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Assessing the Operational Efficiency of Microfinance Institutions in India Using Data Envelopment Analysis

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Abstract:

In the global landscape, more than one billion individuals at the bottom of the economic pyramid lack access to formal financial services. The increasing demand for a broad spectrum of financial solutions for these underserved populations has driven a market-driven revolution in microfinance. This movement has led to the development and delivery of a diverse array of financial products. Over the past three decades, the microfinance sector has experienced substantial growth and diversification, resulting in the emergence of diverse institutions and delivery models.

Microfinance institutions (MFIs) play a crucial role in serving low-income customers, often extending loans without requiring collateral, in contrast to traditional financial institutions that demand security for lending to the economically disadvantaged. Furthermore, MFIs are actively engaged in providing skill-based training to enhance productivity, organizational support, and consciousness-building training to empower impoverished communities. These institutions employ innovative approaches to reach the poor, including group lending, progressive lending, regular repayment schedules, and alternatives to traditional collateral.

While existing research in the microfinance sector primarily focuses on impact assessment studies, with an emphasis on understanding the effects of microfinance activities on the lives of the poor, particularly women, only a few studies have employed non-parametric linear programming-based DEA (Data Envelopment Analysis) models to evaluate the efficiency of microfinance institutions globally. Notably, the studies assessing the efficiency of Indian MFIs remain limited.

This study is particularly relevant given its focus on the post-crisis period, post-2010. In order to ensure the sustained operation of microfinance institutions in the long term, it is essential for MFIs to reach as many borrowers as possible while minimizing operational costs. Therefore, this research endeavours to measure the input-oriented efficiency of selected microfinance institutions in India during the period spanning from 2011 to 2017.

Keywords: Microfinance, MFI, Efficiency, DEA, Input oriented efficiency

Introduction

Across the globe, an astounding one billion individuals living at the base of the economic pyramid find themselves excluded from the realm of formal financial services. This stark reality has spurred a remarkable evolution in the landscape of microfinance, driven by the escalating demands of these underprivileged communities for a comprehensive array of financial solutions. Over the past three decades, this sector has burgeoned and diversified, giving rise to an array of heterogeneous institutions and innovative delivery models.

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The transformation of microfinance extends far beyond the mere development and delivery of financial products. It represents a paradigm shift, recognizing the fundamental importance of providing the marginalized with flexible, dependable, and timely access to financial services. Yet, this transformative journey extends beyond finances alone. It underscores the profound significance of non-financial services in enhancing the capabilities of impoverished individuals. As Nobel laureate Amartya Sen elucidated in 1984, enhancing capabilities lies at the core of human development, and microfinance stands as a testament to this ethos.

In this context, the narrative of microfinance is one of empowerment, as it offers more than just financial lifelines; it fosters self-sufficiency, dignity, and opportunities for those who have long been excluded from the formal financial arena. This exploration into the multifaceted realm of microfinance and its transformative potential is both timely and imperative, as it represents a critical facet of promoting inclusivity, human development, and socio-economic advancement among the world's most vulnerable populations. In the following sections, we delve into the profound impact and efficiency of microfinance institutions, particularly within the context of India during the post-2010 period.

Microfinance and Microfinance Institutions

Microfinance, as a concept, encompasses the provision of financial services to impoverished and vulnerable individuals with small businesses or projects. The global population with access to such financial instruments remains disproportionately small, primarily because mainstream commercial banks often consider the poor as non-bankable due to their absence of collateral and information disparities. Essentially, microfinance fills a critical gap by offering financial lifelines to those on the fringes of the formal financial system. It includes savings and credit services and is designed to uplift low-income households and individuals who lack access to conventional bank services.

Microfinance Institutions (MFIs), which serve as the driving force behind microfinance, are specialized financial institutions that have both social and financial objectives. These relatively modest entities have traditionally offered small loans, known as microcredit, to impoverished and low-income citizens. The overarching goal of MFIs is to empower their clients by facilitating their engagement in productive or income-generating activities, such as microenterprises. Notably, MFIs stand apart from traditional banks by often providing loans without requiring collateral, making financial services accessible to people who might otherwise be excluded from the formal financial sector. Furthermore, MFIs play a multifaceted role by providing skill-based training to enhance productivity, offering organizational support, and conducting consciousness-building training to empower the economically disadvantaged. Their services are directed at the impoverished through innovative approaches like group lending, progressive lending, regular repayment schedules, and substitutes for traditional collateral. It's essential to note that MFIs, despite their unique approach, are deeply concerned with profitability, sustainability, and efficiency.

Efficiency is a key factor for the sustainability of MFIs, as they aim to provide financial services to the vast, unmet demand from impoverished individuals worldwide. Government and donor funds can only address a fraction of this demand, highlighting the critical role of financially self-sufficient institutions. Evaluating the efficiency of Microfinance Institutions is crucial, as it can provide insights into their long-term sustainability. The assessment of the efficiency of MFIs in India, within this context, becomes a significant research endeavour, with implications for the financial inclusion and empowerment of the country's marginalized populations.

Review of Literature

Numerous researchers have delved into the realm of microfinance, primarily through impact assessment studies, which have underscored the positive socio-economic influence of microfinance programs both in India and globally. Furthermore, empirical investigations have demonstrated the effectiveness of microfinance institutions in alleviating poverty. The literature has recognized ratio analysis as a valuable tool for evaluating the efficiency of financial institutions. Alongside this, Data Envelopment Analysis (DEA), a non-parametric technique, and Stochastic Frontier Analysis (SFA), a parametric econometric model, offer alternative approaches to analyze efficiency in the financial sector.

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Many authors have suggested that DEA, as an alternative tool for assessing financial institution performance, provides a more comprehensive view compared to ratio analysis. Notably, Gutierrez-Nieto, Serrano-Cinca, and Molinero (2007) applied DEA to microfinance institutions in Latin America, highlighting its capacity to offer richer insights. Despite the numerous studies on banking sector efficiency, there remains a scarcity of research on the efficiency of Microfinance Institutions (MFIs), as evident from the survey conducted by Berger and Humphrey (1997). Cummins and Weiss (2000), in their examination of the insurance industry, discovered that 21 studies used frontier techniques for efficiency analysis, while Luhen (2009) identified over 93 studies employing similar techniques for the insurance sector.

Within the microfinance realm, various studies (e.g., Hassan and Tuffe, 2001; Gregorio and Ramirez, 2004; Nghiem, 2004; and others) have concentrated on the assessment of microfinance institutions' performance. Farrington (2000) identified specific accounting variables such as administrative expense ratio, the number of loans per loan officer, and portfolio size as drivers of MFI efficiency. LA Fourcade, Isern, Mwangi, and Brown (2005) employed cost per borrower and cost per saver as efficiency measures, noting cost variations among African MFIs, particularly with regards to regulation. They observed that regulated MFIs maintained higher efficiency through lower costs per borrower and saver, whereas African cooperative-MFIs incurred higher costs per borrower. Notably, none of these studies employed parametric or non-parametric techniques to evaluate the efficiency of Micro Finance Institutions.

Baumann (2005) explored the link between MFI efficiency and productivity, highlighting that many South African MFIs focusing on poverty alleviation were less efficient compared to their global counterparts. Nghiem (2004) utilized both DEA and SFA methods to assess the technical efficiency of MFIs in Vietnam, while Bereket Zerai (2012) employed both approaches to evaluate MFIs in Ethiopia. Sravani (2015) extended this research by applying DEA and SFAS approaches to assess the technical efficiency of Indian MFIs from 2008 to 2012, including the crisis year of 2010.

Research Gap

Existing studies within the microfinance sector have primarily revolved around impact assessment, focusing on the effects of microfinance activities, particularly on impoverished individuals and women. A notable scarcity of research employing non-parametric linear programming-based Data Envelopment Analysis (DEA) models to evaluate the efficiency of microfinance institutions worldwide has been observed. Moreover, research concerning the efficiency of Indian Microfinance Institutions (MFIs) is noticeably lacking. The importance of this study is underscored by its examination of the post-crisis period, specifically post-2010, as it delves into the challenges and opportunities that arose during this time. The study's relevance becomes evident when considering the long-term viability of microfinance institutions. For these institutions to endure and continue their mission, they must find ways to efficiently extend their services to a greater number of borrowers while minimizing operational costs. Therefore, the researcher has recognized the imperative need to measure the input-oriented efficiency of a sample of microfinance institutions in India during the period spanning from 2011 to 2017.

Objectives of the study

To study the efficiency of selected MFIs in India from 2011-2017, i.e. post crisis which is been recorded in the year 2010.

1. To observe the technical efficiency of selected MFIs in India during the period of the study
2. To observe the pure technical efficiency scores of selected MFIs in India during the period of the study.
3. To observe the scale efficiency scores of selected MFIs in India during the period of the study.

Methodology

This study employs a non-parametric technique known as Data Envelopment Analysis (DEA) to assess the efficiency of selected microfinance institutions. Specifically, it employs an input-oriented DEA approach, aiming to minimize the inputs required to achieve a given level of outputs by MFIs. The study considers three inputs: cost per borrower, operating expenses, and the number of personnel, along with two outputs: the number of active borrowers and the number of outstanding loans. The DEAP software is used for the analysis, and data is collected from Microfinance Information

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Exchange (MIX), where microfinance institutions from around the world submit their operational information for transparency purposes.

The study considered the following inputs: cost per borrower, operating expenses, and the number of personnel. In terms of outputs, the study analyzed the number of active borrowers and the number of outstanding loans. The research involved a sample of twenty-two microfinance institutions for the study considering the available data from MIX website from the period 2011 to 2017, focusing on the post-crisis period, which began in 2010.

Significance

This study holds significant value due to its focus on the post-crisis period, offering insights into the microfinance sector's challenges and opportunities following the 2010 crisis. Moreover, it addresses a research gap as it goes beyond the typical impact assessment studies that primarily explore the impact of microfinance on beneficiary empowerment. Instead, it delves into the efficiency of microfinance institutions, particularly in terms of their costs and expenditures. While expanding outreach is crucial, the study underscores the equal importance of an MFI's ability to sustain itself in the long run through cost-efficient operations.

Results and Discussion

TECHNICAL EFFICIENCY

The table below shows the technical efficiency scores of selected MFIs during the period between 2011 and 2017 under constant returns to scale assumption (CRS).

It was evident from the results obtained that the MFIs suffer a technical inefficiency of 40 percent as the average technical efficiency score for the entire sample during the entire period of study was found to be 59.6 percent. The technical efficiency was found to be higher during 2016, while it was declined to 58 percent in 2017. There were fluctuations observed in efficiency scores during the period of the study. Sanghamitra and SKDRDP were found to be efficient with 100 percent technical efficiency.

PURE TECHNICAL EFFICIENCY

The table below shows the technical efficiency scores of selected MFIs during the period between 2011 and 2017 under variable returns to scale assumption (VRS).

TECHNICAL EFFICIENCY SCORES OF SAMPLES MFIS DURING 2011 AND 2017 UNDER CRS ASSUMPTION									
FIRM	**MFI**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**AVERAGE**
1	Fusion	0.353	0.458	0.492	0.512	0.564	0.74	0.669	**0.541143**
2	Guardian	0.425	0.643	0.86	0.908	0.863	0.817	0.43	**0.706571**
3	IDF Financial	0.837	0.629	0.595	0.512	0.5	0.428	0.342	**0.549**
4	Lok Biradari Trust	0.347	0.321	0.419	0.524	0.5	0.487	0.445	**0.434714**
5	Madura	0.623	0.528	0.496	0.649	0.548	0.781	0.624	**0.607**
6	Mahasemam	0.52	0.619	0.561	0.747	0.687	0.759	0.658	**0.650143**
7	Navachetana	0.244	0.292	0.537	0.509	0.372	0.561	0.472	**0.426714**
8	Prayas	0.693	0.429	0.469	0.437	0.448	0.578	0.48	**0.504857**
9	Sahara Utsarga	0.275	0.206	0.275	0.333	0.326	0.358	0.295	**0.295429**
10	saija	0.089	0.292	0.394	0.465	0.486	0.62	0.532	**0.411143**
11	Samhita	0.424	0.402	0.418	0.534	0.559	0.429	0.369	**0.447857**

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12	Sanghamithra	1	1	1	1	1	1	1	**1**
13	Sarvodaya Nano	0.765	1	0.441	0.8	0.766	0.748	0.272	**0.684571**
14	Satin	0.461	0.585	0.782	0.774	0.721	0.945	0.584	**0.693143**
15	SKDRDP	1	1	1	1	1	1	1	**1**
16	SMGBK	0.367	0.343	0.349	0.303	0.326	0.577	0.313	**0.368286**
17	SMILE	0.538	0.541	0.536	0.464	0.436	1	1	**0.645**
18	Sonata	0.33	0.453	0.565	0.725	0.632	0.556	0.574	**0.547857**
19	Spandana	1	1	1	1	1	0.914	1	**0.987714**
20	Suryoday	0.487	0.447	0.642	0.61	0.578	0.787	0.57	**0.588714**
21	Uttrayan Financial	0.371	0.572	0.324	0.634	0.539	0.699	0.625	**0.537714**
22	Village Financial	0.408	0.382	0.374	0.446	0.514	0.707	0.507	**0.476857**
	mean	**0.525**	**0.552**	**0.57**	**0.631**	**0.608**	**0.704**	**0.58**	**0.595714**

TECHNICAL EFFICIENCY SCORES OF SAMPLE MFIS DURING 2011 AND 2017 UNDER VRS ASSUMPTION

FIRM	**MFI**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**AVERAGE**
1	Fusion	0.43	0.549	0.494	0.531	0.577	0.769	0.672	**0.574571**
2	Guardian	0.981	1	1	1	1	1	1	**0.997286**
3	IDF Financial	0.865	0.923	0.693	0.667	0.604	0.515	0.51	**0.682429**
4	Lok Biradari Trust	1	1	1	1	1	1	1	**1**
5	Madura	0.658	0.542	0.51	0.669	0.552	0.811	0.627	**0.624143**
6	Mahasemam	0.525	0.621	0.586	0.749	0.741	0.76	0.789	**0.681571**
7	Navachetana	0.523	0.572	0.76	0.537	0.43	0.57	0.509	**0.557286**
8	Prayas	1	0.86	0.751	0.611	0.562	0.703	0.842	**0.761286**
9	Sahara Utsarga	0.335	0.319	0.347	0.362	0.39	0.392	0.513	**0.379714**
10	saija	0.337	0.376	0.48	0.47	0.492	0.657	0.543	**0.479286**
11	Samhita	0.513	0.567	0.476	0.542	0.563	0.498	0.415	**0.510571**
12	Sanghamithra	1	1	1	1	1	1	1	**1**
13	Sarvodaya Nano	1	1	0.621	0.93	0.937	0.901	0.887	**0.896571**
14	Satin	0.566	0.638	0.827	0.793	0.742	0.96	0.586	**0.730286**
15	SKDRDP	1	1	1	1	1	1	1	**1**
16	SMGBK	0.636	0.655	0.575	0.563	0.458	0.811	0.647	**0.620714**
17	SMILE	0.63	0.597	0.563	0.47	0.442	1	1	**0.671714**
18	Sonata	0.347	0.483	0.588	0.741	0.639	0.562	0.591	**0.564429**
19	Spandana	1	1	1	1	1	1	1	**1**

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20	Suryoday	0.494	0.5	0.746	0.627	0.585	0.804	0.572	**0.618286**
21	Uttrayan Financial	0.635	0.689	0.47	0.656	0.56	0.709	0.739	**0.636857**
22	Village Financial	0.437	0.383	0.412	0.478	0.526	0.756	0.517	**0.501286**
	mean	**0.678**	**0.694**	**0.677**	**0.7**	**0.673**	**0.781**	**0.725**	**0.704**

Fluctuations were observed in the pure technical efficiency from 2011 to 2017. The pure technical efficiency was found to be highest in the year 2016 which is 78.1 percent, while it decreased to 72.5 percent in the year 2017. From the analysis it was observed that the total pure technical efficiency for the entire sample from 2011 to 2017 was found to be 70.4 percent which implies that the MFIs suffer an inefficiency of around 30 percent during the period of the study. 100 percent efficiency was recorded for Lok Biradri Trust, Sanghamitra, SKDRDP and Spandana for all the years of study.

SCALE EFFICIENCY

The table below shows the scale efficiency scores of selected MFIs during the period between 2011 and 2017.

SCALE EFFICIENCY SCORES OF SELECTED MFIS DURING THE PERIOD BETWEEN 2011 AND 2017									
Firm	**MFI**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Average**
1	Fusion	0.822	0.834	0.996	0.964	0.978	0.962	0.996	**0.936**
2	Guardian	0.434	0.643	0.86	0.908	0.863	0.817	0.43	**0.707857**
3	IDF Financial	0.967	0.681	0.858	0.768	0.829	0.83	0.671	**0.800571**
4	Lok Biradari Trust	0.347	0.321	0.419	0.524	0.5	0.487	0.445	**0.434714**
5	Madura	0.948	0.973	0.974	0.97	0.991	0.963	0.995	**0.973429**
6	Mahasemam	0.989	0.997	0.956	0.998	0.928	0.998	0.834	**0.957143**
7	Navachetana	0.466	0.51	0.706	0.948	0.865	0.983	0.927	**0.772143**
8	Prayas	0.693	0.499	0.625	0.715	0.796	0.823	0.57	**0.674429**
9	Sahara Utsarga	0.821	0.646	0.792	0.918	0.836	0.912	0.576	**0.785857**
10	saija	0.265	0.777	0.82	0.989	0.988	0.944	0.979	**0.823143**
11	Samhita	0.828	0.709	0.879	0.985	0.993	0.862	0.889	**0.877857**
12	Sanghamithra	1	1	1	1	1	1	1	**1**
13	Sarvodaya Nano	0.765	1	0.711	0.86	0.817	0.83	0.306	**0.755571**
14	Satin	0.814	0.917	0.946	0.976	0.972	0.984	0.997	**0.943714**
15	SKDRDP	1	1	1	1	1	1	1	**1**
16	SMGBK	0.578	0.524	0.607	0.538	0.711	0.711	0.484	**0.593286**
17	SMILE	0.854	0.905	0.953	0.987	0.987	1	1	**0.955143**
18	Sonata	0.951	0.939	0.961	0.978	0.99	0.989	0.972	**0.968571**
19	Spandana	1	1	1	1	1	0.914	1	**0.987714**
20	Suryoday	0.985	0.895	0.861	0.973	0.988	0.979	0.998	**0.954143**
21	Uttrayan Financial	0.584	0.831	0.69	0.966	0.962	0.986	0.846	**0.837857**
22	Village Financial	0.935	0.995	0.909	0.934	0.977	0.935	0.981	**0.952286**
	mean	**0.775**	**0.8**	**0.842**	**0.905**	**0.908**	**0.905**	**0.813**	**0.849714**

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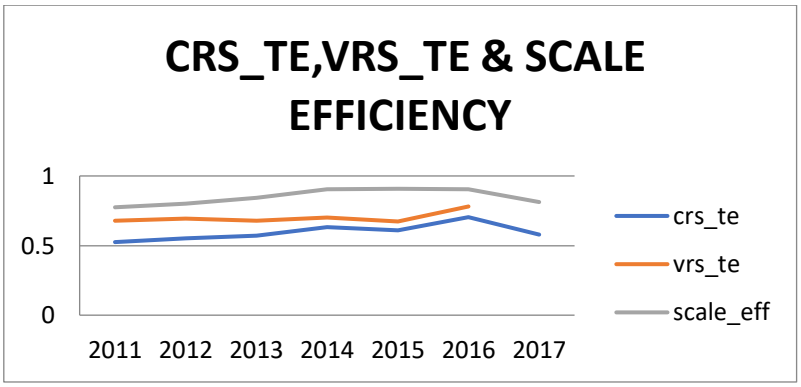
A gradual increase in scale efficiency was observed from 2011 to 2016, i.e. 77.5 percent in 2011 to 90.5 percent in 2016, but the scale efficiency was dropped to 81.3 percent during 2017. For the entire sample the scale efficiency was found to be 84.9 percent for the entire period of the study i.e., from 2011 to 2017, which implies a scale inefficiency of 15 percent. Two MFIs Sanghamitra and SKDRDP were found to be operating with 100 percent scale efficiency during the entire period of study.

The figure below presents the trend of technical efficiency scores of sample MFIs under CRS and VRS assumptions and trend of scale efficiency scores of sample MFIs.



Declining trend of efficiency scores was observed among the MFIs selected for the study during the period of the study.

SUGGESTIONS

1. The results of the analysis reveal that still there is a possibility for sample Indian MFIs to improve their efficiency by about 40 percent under CRS assumption by reducing their inputs viz operating expenses, cost per borrower and number of personnel.
2. The results of the analysis reveal that still there is a possibility for sample Indian MFIs to improve their efficiency by about 30 percent under VRS assumption by reducing their inputs viz operating expenses, cost per borrower and number of personnel.
3. As it was evident from the results obtained that the technical efficiency is very low during the study period which is mainly due to poor input utilization i.e., managerial inefficiency or pure technical inefficiency which can be improved by having a check on operational expenditure and by minimizing the unnecessary wastage of resources like employing too many staff more than required.
4. Further MFIs should also try to utilize their scale to the fullest extent possible which implies reaching a greater number of customers with the limited resources possible i.e., without resorting to practice of higher staffing.
5. The inefficient MFIs should follow the best practices of Sanghamitra, SKDRDP and Spandana in the sample selected as these were found to be more effective with around 100 percent efficiency under both assumptions input oriented VRS-DEA and CRS-DEA.

REFERENCES

1. Baumann, T. (2005). Pro-poor microcredit in South Africa: Cost-efficiency and productivity of south African pro-poor microfinance institutions. Journal of Microfinance, 7(1), 95-118.
2. Bereket Zerai & Lalitha Rani (2012), Technical Efficiency and its determinants of Micro Finance Institutions in Ethiopia: A Stochastic Frontier Approach, African Journal of Accounting, Economics, Finance and Banking Research 8(8), 2012.
3. Bereket Zerai & Rani (2011). Is There a Trade-off between Outreach and Sustainability of Micro finance institutions? Evidence from Indian Microfinance Institutions (MFIs), Research Journal of Finance and Accounting, 2(11), 2011.

4. Berger, A.N., Humphrey, D.B. (1997). Efficiency of financial institutions: international survey and directions for future research. European Journal of Operational Research, 98(2), 175–212.
5. Cummins, J.D. and Weiss, M.A. (2000). Analysing firm performance in the insurance industry using frontier efficiency methods. In: Dionne, G. (Ed.), Handbook of Insurance. Boston: Kluwer Academic Publishers.
6. Guitierrez-Nieto, B. Serrano-Cinca, C. and Molinero, C. M. (2006). Microfinance institutions and efficiency. International Journal of Management Science, 35(2), 131–142.
7. Hassan, M. K. and Tuffe, D. R. (2001). The x-efficiency of a group-based lending institution: the case of Grameen bank. World Development, 29(6), 1071-1082.
8. Hassan, M.K. and S. Benito. (2009). Efficiency analysis of microfinance institutions in developing countries, working paper-12, networks financial institute. Indiana: Indiana State University
9. LA Fourcade AL, Isern J, Mwangi P, and Brown M. (2005). Overview of the outreach and financial performance of microfinance institutions in Africa. Washington, DC: The MIX market Inc.
10. Sravani M (2015), Performance Evaluation of MFIs in India-A study measuring technical efficiency of selected MFIs in India, IOSR Journal of Business and Management (IOSR-JBM),17(6),80-85.