FINANCIAL FEAT OF MICROFINANCE INDUSTRY: STOCHASTIC FRONTIER APPLICATION

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Abstract

Financial support to underserve for having a better life standard through the spillover effect of microfinancing, this concept gained momentum as a movement after 1980s. Microfinance (MF) industry ultimate promise is not merely the poverty reduction but also to become the efficient and financially sustainable, so that subsequently it can maintain its market share permanently. Accomplishment of this dual mission urge has originated a debate regarding the potential and possibilities of this industry and become a hot issue. For the resolution of this double challenge, we evaluated the MF industry in Pakistan which is considered as one of the best regulated MF industries in World. We applied stochastic frontier Analysis for unbalanced panel and ranked technical efficient and sustainable Microfinance institutions in Pakistan. Non Government Organization providing micro credits seemed to be more efficient and sustainable as compared to Microfinance Banks and Rural support programmes. The average efficiency of sector was 74%, pretty high in utilizing the input resources yet the sustainability focus was stumpy as only 24 out of 148 institutions established to be sustainable.

Keywords: Efficiency, Sustainability, Microfinancing, Stochastic Frontier Analysis, Technical efficiency

Introduction

The microfinance thought has been acknowledged as a poverty mitigation gadget since 1976, when Muhammad Yunas lent only US$ 27 to the poor in Jobra (Bangaladesh) to provide them interest free credit. This successful recovery of his loan and success of an experimental project, the Grameen Bank project (GBP) became the base of microfinance fruition, and afterwards become the reason of instigation for this concept formally.

Microfinane gained popularity all over the world because of it potential to help poor and to become a self-sustaining industry as well. Poverty diminution through large scale financially sustainable institutions is the fundamental promise of this industry. Microfinance providers (MFPs) are facing a double challenge; they have to provide financial services to the poor as their social mission and at the same time they also have to cover their costs as to ensure financial sustainability (Hermes *et al*. 2011).

Microfinance (MF) in Pakistan comes a long way from a nascent stage to an industry, which is now well poised to grow. In spite of macroeconomic challenges, security situation and persistent energy crises in Pakistan, MF sector is performing well and showing enhancement. The background of MF in Pakistan was primarily non-regulated but after 2000-01 due to the enforcement of microfinance ordinances by state bank of Pakistan (SPB), a prototype of regulated institutions is being in transmission. There are three peer groups of retail players in overall Pakistan's microfinance industry: microfinance banks (MFBs), Non Government Organizations as microfinance institutions (MFIs henceforth) and rural support programs (RSPs). The Pakistan's regulatory framework for MF has been broadly acknowledged. It got appreciation by the Economic Intelligence Unit (EIU) in terms of the overall environment for doing microfinance business and was ranked fifth among 54 countries (PMN Report).

The main objective of this study is, to evaluate the MF industry in Pakistan from efficiency and sustainability prospective by Applying Stochastic frontier model (SFA). We will address the issue of quantitative assessment of the efficiency level of Microfinance Providers (MFPs). These efficiency results will be used to assess the sustainability of MFPs. The novelty of our study is the application of SFA for ranking the MFPs technical efficiency, being done first time for MFPs in Pakistan. Until recently, the numbers of studies are very limited which applied parametric and non-parametric approaches for MFPs efficiency evaluation, our study will be a valuable addition in it.

Rest of the paper is structured as follows: sections (I) provides an overview of the studies, following section (II) which gives the relevance of methodology espouse further explaining the data collection and SFA specification concern. The next to it the results are discussed and conclusion is drawn.

Review of the Studies

Efficiency is one of the Performance measures of a production process, which is based on the production and cost behavior of a unit. Productivity is a descriptive measure of performance. Efficiency, on the other hand, is a normative measure and financial sustainability is directly or indirectly linked

to efficiency. Efficiency in microfinance is a question of how well an MFI manages it inputs such as staff, assets and subsidies to produce the maximum output such as the number of loans, active borrowers and poverty outreach (Balkenhol, 2007). Efficient MFIs, hunt to ponder on activities that yield more results at minimum cost to the units and to clients. At the beginning, studies examined the MFIs efficiency within or across the region on the basis of simple comparison of variables, without applying any specific parametric or non parametric test for analysis. For Examples study of Farrington (2000) and Lafourcade *et al.* (2005), both appraised the efficiency of MFIs but not any of these two studies applied parametric or non-parametric approach. Efficiency in these two studies was linked to the variables defined. The comparative evaluation of efficiency in these two studies was subjective hence less reliable.

To overcome such deficiencies, researchers started to apply several statistical and econometric methods for the efficiency evaluation of MFPs, previously these approaches has been rigorously applied in the finance literature for the efficiency evaluation of the conventional banks.

Among the studies which applied non-parametric approach for the efficiency analysis in MF literature incorporates Guitierrez-Nieto et al. (2007) ; Nghiem et al (2006) , Qayyum & Ahmad, (2006) , Bassen (2008) ,Sedzro *et al* (2009); Hassan & Sanchez, (2009); Ahmad (2011); Islam *et al*, (2011) and the studies which applied stochastic frontier approach (A parametric approach) for the efficiency assessment of Microfinance Institutions (MFIs) includes the work by Hassan and Tufte (2001); Gregoire and Oswaldo(2003); Desrochers and Lamberte (2003); Tariq and Ahmed (2010) , Herrmes at al (2011),and Abayie et al, (2011).

Methodology

The methodologies for measuring efficiency differ basically through the way, in which the efficient frontier is determined, and the distributional assumptions imposed on the random error and efficiency. Green (1997), elucidated that frontier production function is an extension of the familiar regression model; representing an ideal situation for attainable maximum output or minimum cost for producing that output or maximum profit given the prices for input and output. Further that the estimation of frontier functions is the econometric exercise of making the empirical implementation consistent with the underlying theoretical proposition that no observed agent can exceed the ideal; all observations will be positioned within the theoretical extreme. There are different models and methods of efficiency analysis for exercise; According to Ray (2004), we can classify efficient frontier models according to the different criteria based on functional form, data used and presence of noise. Figure.1 portrays the classification following different criteria;

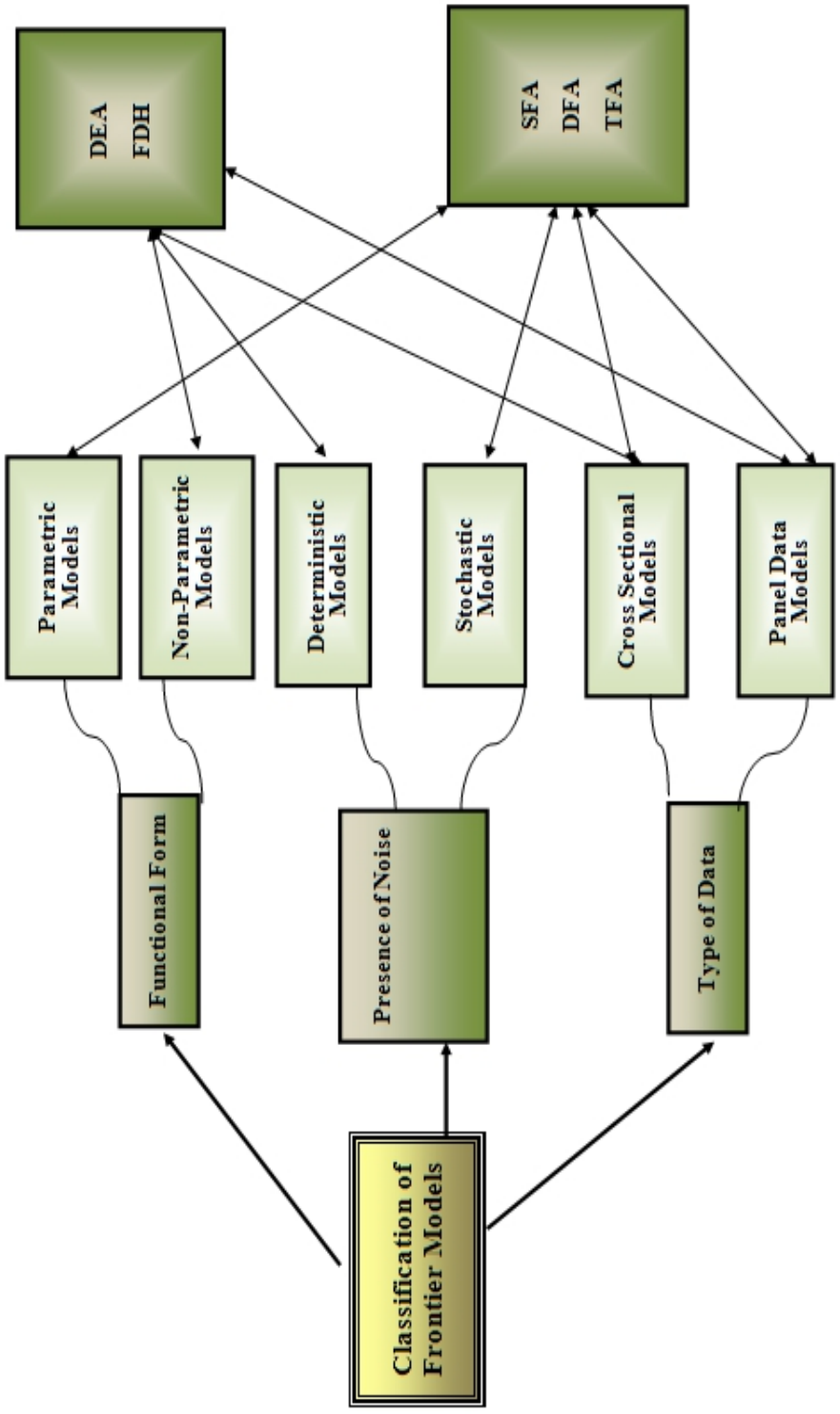

Figure .1 Classification of Frontier Model

- **Figure .1 Classification of Frontier Model**Based on functional form of the frontier the classification in models can be made as parametric and Non-Parametric models. This specification of the functional form is very important in defining the frontier function.
- Based on presence of noise the classification in models can be made as Deterministic Models and Stochastic Models. The presence and absence of noise in the sample data define frontier function and models accordingly.
- Based on the type of data analyzed the classification in the models can be made as Cross-sectional Models and Panel data models. All type of data can be used for frontier models but specification of model will be different according to the data.

II-a Stochastic Frontier Analysis (SFA)

The endeavor of Meeusen & van den Broeck (1977) and Aigner, Lovell, & Schmidt (1977), (quite similar) have been considered as a SFA instigator. These studies shared the composed error structure developed in a production frontier context. The stochastic production frontier proposed by these two is based on an assumed concept that deviations from the production 'frontier' might not be entirely under the control of the firm being studied. Which means an unusually high number of random equipment failures, or even bad weather, might ultimately appears as inefficiency.

These original papers developed a SFA model in production frontier context as follows;

$$Y = f(x, \beta).\exp\{v\text{-}u\} \quad (1)$$

Where "*Y*" is scalar output, "x," is a vector of inputs, and "β" is a vector of technology parameters. The first error component "$v \sim N(0, \sigma_v^2)$" is proposed to detain the effects of statistical noise and the second error component "$u \geq 0$" is proposed to detain the effects of technical inefficiency. Thus producers manage to be on or below their stochastic production frontier $[f(x, \beta).\exp(v)]$ according to $u=0$ or $u>0$. Parameters to be anticipated include β, σ_v^2 and variance parameters associated with "*u*". Distributional assumption on "*u*" implies that the composed error *(v-u)* is negatively skewed, and statistical efficiency necessitate that the model be estimated by maximum likelihood. After estimation, an estimate of mean technical inefficiency can be provided conditional on the distribution of "u".

II-b SFA Model Estimation

The efficiency estimates obtained from SFA is highly conditional on the appropriate selection of input and output variables used in defining the frontier. Three basic approaches for financial institutions are used in research. These are the intermediation, production and asset approaches. We

use the production approach. Because, our data comprises of microfinance banks (MFBs), Non Government Organizations -NGOs (MFIs) and Rural Support Programs (RSPs) providing the microcredit service, showing more similarity to the production approach behavior. Table.I presents the input-output specification for our model. These inputs and outputs have been identified from prior studies of finance literature conducted in different contexts.

Table. I Input-output Specifications

Variable/ Production Approach	Definition	Input	Output
Total assets	This is total net asset accounts i.e., all asset accounts net of any allowance.	Input	
Total Loan officers	The number of staff members who dedicate the majority of their time to direct client contact.	Input	
Loan per loan officer	It indicates the number of loans managed by the loan officer on average. It is calculated as No of Active borrowers/No of total Loan officers.		Output
Gross loan portfolio	This is the outstanding principal for all outstanding client loans, including current, delinquent, and restructured loans. It does not include: • Loans that have been written-off; • Interest receivable; • Employee loans.		Output
Total Active Borrowers	Total Number of borrowers with loan amount outstanding.		Output

Source Extracted from previous studies showing the description of variable used for frontier model in the study

II-c Data and Estimation procedure

There are two approaches to estimate the frontier and the coefficients of efficiency variables. One is the standard two-step SFA approach of Aigner, Lovell and Schmidt (1977), and Meeusen and van den Broeck (1977) and second is (Battese & Coelli , 1995) (BC) approach which is one-step. The foremost benefit of the BC model over the other is that it estimates the frontier and the coefficients of the efficiency variables simultaneously in one step, and keeps the coefficient away from biasness. As Wang and Schmidt (2002) showed that two step method inherently renders biased coefficients, because the method undergo the assumption that the efficiency term is independent and identically truncated-normally distributed in the first step, while in the second step the efficiency terms are assumed to be normally distributed and dependent on the explanatory variables.A second

superiority of the BC model over two step approach is that it can be estimated for an unbalanced panel, which increases total size of sample.

SFA- Production frontier model assuming half-normal distribution for the inefficiency term has been applied for 148 MFPs, where we took Gross loan portfolio as function of total active borrowers and Loan per loan officer as an output using the total assets and total loan officers as an input. Total assets are proxy for capital whereas total loan officers are proxy of labor. Our output total loan per loan officers are the common measure of productivity and total active borrowers also indicates the performance and scale of an institution.

We assumed Cobb-Douglas production specification for variable and estimate it by applying BC one step for the unbalanced panel ranging 2006 to 2012. The years of selection are settled on the basis of the reliability of data, these years have more reliable, consistent and audited data. We collected this data from Pakistan Microfinance Network which is an autonomous institution working for the Microfinance fortification in Pakistan. Empirical analysis of our study covered all formal and semi-formal however registered MFPs. Data is unbalanced because of MFPs irregular reporting of their financial statements. Total 148 MFPs has been analyzed.

Equation (2) specifies the function;

$$\text{Ln(GLP)}=\beta_0 + \beta_1 \ln(TAS_{i,t}) + \beta_2 \ln(TLO_{i,t}) + \beta_3 \ln(LOS_{i,t}) + \beta_4 \ln(TAB_{i,t}) + \mu_{i,t} + v_{i,t} \quad (2)$$

GLP represents gross loan portfolio
TAS represents value of total assets
TLO represents total loan officers
LOS represents loan per loan officers
TAB represents Total Active borrowers
$\mu_{i,t}$ represents Inefficiency component
$v_{i,t}$ represents random error component

Empirical Findings

III- Efficiency Scores

Efficiency measurement by SFA is a way to locate a microfinance institution (MFI); how much its actual efficiency close to what a best-practice MFI's would have been; for producing the same output under the same conditions. Higher the technical efficiency score, more efficient that MFI will be. Technical efficiency (TE) craft the comparison of institutions on the basis of most excellent handling of input and output combination, defined in the study. TE score depicts the institutional strength in utilizing the resources available for producing the maximum output level defined,

maximum value demonstrates a best practice institution among it cluster. TE lies between zero and one.

We scrutinize the performance of microfinance providers (MFP) by dividing them in three peer groups to underscore the best performing set. Maximum Likelihood coefficients of SFA with their Z-values in Parenthesis are as under;

Ln GLP= .10 + .56 $ln(TAS_{i,t})$ **- .09** $ln\ (TLO_{i,t}\ )$ **-.004** $ln(LOS_{i,t})$**+ .57** $ln(TAB_{i,t})$

[12.65] [-3.37] [-2.51] [11.64]

$\sigma = \sigma_v^2 + \sigma_u^2$ σ **=5.78** $\sigma^2 = 33.40$

The relationship of input and output variables with GLP is significant with expected sign of variation albeit not for loan per loan officers, which in showing an inverse relationship with GLP. In our study average TE scores obtained for NGOs MFIs are higher than that for RSPs and MFBs. Though MFBs are formally more organized , have better administration ,and access to technology and financial resources yet regarding optimal utilization of these resources under production criteria they are not utilizing the combination of input efficiently, because they are better in performing a role of intermediation between depositors and creditors. This difference perhaps be due to the more experience of MFIs and RSPs in the field of microcredit loaning in Pakistan as compare to MFBs who are focusing more on ample range of other financial services and have more business orientation. Table II, Table III and Table IV are reporting the TE scores.

Table.II TE Scores of MFBs

MFBs/YEAR	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**AVG**
KBL	0.536957	0.584237	0.637107	0.722308	0.724927	0.619316	0.87565	0.6715
TMFB	*0.990927*	0.826492	0.965406	0.976965	0.993897	*0.999337*	*0.999607*	0.964662
POMFB	0.555374	0.461674	0.827459	0.806951	0.813839	0.925392	0.974333	0.766432
FMFB	0.883503	0.818335	0.826796	0.850265	0.896106	0.97549	0.989502	0.891428
NRSP_B	-	-	-	-	-	0.961085	0.980161	0.970623
NMFB	0.915795	0.975373	*0.996668*	0.987794	0.856847	-	-	0.946496
KMFB	-	-	*0.996244*	*0.995813*	*0.991109*	*0.998609*	-	0.995444
RMFB	0.791235	0.930392	0.9656	0.935285	-	-	-	0.905628
BANKS AVG EFFICENCY	**0.778965**	**0.766084**	**0.77691**	**0.896483**	**0.753818**	**0.782747**	**0.803209**	

Table.II shows the TE scores for Microfinance banks in different years

On average MFB group is utilizing the combination of input, assets and loan officers , by making the wastage of 11% to 24%,indicating that same level of output can be reached by using the less input, this extra input usage is wastage of resources. Moreover, this efficiency enlargement is celebrated for *KBL, RMFB*, FMFB and *POMFB* for latest year's .Individually *TMFB, NRSP_B* and *KMFB* occupied the highest position at technical efficient frontier making only 4, 3 and 1% wastage respectively.

Table.III TE Scores of RSPs

RSPs/YEAR	2006	2007	2008	2009	2010	2011	2012	AVG
NRSP	0.885415	0.866245	0.900259	0.85711	0.93299	0.761891	0.947422	0.878762
PRSP	0.443201	0.461701	0.646867	0.675709	0.615337	0.688907	0.834744	0.623781
SRSP	-	0.724791	0.760136	0.547229	0.901628	0.807241	0.835467	0.762748
TRDP	0.817788	0.878578	0.879362	0.879347	0.830564	0.873789	0.878495	0.862561
SRSO	-	-	-	-	-	0.934019	0.951254	0.942636
RSPS AVG EFF	**0.536601**	**0.586263**	**0.637325**	**0.591879**	**0.82013**	**0.813169**	**0.889477**	

Table.III shows the TE scores for Rural support programme in different years

RSPs are the premier microcredit providers in Pakistan who are targeting rural poverty even though facing a high cost of operation. On average RSPs were performing grim as compare to other MFPS from 2006 to 2009, because of lack of regulatory environment and competition yet in recent years they improve themselves and become efficient by increasing their input utilization capabilities up to 88 % .NRSP and SRSO are the best performing RSPs with making the input wastage up to 6 and 5% respectively.

Table. IV TE Scores of MFIs

MFIs/YEAR	2006	2007	2008	2009	2010	2011	2012	AVG
KASHF	0.89989	0.886303	0.871133	0.865454	-	-	0.876292	0.879814
SAFWCO	0.760805	0.756154	0.825426	0.873703	0.886574	0.897927	0.894647	0.842177
DAMEEN	0.736057	0.785743	0.835864	0.866715	0.869364	0.959256	0.982959	0.86228
CSC	0.825184	0.838714	0.871299	0.924715	0.959719	0.954515	0.954655	0.904114
CWCD	-	-	-	0.976155	0.902496	0.979362	-	0.952671
ASA-p	-	-	-	0.764572	0.833148	0.910607	0.877796	0.846531
BRAC-p	-	-	-	0.663252	0.731992	0.843318	0.917189	0.788938
JWS	-	-	-	0.920778	0.949813	0.967843	0.921471	0.939976
ASASAH	0.813196	0.783832	0.848191	0.740948	0.844427	0.834885	0.906004	0.824497
AKHUWAT	0.793944	0.760791	-	0.779606	0.802831	0.825057	0.92067	0.813816
SDF	-	0.88194	0.823546	0.903909	0.821422		-	0.857706
ORIX	0.986723	0.958964	0.907721	0.931423	0.959082	0.918505	0.957685	0.945729
RCDS	-	-	-	-	0.909608	0.947906	0.928785	0.928766
OPP	0.870226	0.82574	0.876439	0.925459	0.933427	0.938653	-	0.894991
MFIS AVG EFF	0.835753	0.83091	0.857452	0.856668	0.877223	0.914819	0.92165	

Table.IV shows the TE scores for NGO MFI - Microfinance institutions in different year

NGO-MFIs in Pakistan has wide network and stretched all over the country in urban and semi-urban region, providing the services of micro loaning since seventies. However, recently in last decade they have started some other financial services for example education and health loans, saving and remittances etc. MFIs are utilizing input efficiently and only wasting their input up to maximum less than 20% as compared to 24% for MFBs. They perk up their efficiency level throughout the time span and reach the

level of 92% on frontier. Which indicates the wastage of input by 8% . Overall highest efficiency scores spin among different institutions in different years which make it difficult to rank any one institution as best for whole period of analysis. for example in 2006, 2007, 2008 ORIX was technically at highest echelon where as in 2009,2011 CWCD , in 2010 CSC and in 2012 DAMEEN occupied the highest position regarding the TE score while during the same time period we can find several other institutions fairly in close proximity to the best one. This is the case with other peer groups also that highest efficiency scores are rotating among and between the groups .If an institution is best in a year, it may not report next year or may have lower rank in TE for subsequent years. There is no one single institute which shows a persistent high score throughout the period of analysis whom we can nominate as number one in order of ranking.

Nevertheless, we state an ordinary verdict that NGO MFIs are performing better than other peer groups in Pakistan targeting poor borrowers as DAMEEN, KASHF, ASA-P, BRAC-P and ASASAH have almost hundred percent women borrowers, which is a common measure of poverty focus of an MFP (PMN). Average efficiency is increasing annually for all peer groups as shown in the Figure.2

Average Efficiency Score of MFBs, NGO-MFIs and RSPs

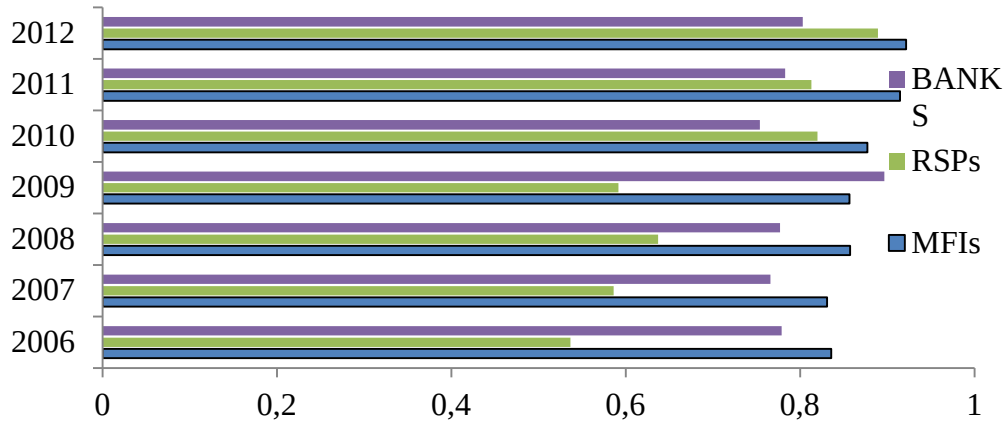

Figure.2 Average Efficiency scores for three peer groups over years 2006-2012

NGO-MFIs are more efficient with average highest scores in 2006 following MFBs and RSPs respectively until 2008.In 2009 MFBs are more efficient than MFIs but later in 2010, 2011, 2012 MFBs are unable to maintain its position and become least efficient as compare to MFI and RSPs, other contemporary groups.. Average efficiency of the sector is 74%. This efficiency ranking is conditional on the variable and model defined in the study

III-b Efficiency and Sustainability

Though efficiency and sustainability terms are used interchangeably and an efficient institution is considered as Sustainable hitherto we use in our study Gow's Parameters to ensure sustainability of an efficient institution. The sustainability test according to Gow's parameter indicates; if Operational Self Sustainability (OSS) is greater than 100 percent and number of borrowers is more than 10,000, then that efficient institution can be regarded as sustainable. We have taken the OSS index from *Market Mix* data source for MF institutions, where OSS shows the Operational self sufficient institutions having OSS index for value of 100 or more than it.

In our investigation of MFPs by TE score, no one institution is 100 percent efficient therefore we selected all the MFPs which have TE score more than 90%.

There are 59 among 148 MFPs, who are utilizing their input efficiently more than 90%,

(Reference Table,II to Table.IV above).

Among these efficient institutions only 24 are sustainable as per Gow's check that becomes 16.2% of our total sample, which is not a pleasing gesture for this industry sustainability (See Table A-II in Appendix) Among these 24 sustainable and efficient MFPs only 13 that are 54% of the sample are MFIs whereas 3 that are 12% and 8 that are 33% of sample are MFBs and RSPs respectively. (See Table A-II).NGO- MFIs are demonstrating their best performance in the cluster, which are serving the poor community through micro credits. Remarkable point is a gradual increase in efficiency and sustainability of this sector. Therefore we can expect more efficient and sustainable institutes in future. Table-v classifies the efficient and sustainable MFPs as per defined scale.

Table.V Sustainable MFPs Yearly

2007	**2008**	**2009**	**2010**	**2011**	**2012**	**Type**
					TMFB	Bank
				NRSP_B	***NRSP_B***	Bank
				DAMEEN	DAMEEN	MFI
			CSC			MFI
				ASA- P		MFI
		JWS	JWS			MFI
ORIX	ORIX	ORIX	ORIX			MFI
			RCDS	RCDS	RCDS	RSP
		OPP	OPP	OPP		MFI
	NRSP		NRSP		NRSP	RSP
				SRSO	SRSO	RSP

Source, Author estimation

D. Conclusion

This paper investigated the efficiency level of MF industry in Pakistan through the Cobb Douglus production model specification for SFA frontier approach. The current evaluation of MFPs in Pakistan from efficiency and sustainability prospective has set an imminent picture of the industry progress. We divide these MFPs in there major peer groups and find NGO MFIs are more efficient and sustainable as contrast to RSPs and MFB. The study analyzes 148 MFPs for the time period 2006 to 2012. For the whole time period only 24 institutes are seems to be sustainable that they are satisfying their operational cost from their own resources and also focusing on outreach. Efficiency of sector is increasing, indicating the optimal utilization of input resources yet the sustainability focus is still unsatisfactory. MFBs in Pakistan are molding towards business direction yet they are accountable to their depositors and regulators, on the other hands MFIs are heavily dependent on donor and charity funds yet they are also accountable to their contributors for the fulfillment of social mission. Subsequently, both will have to focus on the efficiency and sustainability matter for survival which will ensure the growth of industry in coming years.

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Appendix

Half Normal SFA production Model

Stochastic Frontier normal/half **Wald chi2(4) = 4891.11**

Log likelihood = -16.630016 **Prob > chi2 = 0.0000**

Table A- I Coefficient of Variables

Variable	Description	Coefficient	Z	P	Conclusion	Expected Sign
Ln GLP						
constant		.1054467	0.35	0.726	Insignificant	
Ln Assests	input	.5608144	12.65	0.000	Significant	Correct
Ln Loan Officer	input	-.0968869	-3.37	0.001	Significant	Correct
Ln Loan per loan officer	output	-.0045199	-2.51	0.012	Significant	In Correct
Ln Active Borrower	output	.5771492	11.64	0.000	Significant	Correct
Ln σ^2		-3.95	-8.76	0.000	Significant	Correct
Ln μ^2		-1.83	-7.48	0.000	Significant	Correct
λ		2.88				

The most vital part of analysis is the likelihood ratio test which defines the presence or absence of inefficiency component in the model. In our study:

Likelihood-ratio test of *sigma_u*=0: chibar2 (01) = 7.18 Prob>=chibar2 = 0.004

Shows the null about no inefficiency components in the model is being rejected at 1% significance level, indicating the presence of inefficiency discrepancies in the model. Further exploration is left for further research.

Institution name	**Technical Efficiency**	**Yea**	**OSS**	**No of Borrowers**	**Decision**
TMFB	0.999607	2012	OSS	154,973	Efficient and Sustainable
NRSP_B	*0.961085*	*2011*	*OSS*	*101,870*	Efficient and Sustainable
	0.980161	*2012*	*OSS*	*127,005*	Efficient and Sustainable
DAMEEN	0.959256	2011	OSS	31,036	Efficient and Sustainable
	0.982959	2012	OSS	35,065	Efficient and Sustainable
CSC	0.959719	2010	OSS	12,828	Efficient and Sustainable
ASA-p	0.910607	2011	OSS	142,814	Efficient and Sustainable
JWS	0.920778	2009	OSS	13,019	Efficient and Sustainable
	0.949813	2010	OSS	14,020	Efficient and Sustainable
ORIX	0.958964	2007	OSS	15,177	Efficient and Sustainable
	0.907721	2008	OSS	16,326	Efficient and Sustainable
	0.931423	2009	OSS	15,553	Efficient and Sustainable
	0.959082	2010	OSS	18,125	Efficient and Sustainable
RCDS	0.909608	2010	OSS	19,388	Efficient and Sustainable
	0.947906	2011	OSS	23,951	Efficient and Sustainable
	0.928785	2012	OSS	33,582	Efficient and Sustainable
OPP	0.925459	2009	OSS	49,155	Efficient and Sustainable
	0.933427	2010	OSS	41,005	Efficient and Sustainable
	0.938653	2011	OSS	42,224	Efficient and Sustainable
NRSP	0.900259	2008	OSS	399,969	Efficient and Sustainable
	0.93299	2010	OSS	317,381	Efficient and Sustainable
	0.947422	2012	OSS	331,338	Efficient and Sustainable
SRSO	0.934019	2011	OSS	63,063	Efficient and Sustainable
	0.951254	2012	OSS	66,655	Efficient and Sustainable

Table A-II Sustainable institution

Table A-III Yearly Average efficiency scores of MFPs
Table A-IV

Years Avg efficiency	Banks	MFIs	RSPs
2006	0.778965	0.835753	0.536601
2007	0.766084	0.83091	0.586263
2008	0.77691	0.857452	0.637325
2009	0.896483	0.856668	0.591879
2010	0.753818	0.877223	0.82013
2011	0.782747	0.914819	0.813169
2012	0.803209	0.92165	0.889477

Abbreviation	Full name	Abbreviation	Full name	Abbreviation	Full name	Abbreviation	Full name
Kbl	Khushali bank limited	Kashf	Kashf foundation	Brac-p	Brac-p	Nrsp	National rural support progtamme
Tmfb	Tameer microfinance bank limited	Safwco	Sindh agriculture and forestry workers cooperation organizatio	Jws	Jinnah welfare society	Prsp	Punjab rural support progtamme
Pomfb	Pak-oman microfinance bank limited	Damen	Development action for mobilization and emancipation	Sdf	Sungi development foundation	Srsp	Sarhad rural support progtamme
Fmfb	The first microfinance bank limited/agha khan project	Csc	Cummunity support concern	Orix	Orix leasing pakista	Trdp	Tardeep rural support progtamme
Nrsp-b	National rural support progtamme microfinance bank	Cwcd	Centre for women cooperative development /wasil	Rcds	Rural community development society	Srso	Sindh rural support organization
Nmfb	Network/ apna microfinance bank limited	Asa-p	Asa-p	Opp	Orangi pilot project		
Kmfb	Kashf microfinance bank ltd						
Rmfb	Rozgar microfinance bank limited						