



INDIAN INSTITUTE OF FOREIGN TRADE

W.P. No : EC - 15 - 27
February 2015

Working Paper

*Total Factor Productivity of
Indian Microfinance
Institutions*

*Bibek Ray Chaudhuri
Shubhasree Bhadra*

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Printed and published by

Indian Institute of Foreign Trade

Delhi Centre

IIFT Bhawan, B-21, Qutab Institutional Area, New Delhi – 110016

Kolkata Centre

J1/14, EP & GP Block, Sector -V, Salt Lake, Kolkata - 700091

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Total Factor Productivity of Indian Microfinance Institutions

Bibek Ray Chaudhuri

*Shubhasree Bhadra*¹

Abstract

The present study attempts to empirically examine the total factor productivity change (TFPG) of Indian microfinance institutions, using balanced panel data set of 55 MFIs in India between 2008 and 2010. A non parametric Malmquist Productivity Index has been used for this purpose. Efficiency of Indian MFIs has been calculated based on production approach. It was found that technological change has played a significant role in increase of TFPG in the terminal year considered. Further, significant change of scale efficiency in terms of women borrowers also enhances TFPG. Moreover, it was found that operational self sufficiency, return on asset and lagged capital-asset ratio, are significant determinants of TFPG. PAR>30 was also found to be positively related to TFPG.

Key words: Productivity change, efficiency, microfinance institution, index number

JEL classification – D24, G21, C43

Corresponding Author

Bibek Ray Chaudhuri,

Assistant Professor, Indian Institute of Foreign Trade

Email-id –brchaudhuri@iift.ac.in

¹ Ph.D Candidate, Department of Business Management, University of Calcutta.

Introduction

In recent years, the term 'Financial Inclusion' is commonly used in debates & discussions related to development. Financial inclusion means delivery of financial services at affordable cost to the lower income segment of the society. Micro finance is one of the initiatives which can lead to inclusion of masses. World Bank Report (2012) reveals that only 50 percent of adults in India have access to formal financial institutions. For high-income economies the figure is 89 percent but for developing economies as a whole it is only 41percent. Global Findex Survey (2011) reveals that only 35percent of adults, of which 26 percent are women, have accounts at formal financial institutions. On the other hand, Microcredit Summit Campaign Report (2007) states that in 2006, 3,300 microfinance institutions reached 133 million clients with a microloan among which 93 million clients were fresh borrowers. Out of these clients 85percent were women. At the end of 2006, 79 million women among the poorest were served by microfinance services.

Microfinance Institutions (MFIs) thus mainly targeted women borrowers as client with dual objectives of higher financial inclusion through microfinance to women (vulnerable among the poor) as well as empowering women to achieve desirable social outcomes like education of children, improved health and sanitation etc. On one hand giving loans to women reduces default risks (compared to giving to men) and also improves the economic and social status of women. This is a win-win situation for both the MFIs and the borrowers.

In India, to cater to the first objective, Reserve Bank of India (RBI) appointed Nachiket Mor Committee on Comprehensive Financial Services for Small Businesses and Low-Income Households. The committee recommended that every adult in India should have a bank account by January 2016. Further credit to GDP ratio and total deposit and investment to GDP ratio of each district was recommended to increase to 50% and 65% at the rate of 10% and 12.5 %respectively by January 2020.

In India, to start with, Bank-led lending (SHG-Bank Linkage) was more popular. Here microfinance was an intermediate arrangement between formal and informal financial providers. Post-2004 lending by MFIs increased rapidly as Banks found it more convenient

to lend to these Institutions as a part of their Priority Sector obligations. As a result in India, total loan disbursed by the MFIs (NBFC-MFIs) is Rs. 92.81bn¹ whereas priority sector advance is Rs. 17.14bn (as on 31st March 2013, RBI) by public sector banks, private sector banks and foreign banks taken together. In Q3 of FY 2012-13, loan disbursed by MFIs (NBFC-MFIs) increased by 52%² and gross loan portfolio of the same grew by 29%³. In India, states like West Bengal Bihar, Assam, Tamil Nadu, Kerala and Uttar Pradesh have experienced high growth rate of microfinance services.

1. Objective of the paper

In this paper we attempt to understand the total factor productivity growth over time in the Indian microfinance industry. The introductory section shows that a lot is left to be achieved in terms of outreach. An enquiry into the operational efficiency is important to assess whether the targets are achievable within the specified dates. In India, financial inclusion has been accorded highest priority by the government and RBI. Measured in terms of percentage of population holding a bank account the figure is 40% for male and 33.33% for females. More alarming than these figures is the usage of the account which is a dismal 10% of our adult population (Microfinance State of the Sector Report, 2013). One of the major problems identified have been high opportunity cost of opening and operating such accounts. The problem has been tackled through formulation of policy of 'no-frills accounts', technology enabled models to provide door-step financial services like 'banking correspondents'. Due to high costs related to providing savings account and risks involved with correspondents model the process of inclusion had a modest movement. MFIs given their higher outreach can aid in financial inclusion through their branches. This additional channel has and can provide financial services to a large section of the poor population especially in the rural areas. To provide the services to more people and also remain sustainable these institutions need to be efficient. The sources of inefficiency by comparing them with best performers can provide clues to make these institutions more effective in providing the services. Existing data on MFIs across the years is used to calculate total factor productivity growth (TFPG) and its various components for these institutions.

To solve the problems infesting the microfinance sector RBI appointed a Committee chaired by Justice Malegam. The Committee submitted its report in January 2011 with a wide range of recommendations. The Committee suggested formation of a new kind of financial institution called NBFC-MFI. NBFC-MFI is defined as "A company (other than a company licensed under Section 25 of the Companies Act, 1956) which provides financial services pre-dominantly to low-income borrowers with loans of small amounts, for short-terms, on unsecured basis, mainly for income-generating activities, with repayment schedules which are more frequent than those normally stipulated by commercial banks and which further conforms to the regulations specified in that behalf "(RBI, 2011).The Report suggested some regulations, some criteria for NBFC-MFIs to maintain better financial health and also avoid the situations like Andhra Pradesh crisis.

The Committee imposed restrictions on both quantity of lending and rate of interest to be charged. Hence, to sustain their profitability within the existing regulations, MFIs have to look at reducing the cost of their services. One of the acceptable ways of doing that is through increasing productivity. Hence it is important to look at the best practices within the sector and then form an idea about how the sector as a whole can reach higher frontiers. Factors responsible for higher efficiency can be identified through appropriate methods. Identification of issues can provide insight to the MFIs and pin point policy support that may be required by them to grow at a sustainable rate in the future. Some of the studies which look at the relation between efficiency of the MFI and its sustainability may be looked at to form an idea about which variables to consider and what are the expected results. One of the recent studies in this area, Akinlabi et al (2012) showed a strong positive relationship between outreach and sustainability of Microfinance Banks in Southwestern Nigeria between the years 2005 and 2010. Through Granger Causality tests, the authors show that for greater outreach MFIs should improve sustainability. Hermes et al (2009) showed that outreach is negatively related to efficiency of MFIs. MFI with greater women borrowers which is a measure of the depth of outreach is found to be less efficient. Similarly study by Dhakal (2004) shows that MFIs with limited outreach have been facing difficulties to attain sustainability over the long run.

As sustainability is related to efficiency of MFIs the factors impacting the latter would critically impact the former. Thus a balance between the two would in the long run benefit the borrowers and help such institutions to fulfill their social obligations. Measurement of efficiency of MFIs and finding its relationship with its determinants can provide useful insights into their working and guide policy makers in this regard.

2. Literature Review

According to ILO (2007), efficiency of an MFI refers to efficient use of resources like human capital, asset of the MFI, subsidy, other funds of the MFI to produce outputs, measured in terms of gross loan portfolio and number of active borrowers. Efficiency is an important aspect of an MFI for a number of reasons. Firstly, resources like, labor, time, money, raw materials etc. all are scarce and limited in supply. Again donors are also unwilling to fund MFIs to the required level so that they can have the capacity to serve all poor clients (Rosenberg, 1994). Secondly, recent growth in microfinance sector across the world has increased competition among MFIs to get funds to finance their operations. On the other hand, the donors and the funders are interested in funding the MFIs who are sustainable and efficient (Barres et al, 2005). The increased competition among MFIs has resulted in lowering interest rate and operating more efficiently (Hermes et al, 2009). Thirdly, commercial banks and investors are interested to finance MFIs to fulfill their corporate social responsibility, and at the same time for investments which have attractive risk-return profile (Deutsche Bank Research, 2007). This increased interest of commercial players put pressure on MFIs to be sustainable and efficient. It helps organizations in setting their target through better management and to increase performance and profitability (Reynolds & Thompson, 2002).

Use of advance technology in micro finance sector helps to reduce cost and improve the quality of services (Kapoor,Ravi,& Morduch,2007; Rhyne & Otero, 2006). In some developing countries liberalization of financial market is also contributing to enhance efficiency and sustainability of MFIs (Hartarska & Nadolnyak, 2007). To capture double bottom line mission of the MFI, efficiency can be divided into two components – financial efficiency and social efficiency (Nieto et al 2009). Financial efficiency of microfinance institution is based on technical efficiency, which is based on the assumption that efficient

MFIs have higher productivity (Sanchez 1997). Financial efficiency of MFI can be viewed through two approaches – production approach and intermediate approach. Social efficiency is related to welfare policy and it evaluates ability of MFI to utilize resources to empower women especially to alleviate poverty.

But it is very costly to reach the poor because making small loans involve high transaction costs in terms of screening, monitoring and administrative cost per loan. So a unit of large loan is cheaper compare to a unit of small loan (Conning, 1999; Hulme & Mosley, 1996; Lapenu & Zeller, 2002; Paxton & Cuevas, 2002). This leads to the tradeoff between outreach and efficiency of MFIs. It is felt that to be an efficient and sustainable MFI, it has to compromise its traditional mission – to reach poor. This raises debate between welfarists and institutionalists. Welfarists give emphasis on the outreach goal (Hashemi & Rosenberg, 2006; Montgomery & Weiss, 2005; Woller, 2002) on the other hand institutionalists are in favor of sustainability and efficiency of MFI (Christen, 2001; Isern & Porteous, 2005; Rhyne, 1998). But both the schools have agreed that under certain conditions, outreach and sustainability may be compatible (Morduch, 2005).

A comprehensive study by Cull et al. (2007) with data set of 124 MFIs across 49 countries, finds evidence of trade off between outreach and efficiency – MFIs becoming larger shift their focus to wealthier borrowers. Cull et al. (2009) also provides evidence of trade off between outreach and commercialization. Hermes et al (2009) have tried to examine the relation between outreach and efficiency obtaining a negative relationship between the two based on a sample of 435 MFIs over 11 years from 1997 to 2007 across the globe. Further, the MFIs who have more women borrowers as clients are found to be less efficient.

Mwangi and Brown (2005) use cost per borrower and cost per saver as measure of efficiency for African MFIs. The study also mentions that regulated MFIs are more efficient as they are maintaining lower cost per borrower and lower cost per saver.

Varied methods have been used in the literature to calculate efficiency. A study by Guitierrez-Nieto, Serrano-Cinca and Molinero (2006) uses a non parametric approach

(Data Envelopment Analysis) to measure efficiency of 30 Latin American MFIs. The study shows that NGOs and non bank financial institutions are most efficient among the group of 18 MFIs. A paper by Hassan and Tufte (2001) uses stochastic frontier analysis to show Grameen Bank's branches managed by female are more efficient than those managed by male staff. Desrochers and Lamberte (2003) have used parametric approach to study efficiency of cooperative rural banks of Philippines and the study shows that rural banks which have good governance are more efficient than those banks which have bad governance. Similarly study by Leon (2001) reported that productivity of resources, governance and business environment contribute positively to cost efficiency of the Peruvian municipal banks. Baumann (2005) has also found positive relation between MFI efficiency and productivity. Lafourcade, Isern, Mwangi and Brown (2005) show that African MFI-staffs are highly productive as the number of borrowers and savers per staff member are among the highest in the World.

Regarding determinants of efficiency a study by Farrington (2000) identifies that 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 factors on which efficiency of MFIs depends.

In our paper to calculate productivity, we have used Malmquist total factor productivity index (Malmquist, 1953) based on Data Envelope Analysis. The technique is widely used for comparison of productivity growth across sectors & countries. Berg et. al (1992) used it in the context of deregulation of Norwegian Banking and Sathye (2002) in Australian banking. There are several studies, like, Toçi (2009) where Malmquist index have been used to calculate efficiency of banks in South-East Europe.

Ahmed Nawaz (2010) used DEA and Malmquist productivity index to calculate efficiency of MFIs in South Asia, Middle East & North Africa. Gross loan portfolio, financial revenue, financial revenue without subsidy and total subsidies (in case of negative financial revenue without subsidy value) was considered as output and total asset, operating expense, number of staff and total subsidies were considered as inputs for the analysis. The study shows negative association between subsidy dependence and efficiency of MFIs. Further as

outreach increases financial efficiency decreases. The study also pointed out that MFIs who were lending to poor borrowers were less efficient than those who were lending to well off clients. Aikaeli (2008) investigate efficiency of commercial banks in Tanzania using DEA. The paper examines technical, scale and cost efficiency of Tanzanian commercial banks. Ncube (2009) examines efficiency of South African banking sector applying stochastic frontier model. Kiyota (2009) provides comprehensive banking sector efficiency analysis of sub-Saharan African countries applying stochastic frontier approach and Tobit regression to estimate the determinants of productivity. Kamau (2011) investigates intermediation efficiency and productivity in the banking sector in post liberalization period in Kenya applying DEA and Malmquist productivity index.

From the literature two dimensions of MFI efficiency are unearthed. One is that competition among the MFIs creates pressure on themselves to reduce the rate of interest to be charged from borrowers and attempt to run their operations efficiently (may be to maintain their margins). On the other hand small loans are costlier than large loan. So, from demand side, if the MFI charges higher interest rate, borrower will shift to cheaper competitors as a result outreach of the MFI may fall. From supply side, an MFI can decide the rate of interest at which it can earn profit through providing financial services to the poor. Thus efficiency of the MFI is the factor which can impact its fortune. As the MFI runs its operation efficiently it can charge optimum rate of interest and it can both compete effectively and serve larger number of poor people provided additionally portfolio risk can also be managed. In this connection determinants of efficiency have also been accorded high importance in the studies related to MFI sector.

3. Methodology and Data

3.1 Methodology

In this paper we have used Mamlquist Productivity Index (MPI) to measure total factor productivity growth for the Indian microfinance industry. Total factor productivity is measured by the difference of growth rate of output and growth rate of inputs.

Data Envelopment Approach (DEA) has been used to calculate productivity growths of different MFIs across selected time period. Further to identify the factors responsible for productivity change we have used regression analysis.

Some MFIs have extremely high TFP growth rate. Presence of the outliers can give rise to the problem of heteroscedasticity. The learning effect may also give rise to this problem since as MFIs learn more and more about their operations, errors become smaller over time. Also skewness in distribution of one or more than one regressor is another source of heteroscedasticity. For efficiency calculation we have considered five inputs, amount borrowed by MFIs, equity of the firm, deposit taken by MFIs, operating expense and number of personnel working for production of financial services. So non-inclusion of other inputs also may give rise to the problem of heteroscedasticity. Thus White's test has been used to test the existence of the problem of heteroscedasticity in the data.

Once the existence of heteroscedasticity was confirmed a suitable model had to be selected to obtain efficient estimators in the presence of the problem. If number of observation (N) is large and time period (T) is small then random effect estimators are more efficient than fixed effect estimators (Taylor 1980). Here we have considered 55 MFIs over the period of 3 years (2008-2010). This large N and small T imply choice of REM over FEM. To be sure we have used Hausman test to justify the selection of REM over FEM.

The following generalized panel data model have been used

$$y_{it} = \sum_k \beta_k w_{it} + \sum_p \phi_p z_{ip} + \gamma x_{it} + \theta_i + \varepsilon_{it}$$

Where $i = 1, \dots, N$ and $t = 1, \dots, T$

Here y is dependent variable. The model includes θ_i for unit effect and a zero-mean transitory disturbance ε_{it} that varies over time and units. It has constant variance and is uncorrelated over time and across units. It is also uncorrelated to explanatory variables, $E(x_{it}, \varepsilon_{it}) = 0$ for all s, t . The causal variable of interest is x_{it} with parameter γ . The model also consider additional explanatory variables of two types - w_{it} ($k = 1, \dots, K$) which vary over time and across units and z_{ip} ($p = 1, \dots, P$) which vary only between units. If unobserved θ_i are uncorrelated and nothing is gained by distinguishing within and between-unit variation in the estimation of parameters, then θ_i is treated as random effect. In that event generalized least square (GLS) gives consistent and efficient estimator of γ, γ_{re} . We

have thus used GLS method for estimating the coefficients of determinants of total factor productivity change.

3.2 Data

For calculation of efficiency, selection of appropriate combination of inputs and outputs is the central task. Berger and Humphrey (1997) have explained the problem of input-output selection in case of efficiency analysis of financial institutions. They have specified two approaches - intermediate approach and production approach for efficiency calculation of financial institutions.

As per intermediate approach, financial institution intermediates funds between depositors and borrowers (Avkiran, 1999; Yue, 1992). It provide loan to borrowers from collected deposits from savers to earn profit. So according to this approach deposits and loans are to be considered as output, and loan able funds, interest expense and labor cost are considered as inputs.

On the other hand, production approach states that financial institutions are producing financial services like, deposits accounts, loan and advances, and others for their clients. Therefore, numbers of accounts, numbers of loans, transaction volume are considered as output produced using labor and capital as inputs by microfinance institutions, while they are incurring operating cost to produce these outputs. We have used production approach to estimate MPI in this paper.

Table - A

Legal status of institution	No of institution (%)
Non Banking Financial Institution(NBFI)	28(50.91)
NGO	21(38.18)
Credit Union / Cooperative	3(5.45)
Rural Bank	1(1.82)
Bank	1(1.82)
Other	1(1.82)
Total	55(100)

The above table shows the legal status of Indian MFIs used in this study. It is dominated by NBFIs (non banking financial institutions) and NGOs [non-governmental organization - its financial services are usually more restricted, usually not including deposit taking ;(MIX market glossary)]. Here more than half of the sample is not allowed to take deposits (NBFIs as per RBI Guideline). So for this diversified sample intermediate approach will not be appropriate for efficiency analysis. On the other hand production approach is more appropriate for efficiency calculation for Indian MFIs as they are providing small loans and other financial services to poor people using amount borrowed, equity, deposits, operating expense (related to operations, including all personnel expense, depreciation and amortization, and administrative expense –MIX Market glossary) and number of personnel. The first three inputs are capital, number of personnel engaged as labor for production of financial services and other expenses as operating expenses to capture depreciation of capital, amortization of loan and the cost of administration, which contributes to smooth functioning of the MFIs and hence have been considered as inputs for our analysis. As MFIs provide services (mainly small loans) to poor people, gross loan portfolio (GLP) and number of active borrower or number of women borrower are appropriate as measure of output.

A number of studies have used loan to women borrower as an important outcome variable as it improves her household income and it is linked with more labour market activity, better education for children and health facilities for family (Hulme & Mosley, 1996, Vols.1 & 2; Khandker, 1998; Morduch & Haley, 2002; Mosley & Rock, 2004; Todd, 1996; Zaman, 2004) and helps the households strengthen their ability to cope with shocks (Garikipati 2008). Another set of studies show that men are more assertive risk taker than women (Byrnes, Miller, & Schafer, 1999; Feingold, 1994; Kring & Gordon, 1998; Lynn & Martin, 1997). Again some studies show that women exhibit better debt repayment performance (Akula, 2008; Yunus, 1999) which is likely to improve overall performance of MFIs.

Thus number of women borrowers has been taken as output for the efficiency calculation, given its demonstrated importance in achieving the objective of microfinance intervention. Performance with respect to overall loans is captured through gross loan portfolio (GLP). The difference in estimated regression models can point out to the interventions required to increase loans to women borrowers.

In the present study we use MIX Market data base. The study is based on 55 MFIs, operating in India. The number of MFIs chosen is based on retaining the maximum common MFIs in the initial and terminal year considered in the study. The productivity analysis is based on performance during years 2008 to 2010. Selection of MFIs is on the basis of availability of data throughout the study period. All the monetary variables are measured in US\$.

The data used for efficiency calculation is cross sectional-time series hence MPI is the appropriate measure of performance. Panel data analysis addresses the issue of heterogeneity better than pure time series or cross sectional models. Similarly to tackle more complicated behavioral models, panel data is more appropriate than the other two approaches. Factors like, economies of scale change and technological change can be better handled by panel data than the other two. Operationally MFIs are different in size, maturity and types and panel data helps to capture this diversity over time.

4. Results

Calculation of MPI for all MFIs under study is done through DEAP software by Tim Coelli (Coelli, 1996). Table 1 (in appendix) presents the descriptive statistics of the all the variables used in the study. The sector has experienced tremendous growth in 2009 compare to 2008 but the rate has declined in the next year. Average gross loan portfolio has increased by 99.88% in 2009 compare to 2008 but it has gone down to 14.72% in the following year. Further, average number of active borrowers and number of women borrower have grown at 58.39% and 58.08% respectively in 2009. In the next year, the rates have fallen to 20.97% and 17.03% respectively. Thus a general decline in outreach is observed in 2010 which may have been caused by the Andhra-crisis and subsequent lowering of fresh loans to the sector from the banks. Similarly in 2009, average deviation of GLP from the mean value was very high. That implies that performance diverged considerably among the MFIs in the sample.

In case of input variables, in 2009, average borrowing, equity and deposit experienced increase by 94.78%, 95.90% and 93.56% respectively over 2008. But in the next year the

rates came down to 6.25%, 40.83% and 36.60% respectively. But in 2009, expansion rate of average operating expense and average number of personnel were 70.96% and 44.59% and it was followed by 20.75% and 26.06% respectively in the next year.

MPI of a year measures productivity change in current compared to the immediate preceding year, considered as base year. Difference between MPI and unity then determine the change of productivity in the year of calculation with respect to the base year. First we calculate MPI where gross loan portfolio and number of active borrowers are considered as outputs and results are depicted through tables (1A – 1J).

Table 1A

Mamlquist Index (GLP & no. of active borrowers)

Summary of Annual Means (2008-2010)

Year	Technological change	Pure technical efficiency change	Scale efficiency change	Total factor productivity change
2009	0.439	1	1.069	0.469
2010	1.283	1	0.97	1.245
Mean	0.75	1	1.018	0.764

Table 1B

Percentage Change of Average Growth Rates of TFP (2008-2010)

Year	Technological change	Scale efficiency change	Total factor productivity change
2009	(-56.1%)	6.9%	(-53.1%)
2010	28.3%	(-3.0%)	24.5%
Mean	(-25.0%)	1.8%	(-23.6%)

Table1B shows that the micro finance sector in India has faced on an average 23.6% decline of factor productivity growth during the study period. This is because of an average decline of technological change by 25% though the sector has experienced an average

improvement in scale efficiency by 1.8%. In 2009, TFP has declined by 53.1% compared to 2008. But in 2010 the sector has grown by 24.5% from 2009. Both the positive and the negative TFP growth of the sector, as a whole are impacted mainly by technological progress and regress respectively. In individual years also, technological change effect is dominating the scale change effect.

Table 1C

Mamlquist Index Summary of Firms (Means and Growth Rate (%) of Individual MFIs with positive growth rate in TFP) (2008-2010)

Sl. No	MFI	Technological change	Scale efficiency change	Total factor productivity change
1	Adhikar	1.007(0.7)	1.647(64.7)	1.659(65.9)
2	AML	1.014(1.4)	1.527(52.7)	1.549(54.9)
3	Arohan	0.976(-2.4)	1.179(17.9)	1.15(15.0)
4	Bandhan	0.815(-18.5)	1.306(30.6)	1.064(6.4)
5	BSS	0.944(-5.6)	1.386(38.6)	1.309(30.9)
6	BWDAFinance	0.695(-30.5)	2.404(140.4)	1.671(67.1)
7	Disha	18.985	1	18.985
8	GFSPL	1.006(0.6)	1.029(2.9)	1.035(3.5)
9	GOF	0.85(-15.0)	1.252(25.2)	1.064(6.4)
10	GU	0.641(-35.9)	1.61(61.0)	1.031(3.1)
11	IndurMACS	0.79 (-21.0)	1.589(58.9)	1.254(25.4)
12	Janodaya	1.015(1.5)	1.57(57.0)	1.594(59.4)
13	KBSLAB	1.234(23.4)	0.856 (-14.4)	1.056(5.6)
14	NBJK	1.14(14.0)	1(0.0)	1.14(14.0)
15	PWMACS	0.838(-16.2)	1.234(23.4)	1.034(3.4)
16	RASS	0.637 (-36.3)	1.584(58.4)	1.009(0.9)
17	SarvodayaNanoFinance	0.469(-53.1)	2.739(173.9)	1.284(28.4)
18	SMSS	0.735(-26.5)	1.528(52.8)	1.122(12.2)

During the study period 18 (32.7%) MFIs have experienced positive growth in terms of total factor productivity. Only Adhikar, AML, GFSPL and Janodaya have made progress in terms of both technology and scale of production. They have made use of advance technology in production and tried to move towards the most productive scale. Both Disha and NBJF have raised their factor productivity over the study period through technological progress only (but for Disha, it is very high). On the other hand 11 MFIs out of 18 have increased factor productivity by moving towards optimum scale only.

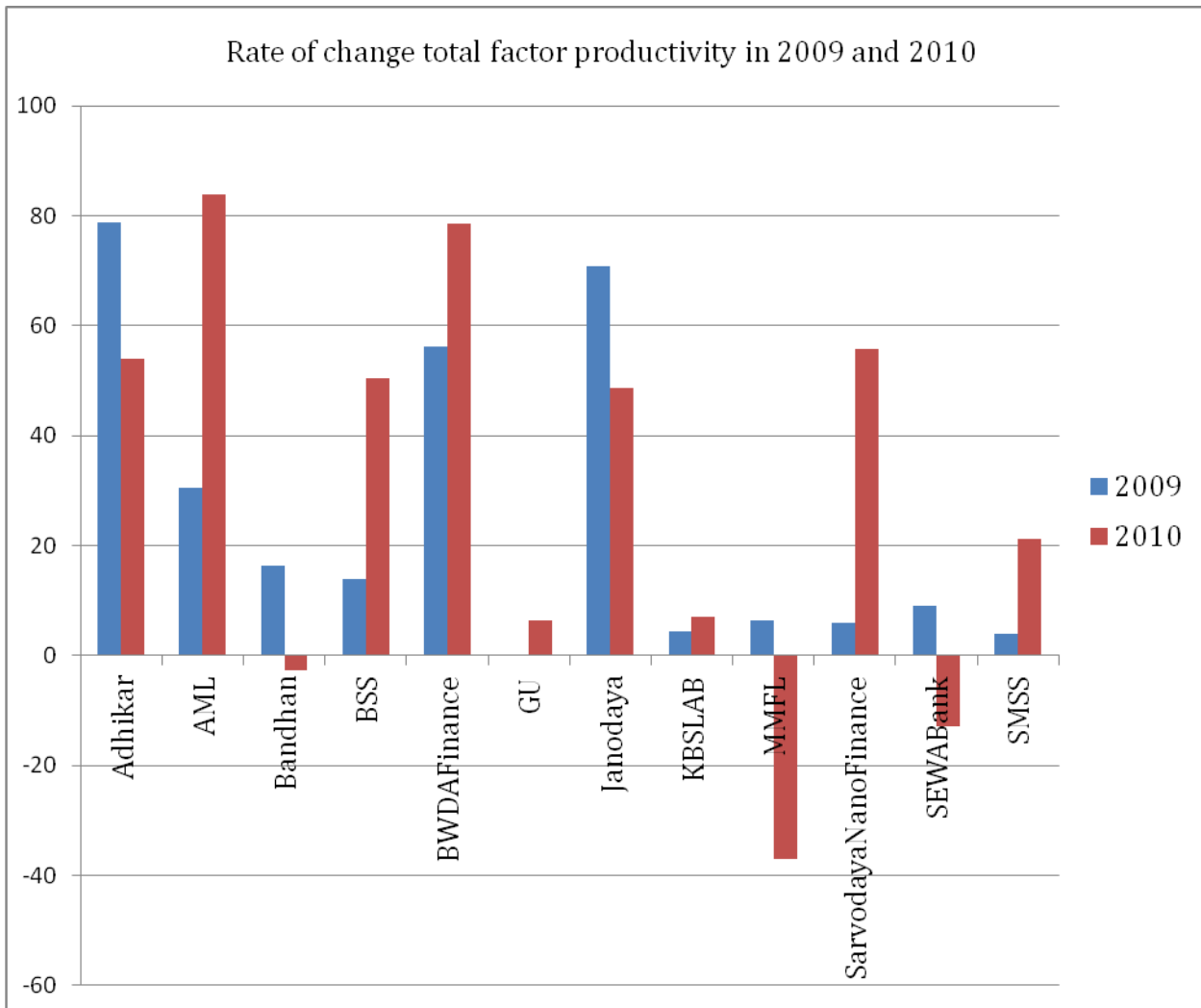
Table 1D (appendix) shows that 37(67.3%) MFIs have suffered negative growth rate during the study period. Though BASIX, Pustikar and SEWA Bank have used advance technology for production, they experienced negative productivity growth during the same period and their average fall in growth of productivity is 2.77%. BASIX and SEWA Bank have experienced 22.4% and 29.2% growth in technological change. Similarly 11 MFIs have used more productive scale size but have suffered due to insufficient usage of advance technology. Other 3 MFIs have not changed their scale of operation in the terminal year and only technological decline causes negative growth of productivity. For rest of the 20 MFIs, decline in both technological change and scale efficiency change has contributed to negative productivity.

Looking at the performance of individual MFIs in 2009 compared to 2008 (table 1E appendix) we find that none of the MFIs have made technological improvement at that time. Out of 55 MFIs, 12 MFIs have positive productivity growth and all of them improved their scale efficiency and rest of the 43 MFIs has failed to improve their productivity in that year. Among them, 18 MFIs have moved to optimum scale size and 22 MFIs have move out from MPSS. But BJC, NBJK and NCS have made no change in scale of operation.

But in the year 2010 (table 1F appendix), we see opposite trend in advanced technology usage. In this year 37 MFIs have given emphasis on technology development in production. Among them 25 MFIs have shown positive productivity growth compared to preceding year. In 2010, 36 MFIs increased their productivity compared to 2009. Out of them 25 MFIs made technological advancement. Among them, 15 MFIs have achieved both, technological progress and enhanced scale efficiency. Eight other MFIs have faced contraction of scale

compared to 2009. On the other hand 19 MFIs experienced negative productivity growth. Out of them, 12 MFIs have used improved technology with reduction in scale of operation. Table 1G(appendix) depicts the performance pattern MFIs who have experienced positive productivity growth in year 2009 compare to the previous year. In 2010, Bandhan, MMFL and SEWA Bank have experienced drop in productivity compared to previous year. SEWA Bank has faced high net NPA (4.98%) in 2010 which may be one of the reasons for decline in total factor productivity in the year 2010 (www.sewabank.com). But in case of Bandhan, soaring depreciation and high financial cost in 2010 compared to previous years led to decline in total factor productivity in the same year (www.bandhanmf.com).

Figure



The above graph (figure 1) shows only 9 MFIs have experienced positive productivity growth in both the years (2009 and 2010). Among them, Adhikar and Janodaya experienced declining rate of growth but rest of the 7 MFIs experienced increasing rate of productivity growth.

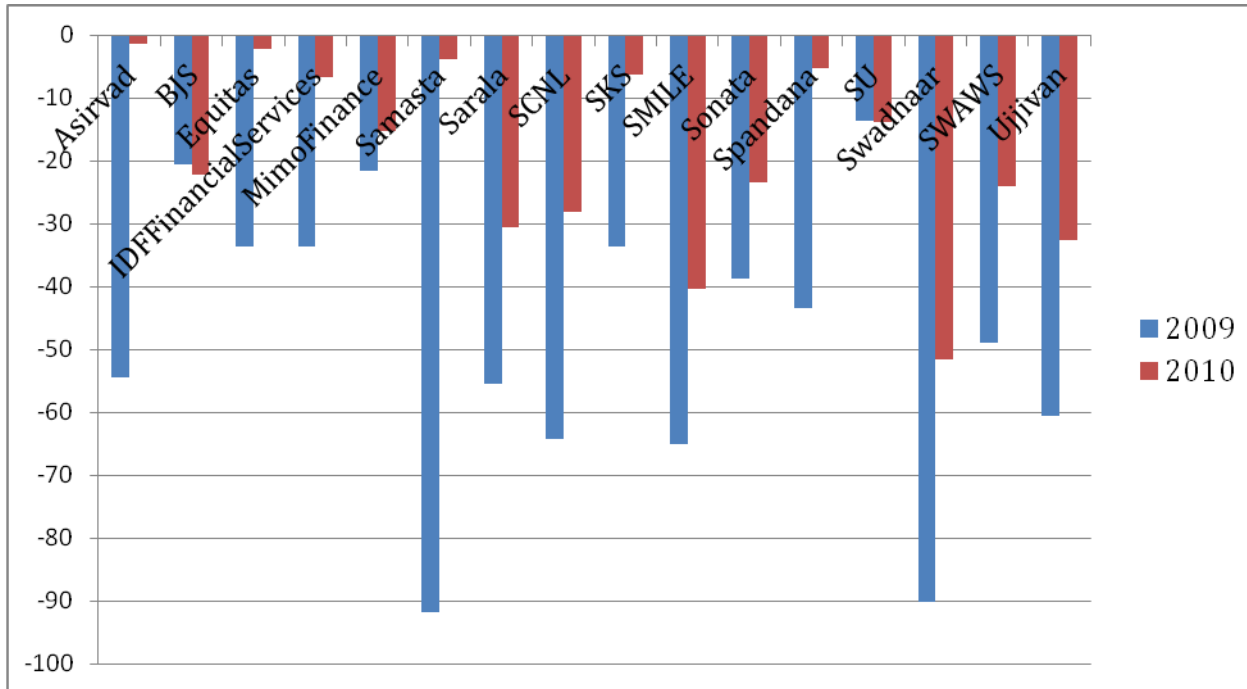
The above table 1H (appendix) illustrate name of those MFIs which were operating inefficiently in the year 2009 but they improved their performance in the next year. Out of 27 MFIs, 18 (except Disha) of them faced double digit growth of productivity in 2010 after a wasteful effort in the preceding year. And rest of them faced single digit growth of productivity in the same year compared to the previous year.

Table 1I

Sl no	Firm Name	tfpch2009	tfpch2010	% change of tfp in 2009	% change of tfp in 2010
1	Asirvad	0.456	0.986	-54.4	-1.4
2	BJS	0.795	0.777	-20.5	-22.3
3	Equitas	0.664	0.977	-33.6	-2.3
4	IDFFinancialServices	0.664	0.933	-33.6	-6.7
5	MimoFinance	0.784	0.848	-21.6	-15.2
6	Samasta	0.083	0.961	-91.7	-3.9
7	Sarala	0.446	0.695	-55.4	-30.5
8	SCNL	0.357	0.718	-64.3	-28.2
9	SKS	0.664	0.936	-33.6	-6.4
10	SMILE	0.35	0.597	-65.0	-40.3
11	Sonata	0.613	0.766	-38.7	-23.4
12	Spandana	0.565	0.947	-43.5	-5.3
13	SU	0.864	0.862	-13.6	-13.8
14	Swadhaar	0.098	0.484	-90.2	-51.6
15	SWAWS	0.511	0.76	-48.9	-24.0
16	Ujjivan	0.394	0.674	-60.6	-32.6

The graph portrays the rate of fall of productivity for those MFIs which were operating inefficiently in both the years.

Figure 2



The figure shows that all the MFIs, other than BJS and SU have controlled deterioration of their performance in 2010 compared to 2009. For SU, there was no significant change in productivity reduction and for BJS, there was a slight increase in the rate.

Table 1J

Sl. No	Firm Name	Techch 2009	Techch 2010	Pech 2009	Pech 2010	Sech 2009	Sech 2010
1	Asirvad	0.846	1.12	1	1	0.88	0.689
2	BJS	0.795	0.777	1	1	1	1
3	Equitas	0.763	1.159	1	1	0.843	0.856
4	IDF Financial Services	0.392	1.092	1	1	0.854	1.204
5	Mimo Finance	0.707	1.245	1	1	0.68	0.869
6	Samasta	0.296	1.235	1	1	0.778	0.468
7	Sarala	0.417	0.942	1	1	0.737	0.888
8	SCNL	0.729	1.232	1	1	0.582	0.534
9	SKS	0.671	0.971	1	1	0.964	0.977

10	SMILE	0.402	0.946	1	1	0.631	0.741
11	Sonata	0.656	1.138	1	1	0.673	0.793
12	Spandana	0.483	0.931	1	1	1.017	1.091
13	SU	0.478	0.98	1	1	0.88	1.262
14	Swadhaar	0.172	1.285	1	1	0.376	0.464
15	SWAWS	0.733	0.936	1	1	0.812	0.752
16	Ujjivan	0.71	1.171	1	1	0.575	0.565

Table 1J shows the source/sources of reduction of inefficiency of the MFIs during the study period. There was no change in pure technical efficiency which means that there was no significant change in management system. Change of scale efficiency and technological change are major causes for the results depicted in table 1I. In case of BJS, there was no change in scale of operation and pure technical efficiency on the other hand technological inefficiency increased over the period which led to rise in inefficiency of the inputs. Except BJS all the MFIs either became technologically efficient or tried to reduce inefficiency. Only Spandana was operating at optimum scale during the period. IDF Financial Services and SU have moved from sub-optimum scale to optimum scale in 2010. Asirvad, Samasta and Ujjivan have continuously deviated from the optimum scale during the period. And other MFIs were trying to move to optimum scale from sub-optimum scale of operation. So, both technological advancement and scale efficiency improvement helped them to reduce the usage of inputs to reduce their inefficiency.

Thus it seems that advance technology usage to deliver financial services to people who are financially excluded may have played the central role in productivity improvement of Indian MFIs.

The paper also tries to analyze whether a similar trend is observed if number of women borrowers, is used as a measure of output along with GLP (table 2A-2L).

Table 2A

Mamlquist Index Summary of Annual Means (2008-2010)

Year	Technological change	Pure technical efficiency change	Scale efficiency change	Total factor productivity change
2009	0.409	1	1.046	0.428
2010	1.21	1	1.08	1.307
Mean	0.703	1	1.063	0.748

Table 2A shows similar results as presented in table 1A. Over the study period the sector has not grown in terms of productivity and this is because of lack of usage of advanced technology. The result shows that the sector in 2009 has experienced negative growth in technological progress which caused the reduction in productivity. But in the next year, 2010 the sector had experienced huge technological change causing 30.7% growth in productivity.

Table2B

year	WB			NOB		
	techch	sech	tfpch	techch	sech	tfpch
2009	-59.1	4.6	-57.2	-56.1	6.9	-53.1
2010	21	8	30.7	28.3	-3	24.5
mean	-29.7	6.3	-25.2	-25	1.8	-23.6

Table 2B shows the comparison between average changes of efficiency during the study period under two measures of output. One considers GLP and number women borrower and the other considers GLP and number of active borrower as output. The table shows similar pattern of change, except change in scale efficiency. It shows that the sector is operating at sub-optimal scale if number active borrowers are taken into consideration. But the result shows that the sector moves to optimal scale of operation by offering loan to more and more women borrower. Technological advancement, along with movement towards optimal

scale of operation with respect to women borrower, led to growth of productivity of the sector in 2010. In case of scale change, efficiency in case of number of active borrowers declined in 2010 but it increased in terms of number of women borrowers. In 2009, huge increase of fund inflow in the sector led to increase in outreach. Thus it seems that the MFIs were under pressure to disburse funds to their clients in order to avoid costs related to holding ideal funds. But in the following year as the rate of inflow of fresh funds reduced MFIs have tried to use their inputs more productively.

Table 2C

Growth Rate (%) of Individual MFIs with positive growth rate in TFP calculated from Means Mamlquist Index Summary of firms (2008-2010)

Sl . No	Firm Name	techch	sech	tfpch
1	Adhikar	-10.9	85.7	65.4
2	AML	-9.3	69.5	53.8
3	Arohan	-11.6	28.1	13.3
4	Bandhan	-26.3	44.1	6.1
5	BSS	-18	59.1	30.5
6	BWDAFinance	-34	158.6	70.6
7	CashporMC	15	3.2	18.7
8	GFSPL	-12.4	19.3	4.5
9	GOF	-19.1	34.6	8.9
10	GU	-38.6	74.3	7.1
11	IndurMACS	-24.7	71.7	29.3
12	Janodaya	82.6	83.9	235.9
13	NBJK	15.7	0	15.7
14	RASS	22.1	94.8	137.8
15	SarvodayaNanoFinance	-53.5	175.2	27.9
16	SMSS	-28	54.4	11.2
17	SWAWS	170.1	5.2	184.3

Table 2C mentions the MFIs which experienced positive productivity growth during the study period. Out of these MFIs, only 5 MFIs have gained in terms of technological efficiency and rest of them has not improved in terms of technology. On the other hand, out of these 17 MFIs, 16 MFIs (except NBJK) have increased their scale of operation to reach the optimum level.

From Table 2D (appendix) it can be seen that only BASIX among 38 MFIs faced negative growth of factor productivity even though it used advance technology. There are 14 MFIs who have made scale efficiency improvements but they faced decline in factor productivity. Table 2E and 2F (appendix) represent Malmquist Index of individual MFIs in 2009 and 2010 respectively.

Table 2G

Sl.no	Firm Name	tfpch2009	tfpch2010	% change in tfp in 2009	% change in tfp in 2010
1	Adhikar	1.787	1.531	78.7	53.1
2	AML	1.305	1.814	30.5	81.4
3	Bandhan	1.16	0.971	16.0	-2.9
4	BSS	1.14	1.492	14.0	49.2
5	BWDAFinance	1.633	1.783	63.3	78.3
6	Janodaya	1.529	7.381	52.9	638.1
7	MMFL	1.068	0.629	6.8	-37.1
8	Sarvodaya Nano Finance	1.051	1.557	5.1	55.7
9	SMSS	1.02	1.212	2.0	21.2

There are only 7 MFIs (table 2G) who are sustaining their productivity growth during the consecutive periods. Only Bandhan and MMFL experienced a decline in productivity growth in 2010.

Table 2.1G

Sl.No	Firm Name	year	techch	sech	tfpch
1	Bandhan	2009	-41.8	99.4	16
		2010	-6.7	4.1	-2.9
2	MMFL	2009	-67.6	229.7	6.8
		2010	11.4	-43.5	-37.1

In case of Bandhan, reduction in rate of growth of scale efficiency leads to lower productivity growth. Similarly for MMFL scale inefficiency plays dominating role for downward movement of factor productivity.

Tables 2H and 2.1H (appendix) depict the name of those MFIs who experienced negative growth of factor productivity in 2009 but achieve positive growth in the following year.

Table 2.1 H depicts the sources of improvement in productivity in 2010 for those MFIs who were less productive in the previous year. MFIs like, Cashpor MC, Disha, ESAF, GFSPL, GOF, HiH, Indur MACS, PWMACS, RASS and SWAWS, which have tried to improve their productivity through scale improvement and technology use. For BASIX, Equitas, Mahasemam and Pustikar only technological advancement is the reason behind increased productivity. But MFIs like, Arohan, Asomi, BISWA, Grama Vidiyal Microfinance Ltd., GU, Mahashakti, NEED, RGVN, Sanghamithra, SHARE, SKDRDP, Trident Microfinance and VFS have increased their productivity through movement towards the optimum scale of operation.

Table 2I

Sl.no	Firm Name	tfpch2009	tfpch2010	% in tfp in 2009	% in tfp in 2010
1	Ajiwika	0.002	0.829	-99.8	-17.1
2	Asirvad	0.456	0.98	-54.4	-2
3	BJS	0.795	0.77	-20.5	-23
4	IDF Financial Services	0.665	0.988	-33.5	-1.2
5	KBSLAB	0.941	0.973	-5.9	-2.7
6	Mimo Finance	0.702	0.876	-29.8	-12.4

7	Samasta	0.08	0.975	-92	-2.5
8	Sarala	0.446	0.695	-55.4	-30.5
9	SCNL	0.311	0.667	-68.9	-33.3
10	SEWA Bank	0.972	0.849	-2.8	-15.1
11	SKS	0.665	0.936	-33.5	-6.4
12	SMILE	0.343	0.597	-65.7	-40.3
13	Sonata	0.584	0.8	-41.6	-20
14	Spandana	0.573	0.947	-42.7	-5.3
15	SU	0.863	0.862	-13.7	-13.8
16	Swadhaar	0.091	0.477	-90.9	-52.3
17	Ujjivan	0.397	0.663	-60.3	-33.7

Table 2I presents the names of those MFIs who are facing negative growth of TFP during the study period. Although these MFIs have tried to improve on input-usage as we progress towards the terminal year. This implies that they are trying to reduce the deviation from industry best practices.

Table 2J

	2009	2010	2009	2010	2009	2010
Firm name	techch	techch	pech	pech	sech	sech
IDF Financial Services	0.391	1.031	1	1	1.699	0.959
KBSLAB	0.448	1.777	1	1	2.099	0.548
Mimo Finance	0.654	1.205	1	1	1.074	0.727
Samasta	0.293	1.218	1	1	0.274	0.8
SCNL	0.46	1.265	1	1	0.677	0.527
SEWA Bank	0.395	1.825	1	1	2.464	0.465
Sonata	0.672	1.105	1	1	0.869	0.725
Swadhaar	0.167	1.252	1	1	0.546	0.381
Ujjivan	0.687	1.143	1	1	0.577	0.58

As can be seen from the above table, out of 17 MFIs, 9 of them resorted to technological advancement to provide better services. But their sub – optimal operations lead to lower productivity.

Table 2K

	2009	2010	2009	2010	2009	2010
Firm name	techch	techch	pech	pech	Sech	sech
Ajiwika	0.002	0.829	1	1	1	1
Asirvad	0.845	0.888	1	1	0.539	1.103
BJS	0.795	0.77	1	1	1	1
Spandana	0.478	0.931	1	1	1.198	1.017

Whereas, Ajiwika, Asirbad, BJS and Spandana were operating at optimal scale but lack of technological advancement led to negative growth of factor productivity for them.

Table 2L

	2009	2010	2009	2010	2009	2010
Firm name	techch	techch	pech	pech	Sech	sech
Sarala	0.417	0.942	1	1	1.07	0.737
SKS	0.662	0.971	1	1	1.005	0.964
SMILE	0.394	0.946	1	1	0.87	0.631
SU	0.477	0.98	1	1	1.808	0.88

Table 2L shows that for Sarala, SKS, SMILE and SU contraction of scale and lack of technological development, were responsible for negative growth of factor productivity.

Overall thus we find that in 2009, MFIs in India had given stress on expanding their operation rather than technological upgradation. But in the following year the scenario has been changed. The focus shifted from expansion of operation to technological advancement. This shift in emphasis may have been backed by information and communication technology (ICT) usage. MFIs might have increased ICT investment, knowledge capital investment in the form of human capital or R&D (Dimelis & Papaioannou (2011)). Introduction of new products and changed distribution system, change in regulation

(Cummins, Turchetti & Weiss (1996)) among other factors might have also impacted TFP changes. Technological progress helps to reduce cost per transaction and this increases profitability. Technological advancement helps the institution to handle internal information more efficiently and it also helps to access borrowers data which can help control operational risk. On the other hand growth of new services and distribution system attracts new borrowers to the MFIs.

Once we obtain the efficiency scores it is important to understand the underlying factors responsible for its change. Total factor productivity score of MFIs calculated earlier is taken as dependent variable and it is postulated to be dependent on return on asset, portfolio at risk: 30 days, operation self sufficiency, capital asset ratio of current year, and the previous year and cost per borrower.

Table 3A and 3B show results of the two panel data regressions run to test the postulated relationships. Table 3A depicts the regression results of TFP score of MFI, as the dependent variable where number of active borrowers and GLP are taken as output variables. Table 3B depicts the TFP score as a dependent variable where number of women borrowers and GLP are taken as output variables. In the former case return on asset, operation self sufficiency, capital asset ratio of present period as well as of previous year are significant factors impacting the TFP score of MFIs. But on the contrary, the other regression (GLP and number of women borrowers as output) results show that return on asset, operational self sufficiency and capital asset ratio of present year are the significant factors impacting productivity of Indian MFIs. In both the cases cost per borrower is not affecting significantly the TFP scores. Similarly, capital asset ratio of previous year and operation self sufficiency have negative relation with TFP score. As the institutions raise more and more capital in a particular year, to reduce the cost of holding ideal capital, institutions provide more and more loans to their borrowers which may generate problems of adverse selection. This leads to more risky portfolio for MFIs. Thus both positive relation of TFP with capital asset ratio of current year and inverse relation with capital asset ratio of previous year can be explained through this reasoning. Return on asset has positive relation with the TFP score. But PAR>30 has positive and significant relationship with TFP score in first regression while in second case it is not significant. To explain this

result correlation coefficients have been calculated for $PAR > 30$ with different types of capital for different types of MFIs, providing services to women borrowers only, both women and men borrowers and men borrowers only. $PAR > 30$ of MFIs who have lent to women borrower only, have positive correlation (0.1053) with borrowed amount but negative relation with equity (-0.02) and deposit taken from borrowers (-0.058). But the values for the MFIs who have lent to both male and female are 0.1788, 0.2332 and 0.2926 respectively. Thus the result shows that as MFIs who serve male and female borrowers increases their loan portfolio and they experience increasing $PAR > 30$. Regression analysis shows that $PAR > 30$ is increased by 0.391unit for one unit rise in TFP growth when outputs are GLP and number of active borrowers but the value is 0.299 for one unit rise in TFP growth when outputs are GLP and number of women borrowers This may imply that female borrowers are relatively less risky than male borrowers. This implies that TFP growth increases risk of operations may be due to moral hazards and/or adverse selection problem. Thus MFIs giving loans to both kinds of borrowers in the sample dominates and makes portfolio risk positively related to output.

Conclusion

This paper attempted to calculate the change in TFP for the microfinance sector of India. First, the paper identifies the trend and pattern of productivity growth. Secondly, it looked into the detailed reasons for such change decomposing the TFPG into its various components. Next we tried to identify the factors responsible for productivity growth. Return on asset, capital asset ratio of current year as well as of previous year, operational self sufficiency and $PAR > 30$ have significant impact on growth of total factor productivity over time.

The paper finds that during the study period average TFP growth rate of Indian microfinance sector was negative. But in 2010 the sector has experienced significant progress of TFP through technological progress and movement towards most productive scale size by providing service to more and more women borrowers. Thus our study corroborates the fact that usage of advance information technology by India MFIs led to significant improvement of total factor productivity in 2010. As has been the experience in

other countries, in India also it is less risky to lend to women borrowers than to both types. And this leads to significant impact on efficiency of MFIs along with other determinants.

In this paper interestingly we found a positive relationship between $PAR > 30$ and TFPG. On further investigation it was found that MFIs providing loans to both women and male borrowers have a higher $PAR > 30$ than who cater to only women borrowers. Also, the World Bank (2007) states "Experience has shown that repayment is higher among female borrowers, mostly due to more conservative investments and lower moral hazard risk". A study by Armendariz and Morduch (2005) shows that targeting of women has been used as a technique to reduce loan repayment defaults. Bart et al (2011) tests this relationship through global data on 350 MFIs in 70 countries. The study indicates that MFIs with higher proportions of female borrowers have lower portfolio at risk.

Both the results have significant implications for policy makers and practitioners in Indian microfinance sector. MFIs have to give major emphasis on ICT usage to enhance efficiency. Reaching out to women may reduce PAR but overall outreach (which may increase PAR) is showing positive impact on efficiency. Regression result shows significant negative impact of operational self sufficiency on efficiency. Thus a tradeoff between sustainability and efficiency is observed. MFIs can increase efficiency by giving loans but the negative impact on sustainability due to increasing portfolio risk can reduce this positive impact. An optimum mix of efficiency and sustainability thus has to be decided to make these institutions more resilient in the long run. The Andhra Pradesh crisis resulted from among other reasons multiple lending (to same borrower) which increased portfolio risk but might have increased efficiency initially. Too much emphasis on higher amount of loans ignoring the risk resulted in the crisis. Thus to avoid such a situation the optimum mix of efficiency and sustainability have to be determined by individual MFIs in order to remain viable in the long run. This issue would be taken up in our future research work.

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Appendix

MFIs	Full Name of MFIs
Adhikar	<i>Adhikar Microfinance Private Ltd</i>
Ajiwika	<i>Ajivika Society</i>
AML	<i>Asmitha Microfin Ltd</i>
Arohan	<i>Arohan Financial Services Private Ltd</i>
Asirvad	<i>Asirvad Microfinance Private Ltd</i>
Asomi	<i>Asomi Finance Private Ltd</i>
Bandhan	<i>Bandhan Financial Services Private Ltd</i>
BASIX	<i>Bhartiya Samruddhi Investments and Consulting Services (BASICS Ltd) - holding company</i>
BISWA	<i>Bharat Integrated Social Welfare Agency</i>
BJS	<i>Belghoria Janakalyana Samity</i>
BSS	<i>BSS Microfinance Pvt. Ltd</i>
BWDAFinance	<i>BWDA Finance Ltd</i>
CashporMC	<i>Cashpor Micro Credit</i>
Disha	<i>Disha Microfin Private Ltd</i>
Equitas	<i>Equitas Micro Finance India Private Ltd</i>
ESAF	<i>ESAF Microfinance and Investments (P) Ltd</i>
GFSPL	<i>Grameen Financial Services Private Ltd</i>
GOF	<i>Growing Opportunity Finance</i>
GramaVidyalMicrofinanceLtd.	<i>Grama Vidiyal Micro Finance Limited</i>
GU	<i>Gram-Utthan</i>
HiH	<i>Hand in Hand India</i>
IDF Financial Services	<i>IDF Financial Services Private Limited</i>
IndurMACS	<i>Indur Intideepam Mutually Aided Thrift & Credit Cooperatives' Federation Limited</i>
Janodaya	<i>Janodaya Micro Credit Programme</i>

KBSLAB	<i>Krishna Bhima Samruddhi Local Area Bank Limited</i>
Mahasemam	<i>Mahasemam Trust</i>
Mahashakti	<i>Mahashakti Foundation</i>
MimoFinance	<i>Mimoza Enterprises Finance Pvt. Ltd</i>
MMFL	<i>Madura Micro Finance Ltd</i>
NBJK	<i>Nav Bharat Jagriti Kendra</i>
NCS	<i>Niranantara Community Services</i>
NEED	<i>Network of Entrepreneurship & Economic Development</i>
Pustikar	<i>Pustikar Laghu VPBSSS Ltd</i>
PWMACS	<i>Payakaraopeta Women's Mutually Aided Co-operative Thrift and Credit Society</i>
RASS	<i>Rashtriya Seva Samithi</i>
RGVN	<i>RGVN(North East) Microfinance Ltd</i>
Samasta	<i>Samasta Microfinance Ltd</i>
Sanghamithra	<i>Sanghamithra Rural Financial Services</i>
Sarala	<i>Sarala Women Welfare Society</i>
SarvodayaNanoFinance	<i>Sarvodaya Nano Finance Limited</i>
SCNL	<i>Satin Creditcare Network Limited</i>
SEWABank	<i>Shri Mahila Sewa Sahakari Bank Ltd</i>
SHARE	<i>Share Microfin Ltd</i>
SKDRDP	<i>Shri Kshethra Dharmasthala Rural Development Project</i>
SKS	<i>SKS Microfinance Limited</i>
SMILE	<i>Semam Microfinance Investment Literacy & Empower Ltd</i>
SMSS	<i>Sreema Mahila Samity</i>
Sonata	<i>Sonata Finance Private Ltd</i>
Spandana	<i>Spandana Sphoorty Financial Limited</i>
SU	<i>Sahara Uttarayan</i>
Swadhaar	<i>Swadhaar FinServe Pvt. Ltd.</i>
SWAWS	<i>Sharada's Women's Association for Weaker Section</i>
Trident Micro finance	<i>Trident MicroFin Private Ltd</i>
Ujjivan	<i>Ujjivan Financial Services Private Ltd</i>
VFS	<i>Village Financial Services Private Ltd</i>

Table 1		Descriptive statistics (55 MFIs)		
Input		2008	2009	2010
Borrowing	Average(\$)	31485871.64	61327083.53	65162743.87
	StdDev (\$)	71247438.87	128180640.22	129747510.40
	Max (\$)	380923746.00	599215512.00	503615699.00
	Min (\$)	0.00	0.00	0.00
	Skewness	3.51	2.93	2.56
	Kurtosis	13.17	8.21	5.61
Equity	Average(\$)	7216969.58	14137693.67	19910664.15
	StdDev (\$)	19347612.19	33725179.46	56902593.37
	Max (\$)	130342128.00	213037996.00	401085312.00
	Min (\$)	-396646.00	22432.00	45649.00
	Skewness	5.29	4.47	5.88
	Kurtosis	31.63	23.33	38.68
Deposit	Average(\$)	1584108.42	3066228.36	4188505.62
	Std Dev (\$)	4472728.17	9139322.78	14457568.11
	Max (\$)	22721053.00	53885246.00	99702857.00
	Min (\$)	0.00	0.00	0.00
	Skewness	3.53	4.08	5.70
	Kurtosis	12.68	18.75	36.51
Operating Expense	Average(\$)	3850060.39	6571675.16	7935047.80
	Std Dev(\$)	9522171.25	14145003.33	16791381.41
	Max (\$)	63312426.28	87991363.29	103297535.47
	Min (\$)	0.00	93724.37	142068.32
	Skewness	4.95	4.16	4.03
	Kurtosis	28.85	20.75	19.61

Personnel	Average	1103.07	1594.89	2010.48
	Std Dev	2074.59	3362.33	3915.52
	Max	12814.00	21154.00	22733.00
	Min	19.00	30.00	40.00
	Skewness	3.91	4.32	3.70
	Kurtosis	19.03	22.27	16.33
Output				
Gross Loan Portfolio	Average(\$)	37851734.55	75657214.07	86796524.56
	Std Dev(\$)	87381939.39	177161517.55	187178985.20
	Max (\$)	482975269	960793988	925844433
	Min (\$)	226360	551901	892277
	Skewness	3.83	3.81	3.19
	Kurtosis	15.61	15.46	10.36
Number of Active Borrower	Average	28474838	45099891	54558333
	Std Dev	62068126	99860683	114677880
	Max	352082600	579502800	624226600
	Min	280600	604000	649400
	Skewness	3.78	3.83	3.43
	Kurtosis	15.70	16.58	12.89
Number of Women Borrower	Average	27075609	42800701	50088471
	Std Dev	61780636	97437696	110354359
	Max	352082600	579502800	624226600
	Min	0	0	0
	Skewness	3.88	4.01	3.63
	Kurtosis	16.38	18.23	14.72

Table 1D

Mamlquist Index Summary of Firms (Means and Annual Growth Rate (in %) of Individual MFIs with negative growth rate of TFP) (2008-2010)

Sl. No	MFI	Technological change	Scale efficiency change	Total factor productivity change
1	Ajiwika	0.026(-97.4)	1(0)	0.026(-97.4)
2	Asirvad	0.973(-2.7)	0.689(-31.1)	0.671(-32.9)
3	Asomi	0.798(-20.2)	0.412(-58.8)	0.329(-67.1)
4	BASIX	1.224(22.4)	0.789(-21.2)	0.965(-3.5)
5	BISWA	0.662(-33.8)	1.288(28.8)	0.853(-14.7)
6	BJS	0.786(-21.4)	1(0)	0.786(-21.4)
7	CashporMC	0.872(-12.8)	0.742(-25.8)	0.647(-35.3)
8	Equitas	0.941(-5.9)	0.856(-14.4)	0.805(-19.5)
9	ESAF	0.923(-7.7)	0.856(-14.4)	0.79(-21.0)
10	GramaVidyal Microfinance Ltd.	0.828(-17.2)	0.944(-5.6)	0.781(-21.9)
11	HiH	0.033(-96.7)	0.319(-68.1)	0.011(-98.9)
12	IDF Financial Services	0.654(-34.6)	1.204(20.4)	0.787(-21.3)
13	Mahasemam	0.887(-11.3)	0.998(-0.2)	0.885(-11.5)
14	Mahashakti	0.682(-31.8)	1.348(34.8)	0.919(-8.1)
15	MimoFinance	0.938(-6.2)	0.869(-13.1)	0.815(-18.5)
16	MMFL	0.603(-39.7)	1.357(35.7)	0.818(-18.2)
17	NCS	0.856(-14.4)	1(0)	0.856(-14.4)
18	NEED	0.766(-23.4)	1.218(21.8)	0.933(-6.7)
19	Pustikar	1.073(7.3)	0.9119(-8.9)	0.977(-2.3)
20	RGVN	0.684(-31.6)	1.322(32.2)	0.905(-9.5)
21	Samasta	0.604(-39.6)	0.468(-53.2)	0.283(-71.7)
22	Sanghamithra	0.537(-46.3)	1.644(64.4)	0.882(-11.8)
23	Sarala	0.627(-37.3)	0.888(-11.2)	0.557(-44.3)
24	SCNL	0.947(-5.3)	0.534(-46.6)	0.506(-49.4)
25	SEWA Bank	1.292(29.2)	0.755(-24.5)	0.975(-2.5)

26	SHARE	0.75(-25.0)	1.179(17.9)	0.884(-11.6)
27	SKDRDP	0.556(-44.4)	1.37(37.0)	0.761(-23.9)
28	SKS	0.807(-19.3)	0.977(-2.3)	0.788(-21.2)
29	SMILE	0.617(-38.3)	0.741(-25.9)	0.457(-54.3)
30	Sonata	0.864(-13.6)	0.793(-20.7)	0.685(-31.5)
31	Spandana	0.671(-32.9)	1.091(9.1)	0.732(-26.8)
32	SU	0.684(-31.6)	1.262(26.2)	0.863(13.7)
33	Swadhaar	0.47(-53.0)	0.464(-53.6)	0.218(58.2)
34	SWAWS	0.829(-17.1)	0.752(-24.8)	0.623(-37.7)
35	Trident Microfinance	0.783(-21.7)	0.802(-19.8)	0.627(-37.3)
36	Ujjivan	0.911(-8.9)	0.565(-43.5)	0.515(-48.5)
37	VFS	0.74(-26.0)	0.795(-20.5)	0.588(-41.2)

Table1E

Malmquist Index Summary of Year 2009 (when output is gross loan portfolio & number of active borrowers)

Sl. no	Firm Name	effch	techch	pech	sech	tfpch
1	Adhikar	2.006	0.891	1	2.006	1.787
2	Ajiwika	0.488	0.001	1	0.488	0
3	AML	1.443	0.904	1	1.443	1.305
4	Arohan	0.933	0.879	1	0.933	0.82
5	Asirvad	0.539	0.846	1	0.539	0.456
6	Asomi	0.149	0.57	1	0.149	0.085
7	Bandhan	1.991	0.584	1	1.991	1.163
8	BASIX	0.963	0.872	1	0.963	0.84
9	BISWA	1.797	0.386	1	1.797	0.693
10	BJS	1	0.795	1	1	0.795
11	BSS	1.493	0.763	1	1.493	1.139
12	BWDAFinance	3.706	0.422	1	3.706	1.563
13	CashporMC	0.354	0.788	1	0.354	0.279
14	Disha	0.954	0.345	1	0.954	0.329
15	Equitas	0.869	0.763	1	0.869	0.664
16	ESAF	0.957	0.65	1	0.957	0.622
17	GFSPL	1.04	0.742	1	1.04	0.771

18	GOF	1.307	0.597	1	1.307	0.78
19	GramaVidyal Microfinance Ltd	0.702	0.656	1	0.702	0.46
20	GU	2.547	0.393	1	2.547	1.001
21	HiH	0.102	0.001	1	0.102	0.00
22	IDFFinancialServices	1.697	0.392	1	1.697	0.664
23	IndurMACS	1.442	0.565	1	1.442	0.815
24	Janodaya	2.5	0.684	1	2.5	1.709
25	KBSLAB	1.386	0.752	1	1.386	1.043
26	Mahasemam	1.368	0.56	1	1.368	0.767
27	Mahashakti	1.387	0.466	1	1.387	0.646
28	MimoFinance	1.109	0.707	1	1.109	0.784
29	MMFL	3.267	0.326	1	3.267	1.064
30	NBJK	1	0.849	1	1	0.849
31	NCS	1	0.587	1	1	0.587
32	NEED	1.363	0.604	1	1.363	0.822
33	Pustikar	1.031	0.758	1	1.031	0.782
34	PWMACS	1.242	0.635	1	1.242	0.789
35	RASS	1.836	0.384	1	1.836	0.704
36	RGVN	1.534	0.491	1	1.534	0.752
37	Samasta	0.281	0.296	1	0.281	0.083
38	Sanghamithra	2.568	0.298	1	2.568	0.766
39	Sarala	1.07	0.417	1	1.07	0.446
40	Sarvodaya Nano Finance	4.909	0.216	1	4.909	1.059
41	SCNL	0.489	0.729	1	0.489	0.357
42	SEWABank	1.622	0.673	1	1.622	1.091
43	SHARE	0.994	0.601	1	0.994	0.598
44	SKDRDP	1.678	0.335	1	1.678	0.561
45	SKS	0.99	0.671	1	0.99	0.664
46	SMILE	0.87	0.402	1	0.87	0.35
47	SMSS	1.785	0.582	1	1.785	1.04
48	Sonata	0.934	0.656	1	0.934	0.613
49	Spandana	1.17	0.483	1	1.17	0.565
50	SU	1.808	0.478	1	1.808	0.864
51	Swadhaar	0.573	0.172	1	0.573	0.098
52	SWAWS	0.696	0.733	1	0.696	0.511
53	Trident Microfinance	0.576	0.662	1	0.576	0.381
54	Ujjivan	0.555	0.71	1	0.555	0.394
55	VFS	0.501	0.59	1	0.501	0.295
Mean		1.069	0.439	1	1.069	0.469

Table 1F

Malmquist Index Summary of Year 2010 (when output is gross loan portfolio & number of active borrowers)

Sl. no	Firm Name	effch	techch	pech	sech	tfpch
1	Adhikar	1.353	1.138	1	1.353	1.539
2	Ajiwika	2.05	0.851	1	2.05	1.745
3	AML	1.617	1.138	1	1.617	1.839
4	Arohan	1.489	1.084	1	1.489	1.614
5	Asirvad	0.88	1.12	1	0.88	0.986
6	Asomi	1.137	1.119	1	1.137	1.272
7	Bandhan	0.856	1.138	1	0.856	0.974
8	BASIX	0.646	1.717	1	0.646	1.11
9	BISWA	0.922	1.138	1	0.922	1.049
10	BJS	1	0.777	1	1	0.777
11	BSS	1.287	1.168	1	1.287	1.504
12	BWDAFinance	1.559	1.146	1	1.559	1.786
13	CashporMC	1.555	0.965	1	1.555	1.501
14	Disha	1.0481	43.413	1	1.0481	93.868
15	Equitas	0.843	1.159	1	0.843	0.977
16	ESAF	0.767	1.31	1	0.767	1.004
17	GFSPL	1.018	1.363	1	1.018	1.388
18	GOF	1.2	1.209	1	1.2	1.451
19	GramaVidyalMicrofinanceLtd.	1.268	1.046	1	1.268	1.326
20	GU	1.018	1.044	1	1.018	1.063
21	HiH	0.999	1.312	1	0.999	1.311
22	IDFFinancialServices	0.854	1.092	1	0.854	0.933
23	IndurMACS	1.75	1.104	1	1.75	1.931
24	Janodaya	0.986	1.507	1	0.986	1.486
25	KBSLAB	0.528	2.026	1	0.528	1.07
26	Mahasemam	0.728	1.405	1	0.728	1.022
27	Mahashakti	1.311	0.997	1	1.311	1.308
28	MimoFinance	0.68	1.245	1	0.68	0.848
29	MMFL	0.564	1.115	1	0.564	0.629
30	NBJK	1	1.531	1	1	1.531
31	NCS	1	1.248	1	1	1.248
32	NEED	1.089	0.973	1	1.089	1.06
33	Pustikar	0.805	1.518	1	0.805	1.222
34	PWMACS	1.227	1.105	1	1.227	1.355
35	RASS	1.366	1.058	1	1.366	1.445

36	RGVN	1.14	0.954	1	1.14	1.088
37	Samasta	0.778	1.235	1	0.778	0.961
38	Sanghamithra	1.052	0.966	1	1.052	1.017
39	Sarala	0.737	0.942	1	0.737	0.695
40	Sarvodaya Nano Finance	1.529	1.018	1	1.529	1.557
41	SCNL	0.582	1.232	1	0.582	0.718
42	SEWA Bank	0.351	2.483	1	0.351	0.872
43	SHARE	1.398	0.936	1	1.398	1.308
44	SKDRDP	1.118	0.923	1	1.118	1.032
45	SKS	0.964	0.971	1	0.964	0.936
46	SMILE	0.631	0.946	1	0.631	0.597
47	SMSS	1.308	0.926	1	1.308	1.212
48	Sonata	0.673	1.138	1	0.673	0.766
49	Spandana	1.017	0.931	1	1.017	0.947
50	SU	0.88	0.98	1	0.88	0.862
51	Swadhaar	0.376	1.285	1	0.376	0.484
52	SWAWS	0.812	0.936	1	0.812	0.76
53	Trident Microfinance	1.115	0.926	1	1.115	1.032
54	Ujjivan	0.575	1.171	1	0.575	0.674
55	VFS	1.263	0.928	1	1.263	1.172
Mean		0.97	1.283	1	0.97	1.245

Table 1G

Sl. no	Firm Name	tfpch2009	tfpch2010	% change of tfp in 2009	% change of tfp in 2010
1	Adhikar	1.787	1.539	78.7	53.9
2	AML	1.305	1.839	30.5	83.9
3	Bandhan	1.163	0.974	16.3	-2.6
4	BSS	1.139	1.504	13.9	50.4
5	BWDA Finance	1.563	1.786	56.3	78.6
6	GU	1.001	1.063	0.1	6.3
7	Janodaya	1.709	1.486	70.9	48.6
8	KBSLAB	1.043	1.07	4.3	7
9	MMFL	1.064	0.629	6.4	-37.1
10	Sarvodaya Nano Finance	1.059	1.557	5.9	55.7
11	SEWA Bank	1.091	0.872	9.1	-12.8
12	SMSS	1.04	1.212	4	21.2

Table 1H

Sl. no	Firm Name	tfpch2009	tfpch2010	% change of tfp in 2010
1	Ajiwika	0	1.745	74.5
2	Arohan	0.82	1.614	61.4
3	Asomi	0.085	1.272	27.2
4	BASIX	0.84	1.11	11
6	CashporMC	0.279	1.501	50.1
7	Disha	0.329	93.868	9286.8
9	GFSPL	0.771	1.388	38.8
10	GOF	0.78	1.451	45.1
11	GramaVidyal Microfinance Ltd.	0.46	1.326	32.6
12	HiH	0	1.311	31.1
13	IndurMACS	0.815	1.931	93.1
15	Mahashakti	0.646	1.308	30.8
16	NBJK	0.849	1.531	53.1
17	NCS	0.587	1.248	24.8
19	Pustikar	0.782	1.222	22.2
20	PWMACS	0.789	1.355	35.5
21	RASS	0.704	1.445	44.5
24	SHARE	0.598	1.308	30.8
27	VFS	0.295	1.172	17.2

Table 2D

Growth Rate (%) of Individual MFIs with negative growth rate in TFP calculated from Means Mamlquist Index Summary of Firms (2008-2010)

Sl. No	Firm Name	techch	sech	tfpch
1	Ajiwika	-96.4	0	-96.4
2	Asirvad	-13.4	-22.9	-33.2
3	Asomi	-25.2	-55.5	-66.7
4	BASIX	4	-10.7	-7.2
5	BISWA	-39	39.9	-14.6
6	BJS	-21.7	0	-21.7
7	Disha	-37.5	0	-37.5
8	Equitas	-10.3	-5.3	-15.1
9	ESAF	-17.6	-3.8	-20.7

10	GramaVidyal Microfinance Ltd.	-21.8	0.7	-21.3
11	HiH	-91	-61.5	-96.5
12	IDF Financial Services	-36.5	27.6	-18.9
13	KBSLAB	-10.7	7.2	-4.3
14	Mahasemam	-14.1	1.7	-12.6
15	Mahashakti	-62.4	-4.5	-64.1
16	Mimo Finance	-11.2	-11.7	-21.6
17	MMFL	-39.9	36.5	-18
18	NCS	-15.7	0	-15.7
19	NEED	-22.3	18	-8.4
20	Pustikar	-20.8	-8.5	-27.5
21	PWMACS	-24.6	30.5	-1.6
22	RGVN	-30.9	29.6	-10.4
23	Samasta	-40.2	-53.2	-72
24	Sanghamithra	-64.9	-41.3	-79.4
25	Sarala	-37.3	-11.2	-44.3
26	SCNL	-23.7	-40.3	-54.4
27	SEWABank	-15.1	7.1	-9.1
28	SHARE	-27.7	19.1	-13.9
29	SKDRDP	-41.3	33.5	-21.7
30	SKS	-19.9	-1.6	-21.1
31	SMILE	-38.9	-25.9	-54.8
32	Sonata	-13.9	-20.6	-31.6
33	Spandana	-33.3	10.4	-26.3
34	SU	-31.6	26.2	-13.7
35	Swadhaar	-54.3	-54.4	-79.1
36	Trident Microfinance	-24.1	-18.2	-37.9
37	Ujjivan	-11.4	-42.1	-48.7
38	VFS	-26.7	-20.2	-41.5

Table 2E

Malmquist Index Summary of MFIs (2009)

Sl. no	Firm Name	effch	techch	pech	sech	tfpch
1	Adhikar	2.007	0.89	1	2.007	1.787
2	Ajiwika	1	0.002	1	1	0.002
3	AML	1.444	0.904	1	1.444	1.305
4	Arohan	0.932	0.896	1	0.932	0.835
5	Asirvad	0.539	0.845	1	0.539	0.456
6	Asomi	0.152	0.569	1	0.152	0.087
7	Bandhan	1.994	0.582	1	1.994	1.16
8	BASIX	0.822	0.928	1	0.822	0.763
9	BISWA	1.799	0.386	1	1.799	0.694
10	BJS	1	0.795	1	1	0.795
11	BSS	1.5	0.76	1	1.5	1.14
12	BWDA Finance	3.655	0.447	1	3.655	1.633
13	CashporMC	0.346	0.794	1	0.346	0.274
14	Disha	0.954	0.347	1	0.954	0.331
15	Equitas	0.899	0.787	1	0.899	0.708
16	ESAF	0.852	0.656	1	0.852	0.559
17	GF SPL	0.967	0.736	1	0.967	0.712
18	GOF	1.332	0.587	1	1.332	0.782
19	Grama Vidiyal Microfinance Ltd	0.678	0.644	1	0.678	0.437
20	GU	2.547	0.392	1	2.547	0.998
21	HiH	0.102	0.001	1	0.102	0
22	IDF Financial Services	1.699	0.391	1	1.699	0.665
23	Indur MACS	1.581	0.53	1	1.581	0.839
24	Janodaya	2.5	0.611	1	2.5	1.529
25	KBSLAB	2.099	0.448	1	2.099	0.941
26	Mahasemam	1.368	0.54	1	1.368	0.739
27	Mahashakti	0.665	0.145	1	0.665	0.097
28	Mimo Finance	1.074	0.654	1	1.074	0.702
29	MMFL	3.297	0.324	1	3.297	1.068
30	NBJK	1	0.874	1	1	0.874
31	NCS	1	0.582	1	1	0.582
32	NEED	1.277	0.621	1	1.277	0.793
33	Pustikar	1	0.454	1	1	0.454
34	PWMACS	1.388	0.548	1	1.388	0.76
35	RASS	1.937	0.359	1	1.937	0.695

36	RGVN	1.473	0.501	1	1.473	0.737
37	Samasta	0.274	0.293	1	0.274	0.08
38	Sanghamithra	0.327	0.127	1	0.327	0.042
39	Sarala	1.07	0.417	1	1.07	0.446
40	Sarvodaya Nano Finance	4.954	0.212	1	4.954	1.051
41	SCNL	0.677	0.46	1	0.677	0.311
42	SEWABank	2.464	0.395	1	2.464	0.972
43	SHARE	1.015	0.558	1	1.015	0.567
44	SKDRDP	1.594	0.373	1	1.594	0.594
45	SKS	1.005	0.662	1	1.005	0.665
46	SMILE	0.87	0.394	1	0.87	0.343
47	SMSS	1.823	0.559	1	1.823	1.02
48	Sonata	0.869	0.672	1	0.869	0.584
49	Spandana	1.198	0.478	1	1.198	0.573
50	SU	1.808	0.477	1	1.808	0.863
51	Swadhaar	0.546	0.167	1	0.546	0.091
52	SWAWS	0.696	0.722	1	0.696	0.502
53	TridentMicrofinance	0.6	0.622	1	0.6	0.373
54	Ujjivan	0.577	0.687	1	0.577	0.397
55	VFS	0.505	0.579	1	0.505	0.292

Table 2F

Malmquist Index Summary of MFIs (2010)

Sl. no	Firm Name	effch	techch	pech	sech	tfpch
1	Adhikar	1.718	0.891	1	1.718	1.531
2	Ajiwika	1	0.829	1	1	0.829
3	AML	1.991	0.911	1	1.991	1.814
4	Arohan	1.761	0.872	1	1.761	1.536
5	Asirvad	1.103	0.888	1	1.103	0.98
6	Asomi	1.302	0.983	1	1.302	1.279
7	Bandhan	1.041	0.933	1	1.041	0.971
8	BASIX	0.969	1.164	1	0.969	1.128
9	BISWA	1.089	0.964	1	1.089	1.05
10	BJS	1	0.77	1	1	0.77
11	BSS	1.687	0.885	1	1.687	1.492
12	BWDAFinance	1.83	0.975	1	1.83	1.783
13	CashporMC	3.08	1.667	1	3.08	5.134
14	Disha	1.048	1.125	1	1.048	1.179
15	Equitas	0.997	1.022	1	0.997	1.019

16	ESAF	1.086	1.035	1	1.086	1.123
17	GF SPL	1.473	1.042	1	1.473	1.535
18	GOF	1.361	1.114	1	1.361	1.517
19	GramaVidyalMicrofinanceLtd.	1.495	0.949	1	1.495	1.419
20	GU	1.192	0.964	1	1.192	1.149
21	HiH	1.455	10.146	1	1.455	14.762
22	IDFFinancialServices	0.959	1.031	1	0.959	0.988
23	IndurMACS	1.863	1.07	1	1.863	1.993
24	Janodaya	1.353	5.454	1	1.353	7.381
25	KBSLAB	0.548	1.777	1	0.548	0.973
26	Mahasemam	0.756	1.366	1	0.756	1.032
27	Mahashakti	1.372	0.975	1	1.372	1.338
28	MimoFinance	0.727	1.205	1	0.727	0.876
29	MMFL	0.565	1.114	1	0.565	0.629
30	NBJK	1	1.531	1	1	1.531
31	NCS	1	1.22	1	1	1.22
32	NEED	1.089	0.973	1	1.089	1.06
33	Pustikar	0.838	1.379	1	0.838	1.156
34	PWMACS	1.227	1.037	1	1.227	1.273
35	RASS	1.959	4.155	1	1.959	8.139
36	RGVN	1.14	0.954	1	1.14	1.088
37	Samasta	0.8	1.218	1	0.8	0.975
38	Sanghamithra	1.052	0.966	1	1.052	1.017
39	Sarala	0.737	0.942	1	0.737	0.695
40	SarvodayaNanoFinance	1.529	1.018	1	1.529	1.557
41	SCNL	0.527	1.265	1	0.527	0.667
42	SEWABank	0.465	1.825	1	0.465	0.849
43	SHARE	1.398	0.936	1	1.398	1.308
44	SKDRDP	1.118	0.923	1	1.118	1.032
45	SKS	0.964	0.971	1	0.964	0.936
46	SMILE	0.631	0.946	1	0.631	0.597
47	SMSS	1.308	0.926	1	1.308	1.212
48	Sonata	0.725	1.105	1	0.725	0.8
49	Spandana	1.017	0.931	1	1.017	0.947
50	SU	0.88	0.98	1	0.88	0.862
51	Swadhaar	0.381	1.252	1	0.381	0.477
52	SWAWS	1.591	10.108	1	1.591	16.081
53	Trident Microfinance	1.115	0.926	1	1.115	1.032
54	Ujjivan	0.58	1.143	1	0.58	0.663
55	VFS	1.263	0.928	1	1.263	1.172

Table 2H

Sl. No	Firm Name	TFP change in 2009	TFP change in 2010	% change in TFP in 2010
1	Arohan	0.835	1.536	53.6
2	Asomi	0.087	1.279	27.9
3	BASIX	0.763	1.128	12.8
4	BISWA	0.694	1.05	5.0
5	CashporMC	0.274	5.134	413.4
6	Disha	0.331	1.179	17.9
7	Equitas	0.708	1.019	1.9
8	ESAF	0.559	1.123	12.3
9	GFSPL	0.712	1.535	53.5
10	GOF	0.782	1.517	51.7
11	GramaVidyal Microfinance Ltd.	0.437	1.419	41.9
12	GU	0.998	1.149	14.9
13	HiH	0	14.762	1376.2
14	IndurMACS	0.839	1.993	99.3
15	Mahasemam	0.739	1.032	3.2
16	Mahashakti	0.097	1.338	33.8
17	NBJK	0.874	1.531	53.1
18	NCS	0.582	1.22	22
19	NEED	0.793	1.06	6.0
20	Pustikar	0.454	1.156	15.6
21	PWMACS	0.76	1.273	27.3
22	RASS	0.695	8.139	713.9
23	RGVN	0.737	1.088	8.8
24	Sanghamithra	0.042	1.017	1.7
25	SHARE	0.567	1.308	30.8
26	SKDRDP	0.594	1.032	3.2
27	SWAWS	0.502	16.081	1508.1

28	Trident Microfinance	0.373	1.032	3.2
29	VFS	0.292	1.172	17.2

Table 2.1 H

Sl. No	Firm Name	2009	2010	2009	2010	2009	2010
		techch	techch	pech	pech	sech	sech
1	Arohan	0.896	0.872	1	1	0.932	1.761
2	Asomi	0.569	0.983	1	1	0.152	1.302
3	BASIX	0.928	1.164	1	1	0.822	0.969
4	BISWA	0.386	0.964	1	1	1.799	1.089
5	CashporMC	0.794	1.667	1	1	0.346	3.08
6	Disha	0.347	1.125	1	1	0.954	1.048
7	Equitas	0.787	1.022	1	1	0.899	0.997
8	ESAF	0.656	1.035	1	1	0.852	1.086
9	GFSP	0.736	1.042	1	1	0.967	1.473
10	GOF	0.587	1.114	1	1	1.332	1.361
11	Grama Vidiyal Microfinance Ltd.	0.644	0.949	1	1	0.678	1.495
12	GU	0.392	0.964	1	1	2.547	1.192
13	HiH	0.001	10.146	1	1	0.102	1.455
14	IndurMACS	0.53	1.07	1	1	1.581	1.863
15	Mahasemam	0.54	1.366	1	1	1.368	0.756
16	Mahashakti	0.145	0.975	1	1	0.665	1.372
17	NBJK	0.874	1.531	1	1	1	1
18	NCS	0.582	1.22	1	1	1	1
19	NEED	0.621	0.973	1	1	1.277	1.089
20	Pustikar	0.454	1.379	1	1	1	0.838
21	PWMACS	0.548	1.037	1	1	1.388	1.227
22	RASS	0.359	4.155	1	1	1.937	1.959
23	RGVN	0.501	0.954	1	1	1.473	1.14
24	Sanghamithra	0.127	0.966	1	1	0.327	1.052
25	SHARE	0.558	0.936	1	1	1.015	1.398
26	SKDRDP	0.373	0.923	1	1	1.594	1.118
27	SWAWS	0.722	10.108	1	1	0.696	1.591
28	TridentMicrofinance	0.622	0.926	1	1	0.6	1.115
29	VFS	0.579	0.928	1	1	0.505	1.263

Table 3A: Generalized Least Squares Regression Results (Output-GLP and number of active borrowers)

	Coefficient	Standard error	Z	P> z
Constant	2.032886**	0.3105595	6.55	0.000
Return on asset	5.534846**	1.490138	3.71	0.000
Portfolio at risk:30days	0.3917208**	0.1909325	2.05	0.040
Operational self sufficiency	-1.048713**	0.2845421	-3.69	0.000
Capital asset ratio of current year	1.070301**	0.39676	2.7	0.007
Capital asset ratio of previous year	-0.7814448**	0.2270009	-3.44	0.001
Cost per borrower	-0.0026202	0.0032436	-0.81	0.419

** Significant at 5% level of significance

Table 3B: Generalized Least Squares Regression Results (Output-GLP and number of women borrowers)

	Coefficient	Standard error	Z	P> z
Constant	2.212076**	0.4798396	4.61	0.000
Return on asset	6.443414**	2.302384	2.8	0.005
Portfolio at risk:30days	0.2990499	0.2950062	1.01	0.311
Operational self sufficiency	-1.208333**	0.4396406	-2.75	0.006

Capital asset ratio of current year	1.145627	0.6130263	1.87	0.062
Capital asset ratio of previous year	-0.8917262**	0.3507348	-2.54	0.011
Cost per borrower	-0.0018765	0.0050117	-0.37	0.708

** Significant at 5% level of significance

List of Working Paper

S. No	WP. No	Title	Author(s)
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