for the SAARC micro finance industry is that they have to increase technological progress to meet the dual objectives of reaching many poor people which is welfarist side and financial sustainability which is survival of any MFI,s.

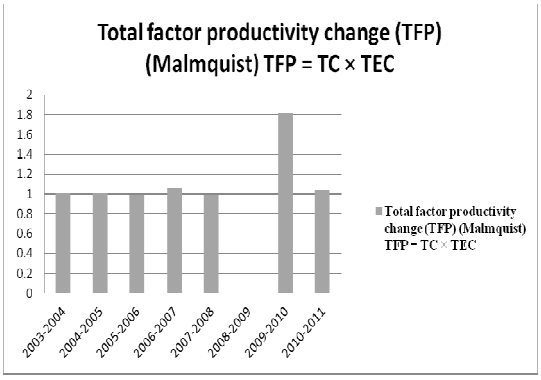
Annual Means Summary by Malmquist Index

Years	Technical efficiency change TEC = TE × SE	Technological change (TC)	Pure technical efficiency Change TE)	Scale efficiency change (SE)	Total factor productivity change TFP = TC × TEC
2003-2004	1.046	0.962	0.915	1.143	1.006
2004-2005	1.134	0.891	1.194	0.950	1.010
2005-2006	1.120	0.886	1.056	1.060	0.992
2006-2007	0.815	1.303	0.876	0.930	1.062
2007-2008	1.103	0.900	1.107	0.996	0.992
2008-2009	0.794	0.000	0.861	0.922	0.000
2009-2010	1.278423	1.809	1.195	1.069423	1.809
2010-2011	1.125	0.922	1.111	1.013	1.038
Mean	1.039	0.000	1.031	1.008	0.000

FIRM MEANS SUMMARY BY MALMQUIST INDEX

Firms	Technical efficiency change TEC = TE × SE	Technological change (TC)	Pure technical efficiency Change (TE)	Scale efficiency change (SE)	Total factor productivity change (TFP) (Malmquist) TFP = TC × TEC
1	0.986	0.908	1.000	0.986	0.895
2	0.866	0.971	0.834	1.038	0.840
3	1.084	0.926	1.119	0.969	1.004
4	1.019	0.943	1.048	0.972	0.961
5	1.087	0.929	1.096	0.992	1.011
6	1.042	0.923	1.045	0.996	0.962
7	1.019	0..919	1.007	1.011	0.936
8	1.114	1.040	1.164	0.957	1.158
9	1.055	0.969	1.054	1.001	1.022
10	1.075	1.012	0.991	1.085	1.089
11	0.992	1.014	1.000	0.992	1.006
12	1.069	0.966	1.100	0.972	1.033
13	1.037	0.884	1.034	1.003	0.917
14	1.059	0.926	1.076	0.984	0.981
15	0.840	0.920	0.908	0.926	0.773
16	1.083	0.943	1.051	1.031	1.022
17	1.026	1.004	1.008	1.017	1.030
18	0.945	0.988	0.942	1.003	0.934
19	0.994	0.915	0.925	1.075	0.910
20	1.105	0.963	1.172	0.943	1.064
21	1.187	1.019	1.228	0.967	1.210
22	1.016	1.015	1.000	1.016	1.032
23	1.049	0.989	0.999	1.050	1.038
24	1.076	0.996	1.146	0.938	1.072
25	0.927	0.968	0.919	1.009	0.897
26	1.041	0.989	0.991	1.051	1.030
27	0.986	1.022	0.954	1.033	1.007
28	1.055	0.901	1.060	0.996	0.951
29	0.993	0.965	0.906	1.029	0.900
30	0.982	0.965	0.967	1.015	0.947
31	1.022	0.941	1.012	1.010	0.962
32	0.991	0.945	0.984	1.007	0.936
33	1.114	1.035	1.060	1.051	1.153
34	0.975	0.999	0.961	1.014	0.974
35	0.978	0.965	0.979	1.000	0.944
36	1.078	0.959	1.092	0.987	1.034
37	1.000	0.964	1.000	1.000	0.964
38	1.034	0.963	1.103	0.938	0.996
39	1.075	1.001	1.111	0.968	1.077
40	1.159	1.025	1.110	1.044	1.188
41	1.041	0.949	1.000	1.041	0.989
42	1.128	1.008	1.215	0.928	1.137
43	1.033	0.987	1.029	1.003	1.020
44	0.973	0.991	1.001	0.972	0.964
45	1.008	0.910	1.004	1.005	0.917
46	1.046	0.967	1.026	1.020	1.012
47	1.077	1.027	1.111	0.969	1.105

48	1.105	0.970	1.121	0.986	1.072
49	1.000	0.915	1.000	1.000	0.915
50	1.012	0.999	0.995	1.016	1.010
51	1.109	0.949	1.000	1.109	1.053
52	0.987	0.954	0.983	1.005	0.942
53	1.103	0.980	1.122	0.983	1.080
54	1.110	1.017	1.112	0.998	1.129
55	1.010	0.911	1.014	0.997	0.920
56	1.046	0.991	1.040	1.005	1.036
57	1.043	0.995	1.069	0.976	1.037
58	0.998	0.923	0.968	1.031	0.921
59	1.003	1.017	0.978	1.026	1.019
60	1.042	0.969	1.000	1.042	1.009
61	1.028	NaN	1.050	0.979	NaN
62	1.091	0.964	1.018	1.072	1.053
63	1.023	0.935	1.014	1.008	0.956
64	1.043	1.008	1.064	0.980	1.051
65	1.046	0.978	1.070	0.978	1.023
66	1.020	1.013	1.000	1.020	1.033
67	1.433	1.036	1.419	1.010	1.485
68	1.013	0.974	1.000	1.012	0.986
69	1.147	1.011	1.156	0.992	1.160
70	0.987	0.949	1.038	0.951	0.937
71	1.026	1.003	0.997	1.029	1.029
72	1.030	0.956	1.027	1.003	0.984
73	1.105	0.965	1.073	1.030	1.066
74	0.952	0.962	0.939	1.014	0.916
75	1.089	0.976	0.971	1.121	1.062
76	0.962	0.940	0.960	1.002	0.904
77	1.003	0.974	0.974	1.030	0.977
78	0.991	0.900	0.964	1.027	0.891
79	1.151	0.947	1.100	1.046	1.090
80	1.067	1.001	1.039	1.026	1.067
81	1.044	0.953	1.038	1.005	0.995
82	1.018	0.952	0.893	1.140	0.969
83	1.098	0.988	1.080	1.017	1.085
84	1.022	1.013	0.982	1.041	1.035
85	1.044	0.947	1.032	1.012	0.989
Mean	1.039	NaN	1.031	1.008	NaN
	65/85	21/85	59/85	55/85	45/85



ABBREVIATIONS

TEC- technical efficiency change
TC-technological change
TE-Pure technical efficiency Change
SE-Scale efficiency change
MPI- Malmquist Productivity Index
SARRC-South Asian Association for Regional Cooperation
AE- Allocative efficiency
CRS- Constant returns to scale
DEA- Data Envelopment Analysis
DRS- Decreasing returns to scale
EE- Economic efficiency
IRS- Increasing returns to scale
MFI -Microfinance Institution
NGO- Non-governmental Organisation
SFA- Stochastic Frontier Analysis
TFP-total factor of productivity index
UNDP- United Nations Development Program
VRS- Variable returns to scale
DFI -development financial institutions
NBFI-Non-Bank Financial Institutions

REFERENCES

(n.d.). Retrieved from www.mixmarket.org.

Ahmad, A. Q. (2006). Efficiency and Sustainability of Micro Finance. *Pakistan Institute of Development Economics (PIDE)* , 1-37.

Ahmad, N. (2010). Efficiency and productivity of microfinance: incorporating the role of subsidies. *Retrieved from https://dipot.ulb.ac.be/dspace/bitstream/2013/56753/1/RePEc_sol_wpaper_10-009.pdf.*

Ahmad, T. M. (2010). *Munich Personal RePEc Archive* , 1-21.

Ahmad, T. M. (2010). Technical Efficiency of Microfinance Institutions in India- A Stochastic Frontier Approach. 1-21.

Anne-Lucie Lafourcade, J. I. (2005). Overview of the Outreach and Financial Performance of Microfinance Institutions in Africa. 1-22.

Anne-Lucie Lafourcade, J. I. (2005). Overview of the Outreach and Financial Performance of Microfinance Institutions in Africa. 1-20.

Annim, S. K. (2010). Microfinance efficiency trade-offs and complementarities. 1-32.

Ashton, J. (1998). Technical change in the UK retail banking sector: 1984-1995. *Applied Economics Letters , 5*, 737-740.

Balkenhol. (2007). Microfinance and public policy. Outreach, performance and efficiency. *Palgrave Edition* .

Bassem, B. S. (2008). Efficiency of Microfinance Institutions in the Mediterranean: An Application of DEA. 343-352.

Bassem, B. S. (2014). Total factor productivity change of MENA microfinance institutions A Malmquist productivity index approach. *ScienceDirect Economic Modelling* , 1-8.

Baumann, T. (2005). Pro poor microcredit in South Africa: cost efficiency and productivity. 95-118.

begone gutierrez, c. s. (2007). Microfinance institutions and efficiency. *Elsevier* , 131-142.

Benston, G. H. (1982). Scale economies in banking: a restructuring and reassessment. *J. Money Credit Bank , 4*, 435-456.

Bereket Zerai Gebremichael, D. L. (2012). Total factor productivity change of ethiopian Microfinance Institutions (MFIs): A Malmquist Productivity Index Approach. *European Journal of Business and Management* , 105-114.

CooperWilliam, W. S. (2007). Data Envelopment Analysis A Comprehensive Text with Models, Applications, References and DEA-Solver Software.Springer, New York.

Eric FosuotengAbayie, K. A. (2011). The Measurement and Determinants of Economic Efficiency of Microfinance Institutions in Ghana: A Stochastic Frontier Approach. *African Review of Economics and Finance , 2*, 149-166.

Fare, R. G. (1994). Productivity growth, technical progress, and efficiency change in industrialized countries. *American Economic Review* , 66-83.

Farrington. (2000). Efficiency in microfinance institutes. Micro Bank. Bull. 8-23.

Ferdousi, F. (2013). Performance of Microfinance Institutions in Asia DEA based efficiency analysis. 91-94.

Gebremichael, B. R. (2007). Total factor productivity change of ethiopian microfinance institutions (MFIs): a malmquist productivity index approach (MPI). *Elsevier Science* , 105-114.

Gebremichael, B. Z. (2012). Total Factor Productivity Change of Ethiopian Microfinance. *European Journal of Business and Management* , 1-11.

Geeta Krishnasamy, A. H. (2004). Malaysian post-merger banks' productivity: application of Malmquist productivity index. *Managerial Finance , 30*, 63-74.

Goswami, R. &. (2013). A scientometric analysis of literature on performance assessment of microfinance institutions (1995-2010). *International Journal of Commerce and Management* , 148-174.

Günter Lang, P. W. (1996). Efficiency and technical progress in banking Empirical results for a panel of German cooperative banks. *Journal of Banking & Finance* , 1003–1023.

Hidenobu Okudaa, C. P. (2014). Operational Efficiency and TFP Change of Major Cambodian Financial Institutions. 1-22.

Hong Son Nghiem, T. C. (2006). THE EFFICIENCY OF MICROFINANCE IN VIETNAM: EVIDENCE FROM NGO SCHEMES IN THE NORTH AND THE CENTRAL REGIONS. *International Journal of Environmental, Cultural, Economic and Social Sustainability* , 71-78.

Hunter, W. T. (1986). Technical change, organizational form, and the structure of bank production. *J. Money Credit Bank , 18*, 152–166.

Ines Ben Abdelkader, S. H. (2014). Microfinance Institutions' Efficiency in the MENA Region: . *Research Journal of Finance and Accounting* , 1-13.

Jayamaha, A. (2009). Efficiency of Small Financial Institutions in Sri Lanka. *Journal of Emerging Trends in Economics and Management Sciences* , 1-12.

K.M. Zahidul Islam, S. B. (2011). Technical, Economic and Allocative Efficiency of Microfinance Borrowers and Non-Borrowers: Evidence from Peasant. *European Journal of Social Sciences* , 361-377.

KABLAN, S. (2012). Microfinance efficiency in the West African Economic and Monetary Union:have reforms promoted sustainability or outreach? *Munich Personal RePEc Archive* , 1-32.

Khatoon, D. N. (2014). FINANCIAL INCLUSION- HOW EFFECTIVE IS MICRO FINANCE? *Abhinav International Monthly Refereed Journal of Research in Management & Technology* , 38-42.

Kimando, K. N. (2012). Factors Influencing the Sustainability of Micro-Finance Institutions in Murang'a Municipality. *International Journal of Business and Commerce* , 21-45.

Kipesha, E. F. (2012). Efficiency of Microfinance Institutions in East Africa: A Data Envelopment Analysis. *European Journal of Business and Management* , 1-12.

Kipesha, E. F. (2012). Efficiency of Microfinance Institutions in East Africa: A Data Envelopment Analysis. *European Journal of Business and Management* , 1-12.

Lamberteb, M. D. (2003). Efficiency and expense preference behavior in Philippines' cooperative rural banks. 3-21.

Lindley, C. W. (1977). Inputs, outputs and a theory of production and cost at DEPOSITORY FINANCIAL INSTITUTIONS. *The Journal of Finance* , *32*, 1251–1266.

Lovell, G.-T. a. (1996). Deregulation and productivity decline: the case of Spanish savings banks. *European Economic Review* , *40*, 1281-1303.

Mahmood, S. A. (2009). GROWTH AND PERFORMANCE OF MICROFINANCE IN PAKISTAN. *Pakistan Economic and Social Review* , 99-122.

Mamiza Haq, M. S. (2009). Efficiency of Microfinance Institutions: A Data Envelopment Analysis. *Asia-Pacific Financial Markets* , 1-13.

Mamiza Haq, M. S. (2010). Efficiency of Microfinance Institutions: A Data Envelopment Analysis. *Pakistan Institute of Development Economics (PIDE)* , 1-13.

Marek Hudon, D. T. (2011). On the Efficiency Effects of Subsidies in Microfinance: An Empirical Inquiry. *World Development* , *39*, 966–973.

Musa A. Olasupo, C. A. (2014). PERFORMANCE AND PRODUCTIVITY CHANGES OF MICROFINANCE BANKS IN SOUTH-WEST, NIGERIA. *International Journal for Innovation Education and Research* , 43-51.

Niels Hermes, R. L. (2008). Outreach and Efficiency of Microfinance Institutions. 1-29.

Oteng-Abayie, E. A. (2011). The measurement and determinants of economic efficiency of microfinance institutions in Ghana: a stochastic frontier approach. *Elsevier Science* , 1-18.

Otero, M. (1998). Types of owners for microfinance institutions . *Ownership, Competition and Control of Microfinance* .

Sanchez, M. K. (2009). Efficiency Analysis of Microfinance Institutions in Developing Countries. 1-22.

Siti Nurzahira Che, T. A. (2003). Efficiency Analysis of Microfinance Institutions in ASEAN: A DEA Approach. *Business Management Dynamics* , 13-23.

Sufian, F. (2007). Total factor productivity change in non-bank financial institutions: Evidence from Malaysia applying a malmquist productivity index (MPI). *Elsevier Science* , 177-186.

Tahrim, I. M. (2013). Efficiency Analysis of Microfinance Institutions in ASEAN: A DEA Approach. *Business Management Dynamics* , 13-23.

Tahrim, I. M. (18 June 2014). Efficiency and Productivity Analysis of Microfinance Institutions in Cambodia: A DEA Approach. *Proceedings of Eurasia Business Research Conference* , 1-20.

Yaron, J. (1994). What Makes Rural Finance Institutions Successful? *The World Bank Research Observer* , *9*, 49-70.