A STUDY ON EXOGENOUS FACTORS INFLUENCING THE INDIAN MICROFINANCE INSTITUTIONS

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Abstract

The commercial banking sector does not consider the poor easily bankable due to the high risk factor in the absence of collateral. Microfinance has come in as a potential alternative to address this problem. The key to growth and sustainability of the sector is sufficient and consistent inflow of funds and efficient operation of the microfinance institutions. Research evidence shows that high levels of demand for micro credit reflects a huge gap between supply and demand for credit, which is estimated at around US$ 250 billion. In such a scenario, the efficiency of microfinance institutions in being able to use every bit of input by converting it into loans and reducing their costs of operation and inefficiencies become extremely important. One of the important factors that determine the efficient operation of Microfinance institutions are the influence of indirect exogenous variables on the performance of the institutions. This study aims to understand those influencing factors which affect the productivity of Indian Microfinance institutions. The study is based on the financial data of 36 Indian Microfinance institutions for the period 2005 to 2008, a period where the sector reached its peak in terms of growth in gross loan portfolio.

Keywords:

Microfinance, Influencing factors, Efficiency measures, Exogenous variables.

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1. INTRODUCTION

Commerce in the 21st century is very different from what was practiced earlier. The rapid growth of technology has aided globalization tremendously. Earlier, in the absence of technology commerce had a wholly different and a much smaller dimension than the one that we are faced with today. In such a situation the distribution of wealth was more equitable. When nations grew post industrial revolution, not all of them grew equally. Although globalisation and information technology has dissolved borders and barriers, it did not include all in the growth wagon. With situations as they prevail, the poor have been extremely isolated and cut off from the mainstream financial services that drive the global economy today **(Sachs, 2005)**.

The commercial banking sector does not consider the poor bankable owning mainly to their inability to meet the eligibility criteria, including collateral. Thus, the poor people[1] in most countries virtually have had no access to formal financial services **(Littlefield *et.al*, 2003)**. In such a scenario the poor turn to informal financial alternatives such as family loans, moneylenders, and traders. These are usually limited in amount and are often extended under very rigid conditions and at very high interest rates. Microfinance has come in as a solution to this problem by facilitating the provision of sustainable economic opportunities at gross root levels by extending the required financial capital at competitive rates. **Robinson (1998)** defines Microfinance as follows:

'Microfinance refers to small-scale financial services, for both credits and deposits — that are provided to people who farm or fish or herd; operate small or microenterprises where goods are produced, recycled, repaired, or traded; provide services; work for wages or commissions; gain income from renting out small amounts of land, vehicles, draft animals, or machinery and tools; and to other individuals and local groups in developing countries, in both rural and urban areas'.

2. REVIEW OF LITERATURE

2.1 Credit: Demand versus Supply

Ananth (2004), observes that against an estimated annual credit demand of $3 to $9 billion in India, the normal financial services are able to provide only $200 to $300 million. Less than 20% of the rural populations have a bank account and only about 30,000 bank branches cater to the

[1] As per World Bank's standards, poor households are defined as those who fall under the international poverty line of income less than 1 USD per capita per day, measured at purchasing power parity. **Maxell (1999)** observes that poor households generally fall under the category of income/consumption poverty, social exclusion, lack of capability and functioning, vulnerability, livelihood unsustainability, and relative deprivation.

needs of 6,00,000 villages in the country. All this go to show the gap that exists between the demand and supply of credit in the nation. A **Deutsche Bank Research Report (2007)**[2] brings out that in spite of microfinance investments increasingly attracting institutional and individual investors due to their double bottom line (i.e., while they allow investors to adopt a social investment strategy geared toward poverty alleviation, they also offer an attractive risk-return profile) it is unable to serve more than a fraction of today's global sector demand of 1 billion micro-borrowers. This situation translates into an immense funding gap estimated at around $250 billion.

2.2 The Rural Indian credit scenario

Rural microcredit in India is not a recent phenomenon. The Regional Rural Banks (RRB) were setup in the mid 70s to replace the cooperative banks which were dominated by rural wealthy people. These banks were given a clear mandate to lend to the poor. In the initial decades the focus of the RRBs was on outreach even at the expense of prudent lending practices. This consequently lead to high default rates and accumulated losses exceeding Rs.3000 crores in 1999 **(Bhatt and Thorat, 2001).** Subsequent reforms relaxed the ceiling on interest rates that were imposed on these RRBs and the financial situation has improved since then with over 80% of the RRBs now being profitable. What started as just micro-credit disbursement has now grown to include micro-savings, micro-insurance, etc., with the emergence of Microfinance institutions, both private and Non-Governmental Organizations (NGO). These have emerged over the past few decades as important tools for economic development and the empowerment of the poor.

Microfinance in India operates in three main variants. First is the classical Grameen bank model where there is no monetary collateral. Loans are extended to groups and the group is jointly responsible for each member's repayment behaviour. Moral suasion acts as the collateral. In this model, microfinance institutions borrow from commercial banks and also seek donor assistance to raise capital. This model is also called the intermediation model. In the second type, banks extend loans to Self-Help Groups (SHG). The difference here is that SHGs extend the option of savings to its members and banks lend to these groups in multiples of the savings they mobilize. The third variant is the partnership model. This is operationally the same as the intermediation model, yet the actual loans remain on the balance sheet of the commercial banks rather than the balance sheet of the Microfinance Institution (MFI). In this way, commercial banks can have

[2] Microfinance: An emerging investment opportunity- Deutsche Bank Research, December 2007.

recourse over the loans they disburse; even if one partner MFI closes down, banks may partner with another MFI in order to fully process the loans already disbursed **(Ananth, 2005).**

Over its entire lifetime, the formal rural banking system in India has struggled to balance the dual objectives of outreach and financial performance. A post-reform shift in focus has improved financial performance but only at the expense of the outreach. The lending portfolio of scheduled commercial banks also reflects this shift away from rural areas. At the end of 2001-2002, the share of agriculture in the outstanding credit of scheduled commercial banks was less than 10% which is even less than the share of personal loans (housing loans and loans for consumer durables).

In 2002, 45% of the borrowers of scheduled commercial banks were from rural areas, but they accounted for only 13.4% of their outstanding loans. For metros, the corresponding numbers were 15% and 54% respectively. With their focus shifted to financial performance, the banks are naturally shifting their portfolio to the low cost segment. So the challenge to improve on both the fronts of financial sustainability and outreach rests on the ability of Microfinance institutions to reduce costs and improve the efficiency of their operations. This shifts the focus to productive efficiency. If microfinance institutions are to survive and be sustainable, productive efficiency is imperative.

2.3 Productivity and Technical Efficiency

Productivity of a firm is the ratio of output(s) that it produces to the input(s) that it uses,

Productivity = outputs/inputs

This is the case where the process of production involves single input and a single output. However, in most cases firms employ multiple inputs to produce one or more outputs. In such a scenario, measure of productivity should take into account all of these outputs and inputs. This measure of productivity is referred to as Total Factor Productivity (TFP).

The question of measuring the productive efficiency of an institution or an industry is of concern from both an economic and business stand point. If economic planning concerns itself with a particular industry, then it is important to know how far a given industry can be expected to increase its output by increasing its efficiency without absorbing further resources. That is, 'productive efficiency' indicates the extent to which all the input factors are utilized and processed such that they produce the maximum output possible for the given set of inputs. In addition to intrinsic factors being determinants of productive efficiency, there are also other

indirect factors which may play a vital and sometimes unobserved role in determining the productive efficiency of a Microfinance institution. These variables which are not directly related to the inputs or outputs, but however may indirectly influence the operation of the firm, are called exogenous variables.

2.4 Efficiency studies of Microfinance

A study by **Farrington (2000)** uses accounting variables like 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 structures as the efficiency drivers and hence as measures of efficiency. Another study by **Lafourcade.*et.al* (2005)** measures the efficiency using cost per borrower and cost per saver as indicators of efficiency. They found that African MFIs incur highest cost per borrower but have the lowest cost per saver. However, both of these studies use only statistical comparisons which have their limitations in productivity measurement **Guitierrez.*et.al* (2006)** have applied Data Envelopment Analysis (DEA) to measure the efficiency of 30 Latin American MFIs and subsequently have a multivariate analysis of the DEA results. They identified W-Popayan and Findesa as the most efficient institutions among the group of firms considered.

Varman and Samyukta (2007) use the two stage Stochastic Frontier Analysis (SFA) method suggested by **Battesse and Coelli (1992)**[3] to estimate the efficiencies of Microfinance institutions in India. They observe that Satin Credit Care and IASC are the most efficient institutions. However, in the two stage model there is an inconsistency with regard to the assumptions about the distributions of v_i and u_i used in the stochastic model, i.e., in the first stage while determining the technical inefficiencies, it is assumed that u_i is an independent normal distribution. However, in the second stage, a regression analysis is done to find out the determinants that contribute to the inefficiencies, which is fundamentally a correlation test that defies the assumption of independence made in the first stage.

A study by **Hassan and Tufte (2001)** using Stochastic frontier analysis found that Grameen Bank's branches staffed by the female employees operated more efficiently than their counterparts with male employees.

Michael. *et.al* (2006) use DEA to compare the efficiencies on an international basis with focus on whether the regulation or status of the MFI (NGO, NBFI, Bank etc) affect the efficient

[3] As developed from the earlier works of Battesse and Coelli (1977, 1988, 1995)

operation of Microfinance institutions. They find that strong outreach and preservation of low operating expenses help Asian MFIs to be efficient. They also find that South Asian MFIs may be more efficient than their East Asian counterparts due to the differences in their lending methodologies.

For using the parametric models for measuring efficiencies of Microfinance institutions, the important pre-requisite is the selection and factoring of influencing variables which cast an indirect influence on the operations of the institution.

2.5 Purpose of the study

In the case of Microfinance industry, which is highly constrained for its resources and inputs, the necessity of maximizing the outputs while minimizing the input resources, becomes very critical to their financial sustainability. The purpose of this study is to understand the extent to which indirect factors which are termed as exogenous variables influence the efficient operation of Indian Microfinance institutions. This is estimated by identifying the exogenous variables and testing their influence on input and output factors identified for the purpose of computing productive efficiencies.

3. RESEARCH OBJECTIVE

To test the influence of exogenous variables on the productive efficiencies of Indian Microfinance Institutions.

4. DATA SOURCE FOR THE STUDY

The data used in this study is secondary in nature and has been obtained from the official website of the Microfinance Information Exchange (MIX), www.mixmarket.org. The Microfinance Information Exchange, Inc. (MIX) is a leading business information provider dedicated to strengthening the microfinance sector. It is a non-profit organization incorporated in June 2002. The organization's core focus is to provide objective data and analysis on microfinance providers. In doing so MIX promotes financial transparency in the industry and helps build the information infrastructure in developing countries. MIX Market seeks to develop a transparent information market to link MFIs worldwide with Investors and Donors and promote greater investment and information flows. MIX Market currently provides data on over 1400 MFIs, over 100 investors and almost 200 partners[4].

[4] Source : http://www.themix.org/about-mix/about-mix

5. INPUTS, OUTPUT AND EXOGENOUS VARIABLES CHOSEN FOR THE STUDY

In this study, there was a need for careful choice of inputs and outputs that are selected from the data provided by MIX Market. The effectiveness of the stochastic frontier analysis depends on that of the appropriateness of the data that is supplied to it. The challenge here is to consider a financial institution in the light of a production unit, producing tangible outputs from tangible inputs. **Escuer.*et al* (2004)** in their study of evaluating the productive efficiencies of European Union Banks using the stochastic frontier technique, present perspectives about the choice of inputs and outputs when it comes to a financial institution. Since banks operate as intermediaries with operations involving assets and liabilities, Escuer.*et al* (2004) take loans as the representative variable for outputs, while number of employees, number of branches, deposits and physical capital are taken as inputs.

Although Microfinance institutions function as a financial intermediary in some ways, they differ from the commercial banks and financial institutions in many other ways. The primary sources of financial inputs here are donor funds, borrowings, equity and deposits **(Varman and Samyukta, 2007)**. These are aggregated into a single variable called 'Total Fund Input', which represents Capital and under the category of Labor, 'Number of employees' is used as a measure in productivity analysis. The primary output that Microfinance institutions produce is the loans that they give out, measured by the 'Gross Loan Portfolio'.

The variables which are not directly related to the inputs or outputs, but however may indirectly influence the operation of the firm, are called exogenous variables. This study assumes that there are four such influencing variables. The first variable considered is whether the institution is regulated or not. When a firm is regulated it needs to operate under the regulations prescribed by the Microfinance regulating authority[5] and hence this will influence the number people employed, capital and hence the output. The second variable captures whether the firm is a NGO or Non Banking Financial Corporations (NBFC). The nature of the firm also has an indirect bearing on the way it operates, the extent of funding it gets from institutional grants etc. The third variable considered is 'Size' of the microfinance institution determined by magnitude of the gross loan portfolio. Three bands are defined based on portfolio size. Size of the microfinance

[5] SHGs dealt by banks and NBFCs are regulated by the RBI. Trusts, societies, non-profit companies and co-operatives are not regulated.

institution was treated as a categorical variable with three divisions based on the size of gross loan portfolio (US$),

0- 0 to 10 million
1- 10 to 50 million
2- more than 50 million

The fourth variable that is considered is the 'Age' of the institution. With maturity and experience firms are assumed to differ in their operations depending on their learning curves. Age is treated as a categorical variable with the following bands,

1- 0-5 years
2- 6-10 years
3- 11-15 years
4- 16-20 years
5- 21-25 years
6- More than 26 years

These exogenous variables that have been considered are not an exhaustive list. They have been chosen based on reasoning as to what are the common factors that could affect the functioning of a microfinance institution. Also, the choice of variables has also been limited by the availability of data.

6. STATISTICAL METHODS USED

SPSS (Statistical Package for Social Sciences) is used to perform independent sample t-test and Anova test to determine whether the exogenous variables have any statistically significant influence on the input and output variables.

7. RESULTS AND ANALYSIS

It is meaningful to delve on the exogenous variables that influence the functioning of the Microfinance institutions. Four variables are considered are 'Regulation', 'Institution Status', 'Age' and 'Size'. A software package-SPSS (Statistical Package for Social Sciences) is used to perform independent sample t-test and Anova test to determine whether the exogenous variables have any statistically significant influence on the input and output variables.

7.1 Influence of 'Regulation' on 'Gross loan portfolio' and 'Total Fund Input' and 'Personnel'

Levene's test is conducted prior to independent sample t-test to determine the nature of the t-test to be considered. t-test can be performed by assuming that population from where samples are drawn have either equal or unequal variances. The Null hypothesis of the Levene's test is that variances of the populations are equal. In this case, with significance levels of 0.001 and 0.00 (which are less than 0.05) for output and fund input, respectively and F-statistic of 14.348 and 15.188, the null hypothesis is rejected at 5% significance level. Thus, t-test is to be considered with unequal variances. The two tailed significance levels corresponding to output (Gross loan portfolio) and input (Total fund input) are 0.024 and 0.03, respectively. Thus, the null hypothesis that regulation does not influence output and fund is rejected at 5% significance level. Thus, the test indicates that Regulatory status of the institution is a meaningful exogenous variable. This statistical inference is meaningful in conjunction with the observed trends in the Microfinance sector in India. The Reserve Bank of India (RBI) has taken an active monitoring role on the Microfinance sector, especially after the recent crisis that broke out in the country, starting in the state of Andhra Pradesh. The regulatory body exercises a strict control on interest rate ceiling, Savings and Insurance mobilizations and norms relating to total number and amount of outstanding loans per individual borrower. Thus the regulatory status of a Microfinance is a meaningful exogenous variable which will indirectly influence the inputs and outputs and hence the operational efficiency of Microfinance institutions.

Table 1: Levene's and t-test to ascertain influence of Regulation on inputs and output.

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Significance	t	df
Output	Equal variances assumed	14.348	.001	-2.448	34
	Equal variances not assumed			-2.448	19.979
Fund	Equal variances assumed	15.188	.000	-2.343	34
	Equal variances not assumed			-2.343	19.823

	t-test for Equality of Means

		Sig. (2-tailed)	Mean Difference	Std. Error Difference
Output	Equal variances assumed	.020	-3.04494E7	1.24403E7
	Equal variances not assumed	.024	-3.04494E7	1.24403E7
Fund	Equal variances assumed	.025	-3.44924E7	1.47231E7
	Equal variances not assumed	.030	-3.44924E7	1.47231E7

7.2 Influence of Status of institution (NGO/NBFI) on 'Gross loan portfolio' and 'Total Fund Input' and 'Personnel'

The same procedure is repeated to determine the influence of status of institution on the output and input variables. The Levene's test with significance levels of 0.00, 0.00, and 0.01 for output, fund and personnel respectively indicate that the null hypothesis of 'equal population variances' can be rejected in all the three cases. The significance levels of t-tests for influence of institution status on output, fund input and personnel employed are 0.023, 0.032 and 0.016 respectively.

Table 2: Levene's and t-test to ascertain influence of 'Status of Institution' on inputs and output.

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Output	Equal variances assumed	16.508	.000	-2.609	34
	Equal variances not assumed			-2.485	18.282
Fund	Equal variances assumed	17.693	.000	-2.439	34
	Equal variances not assumed			-2.322	18.129
Personnel	Equal variances assumed	13.183	.001	-2.700	34
	Equal variances not assumed			-2.611	23.190

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std.Error Difference
Output	Equal variances assumed	.013	-3.21822E7	1.23343E7

	Equal variances not assumed	.023	-3.21822E7	1.29517E7
Fund	Equal variances assumed	.020	-3.57587E7	1.46606E7
	Equal variances not assumed	.032	-3.57587E7	1.54027E7
Personnel	Equal variances assumed	.011	-789.15480	292.29692
	Equal variances not assumed	.016	-789.15480	302.29867

Thus, at 5% significance levels, the null hypothesis for t-test which states that institution's status does not influence the inputs and output, are rejected. Thus, it is meaningful to consider 'Status of Institution' as an exogenous variable. This inference also has a bearing on the differential regulatory treatment that is meted out by the RBI to Microfinance institutions, depending on them being an NGO or an NBFI.

7.3 Influence of Size of microfinance institution on 'Gross Loan Portfolio', 'Total Fund Input' and 'Personnel'

t-test was used in the previous two scenarios since there was a comparison to be made only between two categories, for e.g., fund input without regulation versus fund input with regulation. Size of the microfinance institution was treated as a categorical variable with three divisions based on the size of gross loan portfolio (US$),

0- 0 to 10 million
1- 10 to 50 million
2- More than 50 million

Independent sample t-test cannot be used to compare more than two sample groups. Since three bands are involved here, a one-way Anova (Analysis of Variance) test is used to ascertain whether there is any mean statistically significant difference in output, fund and personnel as the size of the microfinance institution varies.

Table 3: Levene's and t-test to ascertain influence of 'Size of Institution' on inputs and output.

		Sum of Squares	df	Mean Square	F	Sig.
Output	Between Groups	4.423E16	2	2.211E16	63.600	.000
	Within Groups	1.147E16	33	3.477E14		
	Total	5.570E16	35			

Fund	Between Groups	5.983E16	2	2.991E16	57.362	.000
	Within Groups	1.721E16	33	5.215E14		
	Total	7.704E16	35			
Personnel	Between Groups	2.491E7	2	1.245E7	60.966	.000
	Within Groups	6741503.944	33	204287.998		
	Total	3.165E7	35			

The Null hypothesis of the Anova test is that there is no difference in the mean output and inputs as the size of the institution varies. The observed significance level of 0.000 for all the three cases indicates that in all the cases the null hypothesis is rejected. Therefore, the size of the institution has a bearing on the outputs and inputs and it is meaningful to include it as an exogenous variable in the stochastic analysis. Even without the statistically tests, this is a logical conclusion. An institution dealing with a very small portfolio of loans may be efficient in converting its inputs into outputs. However, it would not amount to comparing likes against likes if this institution's efficiency is directly compared with another institution which deals with a portfolio which is much larger than the one that the smaller institution deals with. Thus, it is imperative to account for the size of the institution as an influencing variable in the efficiency analysis.

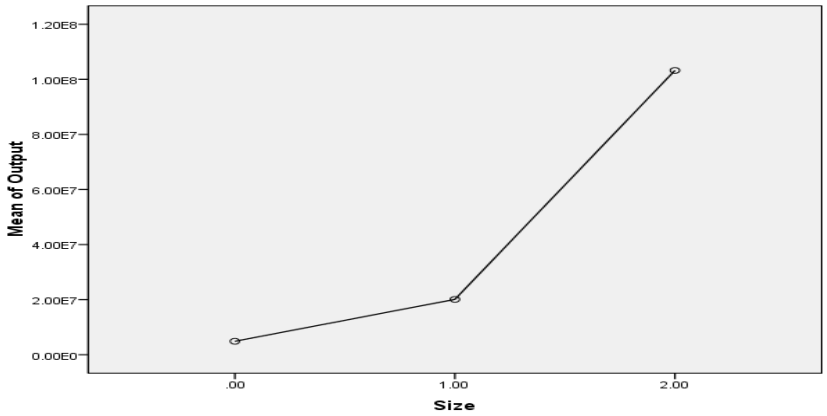
Table 4: Bonferroni - Multiple Comparisons

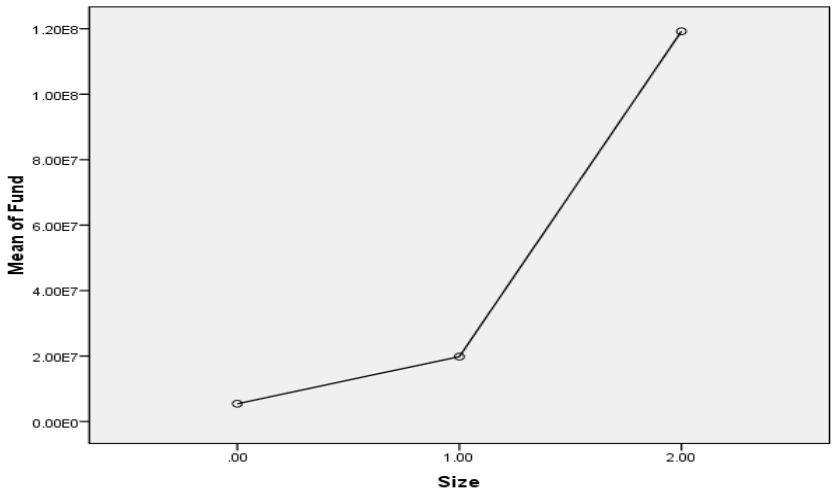
Dependent Variable	(I) Size	(J) Size	Mean Difference (I-J)	Std. Error	Sig.
Output	.00	1.00	-1.52043E7	6.94924E6	.108
		2.00	-9.83456E7	8.79017E6	.000
	1.00	.00	1.52043E7	6.94924E6	.108
		2.00	-8.31413E7	9.32338E6	.000
	2.00	.00	9.83456E7	8.79017E6	.000
		1.00	8.31413E7	9.32338E6	.000
Fund	.00	1.00	-1.43932E7	8.51064E6	.301
		2.00	-1.13774E8	1.07652E7	.000
	1.00	.00	1.43932E7	8.51064E6	.301
		2.00	-9.93805E7	1.14182E7	.000
	2.00	.00	1.13774E8	1.07652E7	.000
		1.00	9.93805E7	1.14182E7	.000
Personnel	.00	1.00	-768.77778*	168.44386	.000

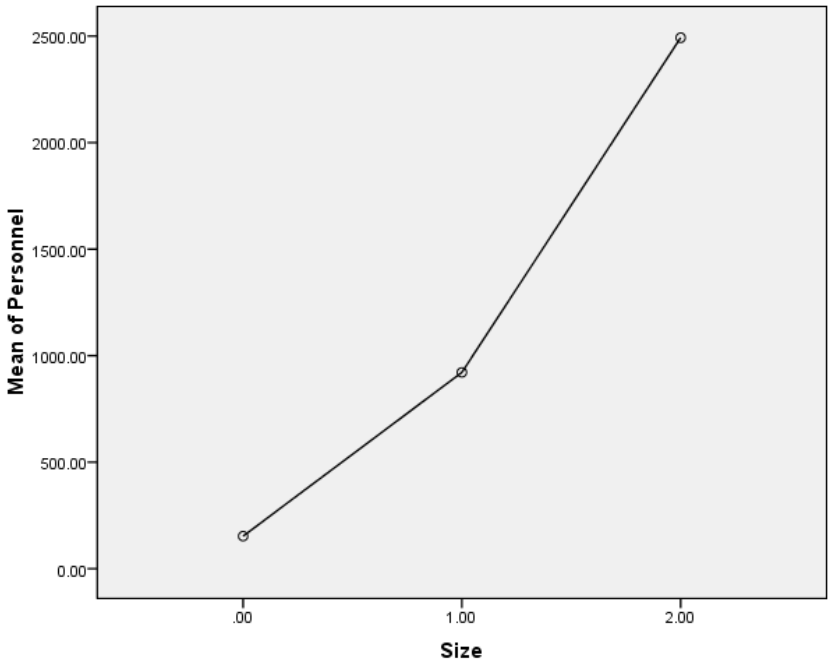
		2.00	-2339.94444*	213.06650	.000
	1.00	.00	768.77778*	168.44386	.000
		2.00	-1571.16667*	225.99115	.000
	2.00	.00	2339.94444*	213.06650	.000
		1.00	1571.16667*	225.99115	.000

*. The mean difference is significant at the 0.05 level.

The table points out as to where the maximum variation in mean output and inputs are observed. From the significance levels it is inferred that there are statistically significant differences between institutions offering a loan portfolio of more than 50 million US$ and those that offer less than that. There's not much difference between those offering less than 10 million US$ and those that offer between 10 and 50 million US$. This can also be observed from the mean plots depicted below:







7.4 Influence of Age of microfinance institution on 'Gross Loan Portfolio', 'Total Fund Input' and 'Personnel'

When it comes to influence of age on the variables considered, there are more than two groups to be compared like in the case of size. Age is treated as a categorical variable with the following bands,

1- 0-5 years
2- 10 years
3- 11-15 years
4- 16-20 years
5- 21-25 years
6- More than 26 years

The Null hypothesis of the Anova test is that there is no difference in the mean output and inputs across age groups. The observed significance levels of 0.940, 0.933 and 0.831 indicate that in all the three cases the null hypothesis is accepted. This means that age of the institution need not be considered as an exogenous variable. This inference although statistically suggested is possibly questionable considering the learning curves that the firm may go through. Therefore, the choice of 'Age of Institution' as exogenous variable is a decision that is to be subjectively taken.

Table 5: One way ANOVA to ascertain influence of 'Age' on inputs and output.

		Sum of Squares	df	Mean Square	F	Sig.
Output	Between Groups	2.177E15	5	4.353E14	.244	.940
	Within Groups	5.353E16	30	1.784E15		
	Total	5.570E16	35			
Fund	Between Groups	3.157E15	5	6.313E14	.256	.933
	Within Groups	7.388E16	30	2.463E15		
	Total	7.704E16	35			
Personnel	Between Groups	2067854.913	5	413570.983	.419	.831
	Within Groups	2.958E7	30	986097.135		
	Total	3.165E7	35			

8. SUMMARY AND CONCLUSIONS

The study reveals that among the four variables considered, namely, 'Regulation', 'Status of Institution', 'Size of Institution' and 'Age of Institution', the statistical tests reveal that all except the age of the institution need to be considered as exogenous variables. This bears significance and importance in the light of influences that these variables have on the input and output factors and therefore on the productive efficiencies of the Microfinance institutions.

The importance of these findings is in the fact that in measuring technical productive efficiencies using parametric or non-parametric techniques, exogenous variables which have considerable and statistically significant influences on the input and output factors need to be accounted for and smoothing techniques are to be appropriately chosen to measure the true levels of institutional productive efficiencies.

The findings reveal that based on the analysis on financial data of 36 Indian Microfinance Institutions during the pre-crisis period,, 'Regulation', 'Status of Institution', and 'Size of Institution' qualify as exogenous variables influencing indirectly the efficiency scores of these institutions.

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