FINANCIAL EFFICIENCY ANDSUSTAINABILITY OF MICROFINANCE INSTITUTIONS IN INDIA: FRONTIER EFFICIENCY APPROACH

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Abstract

The present study seeks to evaluate the performance of 30 Indian microfinance institutions (MFIs) during the sample period of **2006-2012** using frontier efficiency techniques.The empirical result shows that there are significant inefficiency effects. The study estimates the standard Translog cost and profit function using parametric technique involving distribution free approach to obtain average cost and profit efficiency estimates for sample individual MFIs during the relevant period. The estimated relative cost efficiencies for all MFIs range from 0.578 to 1 with an average of 0.76 during the sample period. The profit efficiency ranged from 0.125 to 1 with an average of 0.301. The group-wise analysis reveals that Non Government Organizations (NGOs) are thebetter performerin terms of cost and profit efficiency than Non Banking Micro Finance Institutions (NBFIs). Size seems to be a significant factor explaining performance of Indian MFIs.

Keywords: Microfinance Institutions (MFIs), Financial Efficiency, Frontier Efficiency Techniques, Parametric Technique, Financial Sustainability.

JEL classification numbers: G20, G21, G32, C67

1. INTRODUCTION

The formal financial sector has failed to meet the financial needs of the poor and low income generating micro enterprises indeveloping countries like India. Banks perceive small loans and small savings deposits as highly risky and involve high transaction costs that make them non-bankable. The lack of loans from formal institutions leads to dependency of poor to borrow money from local money-lenders on huge interest rates. Government of India has emphasized upon providing financial services to the poor and underprivileged. The 1969 nationalization of commercial banks constitutes the directions to concessional lending of 40% of bank's loanable funds to the priority sector that basically includes agricultural and rural sector activities and the weaker strata of society.Further, in order to broaden the outreach of formal credit systems to the rural population,Regional Rural banks (RRBs) were established in the year 1975 as a major policy initiative for the same.However, the limitations such as lack of political will to enforce loan repayment by bank's creditors, access of formal financial sector mainly by wealthy and influential people rather than the poor to bank loans had hindered the wider reach, access and usage of formal financial services by poor and disadvantaged inhabitants of the country. Microfinance has emerged as an alternative credit delivery mechanism to effectively target the e credit requirements of poor. The provision of microfinance to the poor in India is being made by the wide variety of public and private institutions. Microfinance is a new finance paradigm that is expected to be an answer to deprivation and financial exclusion. Microfinance Institutions (MFIs) are those institutions which have microfinance as their main operation. MFIs generally act as an intermediary that borrow large amount of funds from the apex financial institutions, donors and banks and lend to micro enterprises and small borrowers. MFIs enable the access of financial services to the individuals or to the groups like Self-help Groups (SHGs), Grameen groups etc.

MFI in India is vibrant segment of the financial sector, exhibiting an extremely heterogeneous group. Some MFIs have brought a setback to the microfinance sector temporarily due to non-compliance of the regulatory norms and irresponsible lending. However, the sector regained its growth trajectoryfrom 2012–13 onwards and is showing consistent development. In the year2014-15, RBI also granted specific banking licenses to 11 payment banks and 10 small finance banks. Of the 10 small finance banks, 8 were MFIs. MFIs have taken a revolutionary step by entering in the small finance bank segment. This will allow them to accept deposits and engaged in extending credit after sourcing money from commercial banks which will significantly lower their cost of borrowing and enable them to bring down their rate of interest on loans. The sector is benefitted with the strengthening of regulatory framework by the Government andReserve Bank of India. The stylized facts of MFIs in India show that the client outreach is the important indicator of the growth of MFIs. The MFIs served 370 lakh clients in the year 2014.Indian microfinance can be described basically a rural phenomenon. However, the proportion of urban clients is improving. The trend of the rural-urban presence of MFIs shows that the proportion of rural to urban clients for the year 2012-13 was 67% to 33%. In the year, 2013-14, the share of urban clientele has increased to 44%.
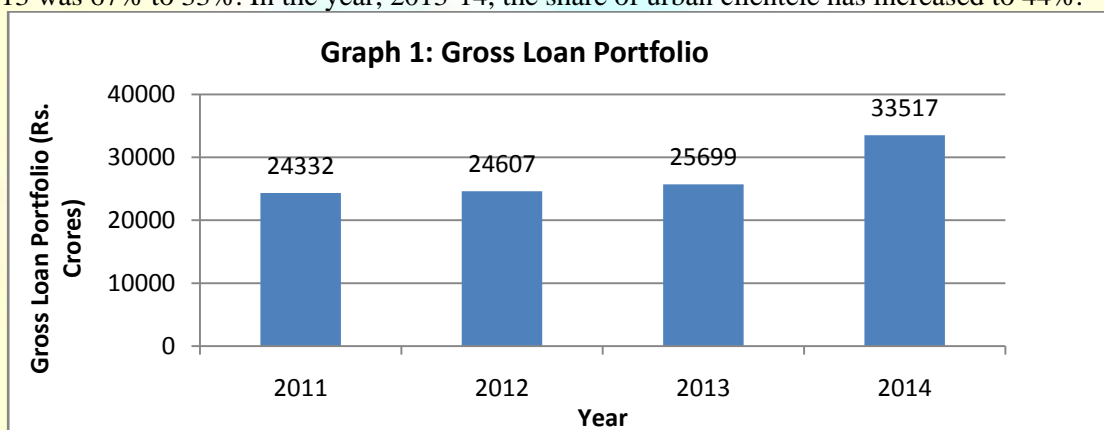
Graph 1: Gross Loan Portfolio

Source: Compiled from NABARD Report on Microfinance, 2014

Graph 2: Yield of MFIs
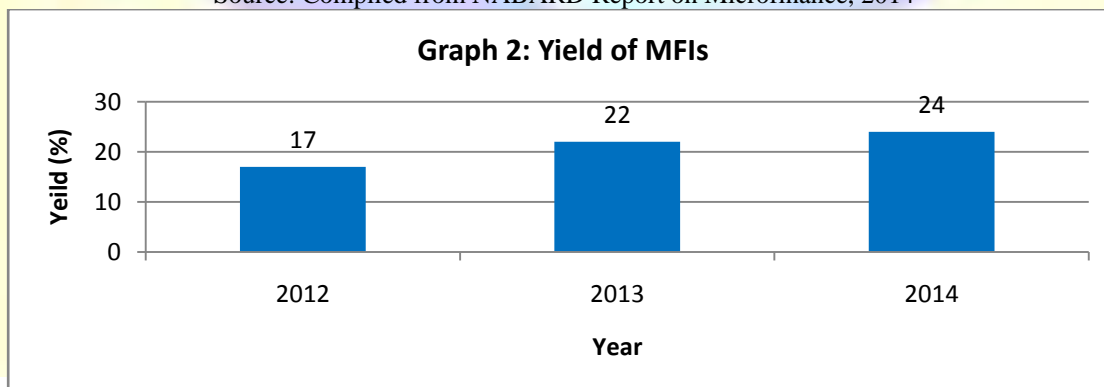
Source: Compiled from NABARD Report on Microfinance, 2014

The focus of MFIs is to serve poor, women and people from Scheduled Castes, Scheduled Tribes and Minorities. 96% of total clients of MFIs constitute women clients.Credit is the main service offered by MFIs to clients who are financially excluded formal financial system.The primary revenue generating asset for MFIs is the loan portfolio.The level of loan portfolio determines the financial performance of MFIs. The gross loan portfolios of MFIs show a consistent increasing trend (Graph 1). The analysis of Yield on Loan Portfolio alsoshows an increasing trend and reflects the consistent improvements in the portfolioqualityof MFIs (Graph 2).In the light of these facts the present study attempts to evaluate

empirically the performance of MFIs using frontier efficiency techniques. In particular, the study seeks to analyze cost and profit efficiency of sample MFIs to evaluate its performance during the sample period of 2006-2012.The investigation of India's MFI's efficiency and profitability is more relevant issue today than in earlier times. The Andhra Pradesh's MFIs crisis in year 2010 that witnessed the mass suicide of microcredit debtors due to default in loan repayment and resultant stress and desperation necessitated the focus on responsible lending, effective regulatory framework for MFIs and a strong operational sustainability. In fact, in the light of new regulatory framework and market developments in the post Andhra crisis, the analysis of MFI'sactivities and performance has gained the importance amongst policy makers, researchers and practitionersin India to assess the operational sustainability of MFIs in the new environment. Sustainability refers to the capacity of an institution to stay financially viable even if subsidies and financial aids are cut off.MFIs make use of the marginal and scarce capital and the intended to benefit marginalized and disadvantageous sections of the society. The achievement of financial sustainability is an important prerequisite to continue pursuing the socio-economic objectives effectively. The instability and operative inefficiency of MFIs may havesevere implications for all the stakeholders. The rest of the paper proceeds as follows:**Section 2**, presents review of relevant literature on performance appraisal of MFIs.**Section 3**defines the database and variables used in the study along with econometric model and methodology whereas**Section 4** provides the empirical results and **Section 5** summarizes the basic findings of this study.

2.   LITERATURE REVIEW

Numerous empirical studies were conducted in 1990s; recently most research has been conducted on MFI efficiency because it has got the attention of academicians and practitioners as an innovative method of providing access to formal financial services to the financially excluded section of society.**Naithani, (2001)** critically examined the impact of microfinance on the all round development of the poor and expressed some authors have also advocated for extending this concept to other areas like basic education, health, infrastructure development etc.**Befekadu B. Kereta (2007)** assessed the performance of microfinance institutions of Ethiopia to measure outreach and financial sustainability of MFIs and found the women's access of MFIs to be positively correlated with its financial performance. So MFIs should increase client outreach to achieve social mission as well as profitability.**Bassem (2008)**provided the efficiency analysis using DEA technique for 35 MFIs of Mediterranean zone and found that 8 sampled MFIs as efficient. The size of the MFIwas found to be negatively related to the firm's efficiency.**Hassan & Sanchez, (2009)** examined technical and scales efficiencies of microfinance institutions (MFIs) and compared efficiencies across regions and across type of MFIs in 2005 using DEA method and found that "MFIs are either wasting resources or are not producing enough outputs i.e. making enough loans, raising funds, and getting more borrowers". **Annim (2010)** used balanced panel data of 164 MFIs for the period 2004-2008 to evaluate MFIs efficiency and applied both parametric and non-parametric efficiency techniques. **Abayie et al. (2011)**applied two-stage efficiency analysis to examine the economic efficiency of MFIs in Ghana. At the first stage parametric Stochastic Frontier Approach is used and in the second stage, Tobit regression is used to identify the determinants of efficiency. The average economic efficiency was found to be 56.29 percent. The age, level of savings and cost per borrower of MFIs were the significant factors explaining the efficiency levels. **Jayamaha (2012) estimated the efficiency of** small financial institutions (SFIs) with data of 1933 firms during 2005 to 2010 using Data envelopment analysis (DEA). The efficiency of CRBs in Sri Lanka is found declined during the study period.**Singh et al. (2013)** evaluated firm-level economic efficiency of 41 Indian MFIs by using non parametric DEA. The input oriented and output oriented approaches were used to analyze efficiency. The factors explaining efficiency were analyzed by using Tobit regression. The study found that MFIs operating in southern India are more efficient. MFIs witnessed sub-optimal output level to the extent that the output levels can be increased to

the extent of 59.4 percent.

3. DATA AND ECONOMETRIC MODEL

The study seeks to evaluate performance of sample MFIs during the sample period of 2006-2012.The analysis is based on the balanced data of 40 MFIs that consist of two popular legal forms viz Non- Banking Finance Companies (NBFCs)MFIs (NBFIs) and Non Government Organizations (NGOs). The selection criterion of MFI in the sample is the availability of continuous data for the sample period on MIX, USA website. In the sample, 30 MFIs belong to NBFC category and 10 MFIs belong to NGO category. The data on the microfinance sector is collected from NABARD annual reports and microfinance self regulatory organizations.

The concept of cost efficiency and profit efficiency is used to analyze the firm level performance of MFIs. "The level of cost efficiency measures how close a MFI's actual cost is to what a best practice institution's cost would be for producing an identical output bundle under comparable condition. The level of profit efficiency as a measure of profitability on the other hand focuses on how close the MFI's profit is to the best practice MFI's profit for specific input prices and outputs under given conditions" (Rajput,A. & Rajput,B.(2013).The standard Translog cost and profit functions are estimated to obtain average cost and profit efficiency levels for individual MFIs in the sample during the sample period under study. The parametric technique involving distribution free approach to obtain average cost andprofit efficiency estimates for sample individual MFIs during the relevant period are calculated. The cost efficiency is given by:

$$CostEff^i = \frac{C^{\min}}{C^i} = \frac{\exp[f(w^i,q^i,z^i,h^i)]\times\exp[IN\mu_c^{\min}]}{\exp[f(w^i,q^i,z^i,h^i)]\times\exp[In\mu_c^i]} = \frac{\mu_c^{\min}}{\mu_c^i} \quad (1)$$

The profit efficiency is given by:

$$\pi EFF^i = \frac{a\pi^i}{a\pi^{\max}} = \frac{\left\{\exp[f(w^i,q^i,z^i,h^i,v^i)]\times\exp[In\mu_\pi^i]\right\}}{\left\{\exp[f(w^i,q^i,z^i,h^i,v^i)]\times\exp[In\mu_{a\pi}^{\max}]\right\}} = \frac{\mu_\pi^i}{\mu_{a\pi}^{\max}} \quad (2)$$

The value of Alt πEFF^i gives the proportion of maximum profits that can be earned. The numerator and denominator are averaged over the sample period before dividing in equation above. Profit efficiency estimates will range between 0 &1 and equals 1 for the best practice firm with in the observed data and 0 for the most inefficient MFI.The study uses intermediation approach to define variables of the cost and profit function used in the estimation of efficiency measures.Applying duality properties, Translog the following cost function is estimated

$$In(C/w_1z) = \beta_0 + \sum_{i=1}^{2}\beta_i In(w_i/w_1) + \frac{1}{2}\sum_{i=1}^{2}\sum_{j=1}^{2}\beta_{ij}In(w_i/w_1)In(w_j/w_1)$$

$$+ \sum_{k=1}^{2}\gamma_k In(q_k/z) + \frac{1}{2}\sum_{k=1}^{2}\sum_{m=1}^{2}\gamma_{km}In(q_k/z)In(q_m/z)$$

$$+\sum_{i=1}^{2}\sum_{k=1}^{2}\rho_{jk}In(w_i/w_1)In(q_k/z) + \alpha_b In(b) + \alpha_{bb}In(b)In(b) \qquad (3)$$

$$+\sum_{k=1}^{2}\delta_k In(b)In(q_k/z) + \sum_{i=1}^{2}\rho_i In(b)In(w_i/w_1) + d_{NBFI}$$

$$+d_{Time} + d_{govern} + In\mu_c + In\varepsilon_c$$

$$IN(\pi/w_1z) = \beta_0 + \sum_{i=1}^{2}\beta_i In(w_i/w_1) + \frac{1}{2}\sum_{i=1}^{2}\sum_{j=1}^{2}\beta_{ij}In(w_i/w_1)In(w_j/w_1)$$

$$+ \sum_{k=1}^{2}\gamma_k In(q_k/z) + \frac{1}{2}\sum_{k=1}^{2}\sum_{m=1}^{2}\gamma_{km}In(q_k/z)In(q_m/z)$$

$$+\sum_{i=1}^{2}\sum_{k=1}^{2}\rho_{jk}In(w_i/w_1)In(q_k/z) + \alpha_b In(b) + \alpha_{bb}In(b)In(b) \qquad (4)$$

$$+\sum_{k=1}^{2}\delta_k In(b)In(q_k/z) + \sum_{i=1}^{2}\rho_i In(b)In(w_i/w_1) + \theta IN(NPI_{it})$$

$$+ d_{NBFI} + d_{Time} + d_{govern} + In\mu_c + In\varepsilon_c$$

Where q refers to the output measures; w refers to the price of inputs measures z is the amount of equity plus reserves included as fixed environmental variable b is the branch variable. d_{NBFI} is the dummy variable which takes value 1 if the MFI is NBFI and 0 otherwise. d_{Time} is the dummy variable which takes the value 1 if the time period is 2010 (the year of Andhra Pradesh crisis) or beyond and 0 otherwise. d_{govern} is the dummy variable which takes the value 1 if the management of MFI has social objective as part of governance and 0 otherwise. μ_c denotes an inefficiency factor and ε_c denotes the standard statistical random error, which is normally distributed. ln denotes the natural logarithmic operator. Two output measures are used q_1 outstanding amount of loans and advances; q2: Non-interest income (fees, commission, brokerage etc). The input measures are

Labor measured by total number of employees of a MFI. **Purchased funds** given by sum total of deposits and borrowings and **Physical assets** is the sum total of fixed assets.

- The **price of labor (w_1)** is measured as expenditure incurred on employees divided by the total number of employees. Symbolically, it is

$$\frac{\text{Salaries and Wages}}{\text{Number of Employees}} \qquad (5)$$

- The **price of purchased funds (w_2)** is given by:

$$\frac{\text{Interest Paid}}{\text{Total deposits and Borrowings}} \qquad (6)$$

- The **price of physical assets (w_3)** is measured by:

$$\frac{\text{Total operating expenses minus personnel and interest expenses}}{\text{Book Value of Physical Assets}} \quad (7)$$

The total cost (C)means total operating cost andincludes interest cost, personnel expenses and other operating expenditure.The profit function uses the same specification as the cost function but the c is replaced by the profit π and is defined as difference between total revenues minus total cost.The profit reflects the operating profit earned during the period. The negative profit indicator (NPI) will takethe value of 1 for those firm with positive profits ($\pi > 0$) and is equal to absolute value of profit when companies incur losses ($\pi < 0$). Simultaneously, the dependent variable (π) take a value of 1 when profits are negative and the corresponding value when profits are positive. The composite error term is In ε_π –Inu.ln denotes the natural logarithmic operator. The Maximum Likelihood Estimation technique based on random effects is adopted to estimate the parameters of the cost and alternative profit functions using panel data set.

3.1 STRUCTURAL TESTS

In order to check the robustness of the model used to estimate efficiency of MFIs, two alternative specifications were also estimated viz. Cost and Profit Function using Narrow Definition of Output with only loans (q_1) as one output measures and second Cobb- Douglas functional form. The LR test is applied to check the efficacy of two alternative functional forms in the estimation of efficiency. Further, the spearman's correlation between efficiency measures and the standard non- frontier performance measures is estimated. The important ratios considered are Cost to Asset ratio(C/GTA), Return of Asset (ROA) and Return on equity (ROE). The cost and profit efficiency estimates should have negative rank-order with C/GTA ratio and positive with ROA and ROE.

4. EMPIRICAL RESULTS

Table1depicts the descriptive statistics of the variables used in the estimation of cost and profit function.The average price of funds is lower on an average for NGOs than NBFIs. NBFIs have higher interest cost than NGOs as NBFIs is dependent upon the commercial funds than donations as in the case of NGOs. But recently, the trend has reversed.

Table1: Descriptive Summary of the Variables(2006-2012)

Variables	All (n=280)			NBFI (210)			NGO(70)		
	Mean	MD	S.D.	Mean	MD	S.D.	Mean	MD	S.D.
LN(ROA)	0.005	0.03	0.135	0.002	0.032	0.148	0.013	0.028	0.085
LN(ROE)	-0.356	0.207	7.414	-0.635	0.167	8.532	0.482	0.347	0.892
C/GTA	0.218	0.199	0.131	0.221	0.2	0.141	0.21	0.19	0.094
w_1	121.2	107.0	82.9	130.7	117.2	87.8	93	82	58
w_2	0.13	0.114	0.127	0.135	0.12	0.144	0.113	0.106	0.045
w_3	0.072	0.048	0.099	0.075	0.05	0.11	0.062	0.041	0.057
Q2 to Assets	0.015	0.01	0.018	0.014	0.01	0.015	0.016	0.01	0.025
NIM	0.126	0.125	0.065	0.126	0.127	0.057	0.123	0.111	0.086
Q1 toAssets	0.836	0.849	0.215	0.837	0.838	0.224	0.833	0.867	0.187
E/A	0.199	0.158	0.169	0.223	0.182	0.166	0.128	0.073	0.159

Source: Authors Own Calculations.

The average price of material indicating the operating expenses and unit labor costs are higher for the NBFIs than for NGOs. NGOS seem to have greater focus on fee-based activities than NBFIs. The assets of an MFI comprise mostly of its net loan portfolio on an average more than 80% of the total assets constitute loans and advances. Thus, the traditional financial services in terms of lending remain the core activities of MFIs.

4.1 EFFICIENCY ESTIMATES: BASE MODEL

The estimated relative cost efficiencies for all MFIs range from 0.578 to 1 with an average of 0.76 during the sample period (Table 2).This indicates that a typical MFI could have saved on an average around 24 percent of their realized costs as compared to the best practice firm if X-inefficiencies were eliminated. The group-wise analysis reveals that NGOs seem to be better performer as far cost efficiency is concerned as it shows higher level of cost efficiency than NBFIs. However, the inter-firm variations in cost efficiency are higher for NGOs than for NBFIs.

Table2: Cost & Profit Efficiency Estimates (Base Model) ALL MFIs

Indicators	Cost Efficiency			Profit Efficiency		
	All	NBFI	NGO	All	NBFI	NGO
Average	0.76	0.759	0.762	0.301	0.294	0.324
Median	0.755	0.76	0.742	0.268	0.283	0.249
Minimum	0.578	0.633	0.578	0.125	0.125	0.138
Maximum	1	1	0.948	1	0.725	1
S.D.	0.086	0.08	0.106	0.175	0.14	0.262
C.V.	0.113	0.106	0.138	0.581	0.477	0.809

Source: Authors Own Calculations.

The measures of average and dispersion of relative profit efficiency estimates are summarized in the Table 2. The profit efficiency ranged from 0.125 to 1 with an average of 0.301 and standard deviation of 0.175. This indicates that MFIs could have increased on an average around 70 percent of their realized profits if X- inefficiencies were eliminated. NGOs are better performer in case of profit efficiency also with 0.324 average profit efficiency levels as compared to only 0.294 of average profit efficiency levels for NBFIs. The dispersion levels of profit efficiency estimates are higher than cost efficiency estimates for all categories of MFIs. The inter-firm variations in profitability for NGOs are significantly higher for NGOs than for NBFIs.The analysis of number of MFIs that lie on the frontier or termed as most efficient with respect to their performance (in terms of cost and profit efficiency) is in Table 3which shows that NGOs were able to maintain the most profit efficient performance (i.e. form part of the profit efficiency frontier) and NBFC was found to form part of cost efficiency frontier.

Table 3: Number of Frontier MFIs

	ALL	NBFC	NGOs
Cost Frontier	1	1	0
Profit Frontier	1	0	1

Source: Authors Own Calculations.   **Notes:** Efficiency frontiers are based on base model.

4.2 EFFICIENCYESTIMATES: MODEL WITH ONE OUTPUT

Table 4 reports the average efficiency estimates with loans and advances as output measure. The average cost efficiency levels are 0.522 for all MFIs. The average cost efficiency level are significantly lower for all MFIs i.e. if non-interest income is eliminated from the cost equation then the cost efficiency levels are under reported. The average profit efficiency estimates remain almost at the same level for the restrictive model as in the case of base model.

Table 4: Restrictive One- Output Model vs. Base Model

	Base Model (ALL Banks)		One- Output Model (All Banks)	
	Cost Efficiency	Profit Efficiency	Cost Efficiency	Profit Efficiency
Average	0.76	0.301	0.522	0.31
S.D.	0.086	0.175	0.233	0.188
Log-Likelihood	784.73***	1042.72***	764.66***	1008.75***
N	40	40	40	40
LR Chi-Sqr(5){p>chi-sqr}	20.07** (0.002)		34.21*** (0.000)	

Source: Authors Own Calculations.

*Figures as subscript parentheses degree of freedom for relevant test **a**nd p-value in parentheses.*

The LR test conducted to test the relevance of using base model as against restrictive model supports the model that includes non-interest income as output i.e. base model. The value of log-likelihood is much lower for two- output specification, and the LR test rejects the one-output restriction at 1 percent level of significance for the sample period both for cost and profit function. It means one-output model does not nest within itself the full model. The log-likelihood ratio test also rejects the Cobb-Douglas restriction for all cases. It means Cobb-Douglas function) is not suitable for the present data and the unrestricted Translog model more suitably depicts the cost and profit characteristics of Indian MFIs for the sample period (Table 5).

Table 5: Restrictive Cobb-Douglas vs. Full Translog Model

	Cost Function		Profit Function	
	Translog Model	**Cobb-Douglas**	**Translog Model**	**Cobb-Douglas**
Log-Likelihood	**784.73*****	611.75***	**1042.72*****	1013.58***
LR-Chi Sqr (21)	172.98***		29.38***	
Probability>Chi-Sqr	0.000		0.000	

Source: Authors Own Calculations.

4.3 CORRELATION BETWEEN EFFICIENCY ESTIMATES AND RAW DATA PERFORMANCE MEASURES

As robustness check, the rank- order correlations among the frontier efficiency estimates and financial ratios based raw-data measures of efficiency for the sample are depicted in Table 6. It is found that the "correlations between the efficiency estimates and each of the raw-data measures follow the expected pattern. Both profit and cost efficiency estimates is negatively and significantly correlated with the standard average cost ratio i.e. C/GTA and positively and significantly correlated with the standard profitability ratios i.e. ROA and ROE. Thus, the efficiency measures are robust and not simply the consequences of the specifications or methods and supports the choice of the Translog model"(Rajput,A. & Rajput,B.,2013).

Table 6: Correlation Coefficient$^{@}$ between Efficiency Estimates and Raw Data Performance Measures

	Cost Efficiency	ProfitEfficiency	ROA	Cost/Assets	ROE
Cost Efficiency	**1**				
Profit Efficiency	**0.6406***	**1**			
ROA	**0.4528***	**0.0999****	**1**		
Cost/Assets	**-0.5234****	**-0.0107***	**-0.8378*****	**1**	
ROE	**0.149***	**0.1617****	**0.5355*****	**-0.5133*****	**1**

Source: Authors Own Calculations.Notes: Value in parentheses denotes p- valueof the test for zero correlation.

4.4 MFI'S SIZE AND EFFICIENCY ESTIMATES

The size-wise cost efficiency analysis reveals a lower level of the cost efficiency estimates for all small MFIs for the base model (Table7). However, the small MFIs are found to be more efficient in advancing loans as the cost efficiency estimates were higher for small MFIs than for the larger MFIs with one-output model. The cost efficiency estimates remain lower for all sizes of MFIs. The mid-sized MFIs were found to have greater variability of cost efficiency under both the models. Further, the cost efficiency levels remain lower for one-output model in all sizes as compared to base model. In general, the cost efficiency estimates of larger MFIs are more tightly distributed than small MFIs with lower standard deviation in the cost efficiency levels under both models. The profit efficiency analysis reveals the same picture with lower level of average profit efficiency for the all sizes of MFIs under one-output model as compared to base model (Table 8). Thus the performance of MFIs under all sizes is underreported in case of one output model

(Table 7& 8).The variations in the profit efficiency levels are higher for the larger MFIs than for the smaller MFIs with higher CV. for large MFIs.

Table 7: MFI Size and Cost Efficiency Estimates

	Base Model				One Output Model			
	Small MFI	Large MFI	Medium MFI	All MFI	Small MFI	Large MFI	Medium MFI	All MFI
Mean	0.747496	0.769594	0.760551	0.759548	0.597432	0.524379	0.482914	0.52191
Median	0.741391	0.759275	0.759038	0.754872	0.495453	0.46709	0.425731	0.464745
Standard Deviation	0.083811	0.064739	0.097396	0.085283	0.284195	0.22189	0.210902	0.232194
C.V.	0.112123	0.084121	0.128059	0.112281	0.475695	0.423148	0.436728	0.444892
Max	0.864994	0.846488	1	1	1	0.863728	0.905385	1
Min	0.577232	0.683859	0.632906	0.577232	0.124359	0.171699	0.22457	0.124359
No. Of MFI	10	10	20	40	10	10	20	40

Source: Authors Own Calculations.

Table 8: MFI Size and Profit Efficiency Estimates

	Base Model				One Output Model			
	Small	Large	Medium	All	Small	Large	Medium	All
Mean	0.295035	0.293907	0.30751	0.30099	0.2988273	0.3069117	0.3157142	0.3092919
Median	0.25183	0.266758	0.292249	0.267593	0.2161254	0.2579867	0.2759439	0.2567745
Standard Deviation	0.258156	0.171863	0.130373	0.1747	0.2623585	0.187701	0.149616	0.187005
C.V.	0.874999	0.584753	0.423965	0.580417	0.8779603	0.6115798	0.4738969	0.604623
max	1	0.724287	0.553768	1	1	0.7479591	0.5980447	1
min	0.124359	0.14398	0.137355	0.124359	0.1006625	0.1439833	0.1115559	0.1006625
No. Of MFI	10	10	20	40	10	10	20	40

Source: Authors Own Calculations.

5. CONCLUSION

The estimated relative cost efficiencies for all MFIs range from 0.578 to 1 with an average of 0.76 during the sample period. The profit efficiency ranged from 0.125 to 1 with an average of 0.301. The empirical analysis clearly depicts that the profit efficiency levels are higher for NGO-MFI than NBFC-MFIs. However, the cost efficiency is not significantly different for two groups of MFIs.The medium- size MFIs in general performed better (in terms cost efficiency) during the sample period of study. However, small sized MFIs seems to be better performer as far profitability is concerned. Size seems to be a significant factor explaining performance of Indian MFIs. The rank-correlations coefficient between the frontier efficiency estimates is found to be negatively and significantly correlated with the standard average cost ratio i.e. C/GTA and positively and significantly correlated with the standard profitability ratios i.e. ROA

and ROE during the sample period. These findings suggest that the efficiency measures are robust and not simply the consequences of the specifications or methods and supports the choice of the Translog model. Further, the LR test results also suggest that the Translog specification perform better than one-output and Cobb-Douglas model. The profitability of MFIs is found to be the result of better operational practices and efficiency as indicated by the significant positive correlation between cost efficiency and profit efficiency estimates during the sample period.

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