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**BANKS IN INDIA - EFFICIENCY IN FINANCING ENTREPRENEURS
AND SMALL BUSINESSES UNDER PMMY SCHEME: DEA APPROACH**

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Abstract

This study, for the first time, empirically analyzes banks' efficiency in implementing a government scheme that promotes entrepreneurship. It examines the relative technical and scale efficiency of 42 Indian banks, including a comparative efficiency between private and public sector banks in providing loans, under the Prime Minister MUDRA Yojana Scheme (PMMY), launched by the Government of India, to promote entrepreneurship and facilitate easy access to capital for small and micro units, including the start-ups, by using data on the number of loans sanctioned and amount of loan disbursed under the scheme. The study found that Indian banks have been less efficient in implementing the PMMY. Public sectors banks were more efficient in providing loans under the scheme and providing loans to start-ups under the scheme than the private sector banks. The study revealed that banks efficiency scores give the policy makers a better picture of their relative performance as it takes into account the differences in size, branch network, back end technology and profitability rather than the number of loans sanctioned.

Keywords: *Bank Efficiency, Entrepreneurship, DEA, Government scheme, Start-up*

JEL Code: *G21, L26, C14, M13*

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1. Introduction

Institutions like banks play a crucial role in determining the demand and supply of entrepreneurs as they have the ability to influence economic behavior of individuals in a country (**Busenitz, Gomez & Spencer, 2000; Mehlum, Moene & Torvik, 2006**) and economic transactions carried out by individuals of the country (**Williamson, 1998**). The “Regulatory Dimension” component of the “Country Institutional Profile”, conceptualized by **Kostova (1997)**, explains the effect of laws, regulations, and government policies of a country, on its institution’s ability to support new businesses. The country’s regulatory dimension of the institutional profile also determines an individual’s opportunity to access the available resources and privileges, using the government sponsored programs and policies favoring entrepreneurship (**Busenitz, Gomez & Spencer, 2000**). In this connection, **Minniti (2008)** claims that Government policies that shape the institutional environment, in which entrepreneurial decisions are made, play an important role in deciding the entrepreneurial activity of a country.

Financial intermediaries like banks, which facilitate access to capital, are a part of the institutional environment of a country and they are also affected by government schemes, that promote entrepreneurship (**Black & Strahan, 2002**). The financial intermediaries’ ability to partially negate the adverse selection problem, in credit decisions, by reducing information asymmetry and its ability to mobilize funds of small investors and channelize it to profitable investments, makes them a suitable medium for implementing Government schemes, that promote entrepreneurship (**King & Levine, 1993a**). Government schemes, that involve financial intermediaries, to facilitate access to capital to small businesses, were found to have causal effect on entrepreneurship and long run economic growth (**Feld, 2012; King & Levine, 1993b**).

This study contributes to the literature, on bank efficiency and entrepreneurship, by appraising the relative efficiency of the Indian banks, both public sector and private sector, in the implementation of the PMMY, by using the Data Envelope Analysis, a non-parametric method.

2. Review of Literature

The efficiency of banks in the implementation of the government schemes, that promote entrepreneurship, is a pertinent area of research for entrepreneurship and banking but literature is sparse in this domain. The literature provides evidence, on various aspects of the efficiency of banks, in different countries, by using different parametric and non-parametric methods. **Benston (1972), Humphrey (1990), Berger, Hunter & Timme, (1993), Pastor, Perez & Quesada (1997), Ashton & Hardwick (2000), Casu & Molyneux (2001), Brown & Skully (2003), Berger (2007), Paradi, Yang & Zhu (2011)** provide comprehensive account of the studies, on efficiency of banks, in the global context, by using different parametric and non-parametric methods. Similarly, the literature on efficiency of banks in India, has used both parametric and non-parametric techniques like stochastic cost frontier (**Bhattacharyya, Lovell & Sahay, 1997; Kumbhakar & Sarkar, 2003; Rogers, 1998; Shanmugam & Das, 2004**) and non-parametric techniques like Data Envelope Analysis (**Kumar, Charles & Mishra, 2016; Saha, & Ravisankar, 2000**), for measuring efficiency. Majority of existing studies are confined to the period of 1990s and early 2000s. Main focus of these studies was on the impact of financial deregulation on banks’ productivity and efficiency and efficiency differences across ownership groups (**Gulati & Kumar, 2016**). The efficiency of the implementing mechanism, determines the effectiveness of Government programmes (**Larson, 1980**). Hence efficiency of the

financial intermediaries like banks, will positively affect the number of entrepreneurs, getting benefitted by the Government schemes that facilitate access to capital. The objective of this study was to evaluate the banks' efficiency, as a financial intermediary, in supporting Government initiative to boost entrepreneurship, in an emerging economy like India, by reducing the financial constraints like limited access to capital. Realizing the important role that entrepreneurship plays in the process of "Creative Destruction" (Schumpeter, 1934), resulting in economic development, Governments, both in developed and developing economies, are designing creative policies as part of their attempts, to alleviate financing constraints, for would-be entrepreneurs which also include opportunity-driven entrepreneurs (Kerr & Nanda, 2009). India, an emerging economy, as part of its attempts to support the financial institutions in providing loans to micro and small business entities, started 'Micro Units Development and Refinance Agency' (MUDRA) in 2015, as a public sector financial institution. Financial intermediaries like Banks, Micro Finance Institutions (MFI) and Non-Banking Finance Companies (NBFC) provide MUDRA loan upto Rs.1 Million (15000 USD), to income-generating micro enterprises, engaged in manufacturing, trading and services sectors, without any collateral securities, under a Government scheme called Pradhan Mantri MUDRA Yojana (PMMY), launched in 2015. The borrowers of MUDRA loan do not have to pledge their assets as collateral and encumbrance is created, on the assets, which are created out of the loan. Based on the amount of loan sanctioned, starting from the lowest, the loans are classified at three levels as "Shishu", which means a new born, "Kishore", which means adolescent and "Tarun", which means youth.

3. Statement of the Problem

The effectiveness of the government policies depends on the efficiency of its

implementation mechanism (Van Meter & Van Horn, 1975). One of the components in the implementation of PMMY is the financial intermediaries and hence effectiveness from the supply side can be studied, by evaluating the efficiency of the financial intermediaries like the banks. Hence the problem to be examined is whether the banks, that report large number of loans sanctioned under the scheme, are doing it in proportion to the resources held by them i.e., whether the banks are using its resources efficiently, for providing loans under the PMMY.

4. Need for the Study

The efficiency of banks in using their resources, like number of branches, total assets, profitability and number of employees, is seldom considered for evaluating their performance in implementing Government programmes. Instead it is only the number of loans sanctioned that is considered, for evaluating their performance. In this aspect, the difference in size, profitability, back-end technology and coverage, provide undue advantage to large banks. It is imperative to study the efficiency of banks, in providing loans under the PMMY, in particular because of the nature of its beneficiaries. The demand for loans under the programme, comes from individuals who are keen to start a small business and they do not have adequate documents to prove their credibility. The beneficiaries of PMMY loan are informationally opaque and the banks have to rely on unverifiable, soft information, to evaluate their creditworthiness as most of them do not have an external credit rating.

5. Objective of the Study

The main objective of the study was to evaluate the Indian banks' efficiency, in providing loans to entrepreneurs, under the PMMY. It also evaluates the relative efficiency of public sector and private sector banks, in providing loans under the PMMY, to entrepreneurs and to find out which among them is more efficient.

6. Hypotheses of the Study

The following were the hypotheses, tested in the study:

NH-1: The mean overall technical efficiency, pure technical efficiency and scale efficiency of public sector banks and private sector banks in providing loans under PMMY scheme is not significantly different.

NH-2: The mean overall technical efficiency, pure technical efficiency and scale efficiency of public sector banks and private sector banks in providing “Shishu” loans under PMMY scheme to start ups is not significantly different.

7. Research Methodology

7.1. Sample Selection

In the study, the 42 listed Indian commercial banks were included in the sample, which included 25 banks in the public sector and 17 banks in the private sector.

7.2. Sources of Data

The data, on number of loans sanctioned under the PMMY scheme, as on March 2016, were obtained from the website of MUDRA, which provided bank wise data, on total loan amount disbursed and number of loans sanctioned, under the PMMY scheme. The variables, used in the analysis, were return on assets, business per employee, number of branches and total assets, which were obtained from annual financial reports of the banks’ for the year ended March 2016. The DEAP software, version 2.1 was used to do the Data Envelope Analysis and hypothesis testing was done by using SPSS software.

7.3. Period of the Study

The period of the study was from April 2015 to March 2016.

7.4. Statistical Tools used

Descriptive Statistics and Percentage analysis were used in the study.

8. Analysis of Data

Table-1 gives the descriptive statistics of the public sector banks’ inputs and outputs, while **Table-2** gives the descriptive statistics of the private sector banks’ inputs and outputs. The summary statistics shows that the average return, on assets of private sector banks, was almost three times the public sector banks, which indicated that they were more profitable than public sector banks. But the private sector banks’ average number of branches and average total assets were less, which indicated that these were smaller in size and spread than the public sector banks. The business per employee was higher in the public sector banks. This was the ratio of total business of the bank in terms of deposits and advances, and the total number of employees. In other words, the “Back End Technology” (**Petersen& Rajan, 2002**) i.e. the number of employees available to attend to the customer needs, was more in public sector banks.

The empirical estimates of technical efficiency, with its components of the 42 banks, are reported in the **Table-3**. The results revealed that when all types of loan sanctioned were considered, efficient frontier for the nine banks, with all the three types of efficiencies estimated, was equal to one (CRS and the VRS model was operated). The output oriented approach provided the means of OTE, PTE and SE at 52%, 66% and 81.4% respectively. This indicated that the banks can increase the loan, under PMMY portfolio, up to 48%, by efficiently using the existing level of inputs. When the efficiency, for providing “Shishu” loans to start ups, was examined, the results revealed the efficient frontier for eight Banks. The output oriented approach provided the means of OTE and the PTE and SE, for providing “Shishu” loans, at 43%, 53%and 80% respectively, which was a further fall over the combined 42 banks. DEA of the sample, containing only the 25 public sector banks, showed that the mean efficiency

of OTE, PTE and SE, for providing loans under PMMY was 64%, 82% and 79% respectively. DEA done on the sample of 17 private banks showed that the means of OTE, PTE and SE were 40%, 59% and 74% respectively. Even though the mean efficiency of private sector banks was less than the public sector banks, it was necessary to test whether the difference was significant or not. The Mann Whitney U test was done, to test the hypothesis and the results are compiled in **Table-4**.

Table-5 presents the number of banks, in four quartiles of efficiency scores. Considering the efficiency of banks in providing loans under PMMY, 29% of the banks recorded overall technical efficiency at more than 75% quartile and 46% had pure technical efficiency at more than 75% quartile. But when the efficiency of the banks, in providing loans to Micro start-ups, was considered, it was reduced to 26% of the banks, having overall technical efficiency at more than the 75% quartile and 38% of the banks, having pure technical efficiency at more than the 75% quartile respectively.

9. Findings of the Study

The study found that the mean overall technical efficiency of banks, in providing loans to small business, including start-ups, was 52%, while it was 66% for pure technical efficiency and 87% for scale efficiency respectively. This was further reduced to 43%, 53% and 72% respectively in providing loans to small start-ups, under the PMMY. The comparison of efficiency of Public Sector Banks (PSBs) and Private Sector Banks (Pvt. SBs) revealed that the distribution of efficiency scores, for the two groups was significantly different, and that the PSBs outperformed their counterparts in private sector. Hence the null hypothesis **NH-1** is rejected.

From the efficiency scores, it was evident that the Indian banks were not utilizing their branch network, back end technology, size and profitability efficiently, for providing loans under

the PMMY. It implied that they presented significant scope for increasing the number of loans sanctioned under the PMMY scheme. The results of hypothesis testing indicated that the means of OTE, PTE and SE were more for public sector banks. These banks also had a better mean efficiency for sanctioning loans to start-ups. The private banks were found to be less efficient in sanctioning 'Shishu' loans to start-ups. The most disturbing finding from this study was that around 30-35 % of the banks under the study, had less than 25% efficiency, in providing loans to start-ups. The means of OTE and PTE of the private sector banks, for giving Shishu loans, was very low at 29% and 39%, which implied that private bank management was shying away from giving loans to small entrepreneurs, even when refinance facility was available. The high efficiency of public sector banks, compared to private sector, may be attributed to the increased control of Government in the internal management of the banks. Hence the null hypothesis **NH-2** is rejected.

This study also found that some banks, which reported more number of accounts and more amount of loan disbursement, compared to others, did not occupy the efficient frontier and some of them, which sanctioned lesser number of loans, were efficient at using their resources. This indicated that the performance of the banks, in the implementation, should not be judged merely by the number of loans sanctioned. The outputs should be judged in comparison to the inputs used, for generating those loans, to get a better picture of the efficiency.

10. Conclusion

The study aimed at measuring the efficiency of Indian Banks, in providing loans under the PMMY, which is a scheme launched by the Government of India, to promote entrepreneurship. It was found that Indian banks were not efficient in providing loans under the

PMMY and they will have to double the output, with the existing inputs, to become efficient. Public sector banks compared to private banks, were more efficient in providing credits to small businesses and start-ups, under the scheme. The study has policy implications. Unlike the number of loans sanctioned, the efficiency scores of the banks helped the policy makers a better picture of their relative performance of banks, as it took into account the differences in size, branch network, back end technology and profitability. The efficiency level provided information to the policy makers on how many more loans can be sanctioned by each bank, with their existing resources. The study recorded lower efficiency of private sector banks, which mandated separate and stricter norms for the implementation of PMMY.

11. Suggestions

The study has policy implications. The efficiency of banks, in providing loans to start-ups, was very low. Hence the policy makers should investigate and find the reasons for such low levels of efficiency and take necessary action, to improve the entrepreneurial activities in the country.

12. Limitations of the Study

This study suffered from some limitations. It did not consider all the commercial banks. Compared to all the public sector banks, the study analyzed a limited number of private sector banks. The period of study was a single year because only one year had elapsed after the launch of PMMY. Also, the study used only four input and two output variables, to appraise the banks efficiency. In general, DEA was very subtle to data changes.

13. Scope for Future Research

Future studies may attempt to incorporate more input factors, that are more closely related to the bank's ability, to provide collateral free loans to micro units. The inputs and outputs may also be observed, for more number of years, to

compute the efficiencies in the coming years of its implementation. Studies may also be undertaken, to find the reason for lower levels of efficiency and to find out what can be done to improve the efficiency of banks.

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Table-1: Summary Statistic Public Sector Banks Inputs and Outputs

Descriptive Statistics	Return on asset (ROA)%	Business per employee ('000'Rs.)	Branches	Total Assets ('000'Rs.)	Number of loans sanctioned under PMMY	Amount Disbursed under PMMY in Crore' (Rs.)	Number of loans sanctioned to start-ups under PMMY	Amount Disbursed under PMMY to start-ups in Crore' (Rs.)
Mean	0.40	152645	3531	3424087167	262660	2211.84	199241	319.83
Median	0.33	144600	2507	2270964800	163854	1484.35	126826	255.47
Maximum	1	261200	16333	20480798000	1031804	12281.18	11166	977.62
Minimum	0	107200	1015	794689300	19477	334.82	756098	22.98
Standard Deviation	0.21	33590893	3094	3972717864	250874	2531.24	195617	257.85

Source: <http://www.mudra.org.in>

Table-2: Summary Statistic Private Sector Banks Inputs and Outputs

Descriptive Statistics	Return on asset (ROA) %	Business per employee ('000' Rs)	Branches	Total Assets ('000'Rs)	Number of loans sanctioned under PMMY	Amount Disbursed under PMMY in Crore' (Rs.)	Number of loans sanctioned to start-ups under PMMY	Amount Disbursed under PMMY to start-ups in Crore' (Rs.)
Mean	1.31	103286	1191	848065194	180449.47	1177.92	156901.47	349.33
Median	1.38	106792	726	518366000	12651.00	366.53	2604.00	11.06
Maximum	2.30	168600	4050	4619323942	1251106.00	5356.89	1167585.00	2447.37
Minimum	0.34	67800	154	14857600	670.00	11.07	0.00	0
Standard Deviation	0.53	26054057	1249	1149589120	359235.91	1648.50	334279.15	748.01

Source: <http://www.mudra.org.in>

Table-3: Overall Technical Efficiency, Pure Technical efficiency and Scale Efficiency of Indian Scheduled Commercial Banks in providing collateral free loans to Small businesses, Start-ups and Micro Start Ups

Sl. No.	Name of the Bank	Financing small businesses & start-ups			Financing Shishu (Micro Start-Ups)		
		Technical efficiency (CRS)	Technical efficiency (VRS)	Scale efficiency	Technical efficiency (CRS)	Technical efficiency (VRS)	Scale efficiency
1	Allahabad Bank	0.54	0.66	0.82	0.47	0.49	0.96
2	Andhra Bank	0.59	0.70	0.84	0.68	0.74	0.93
3	Bank of Baroda	0.31	0.31	1.00	0.34	0.34	1.00
4	Bank of India	0.74	0.75	0.99	1.00	1.00	1.00
5	Bank of Maharashtra	0.54	0.68	0.79	0.33	0.39	0.85
6	Canara Bank	1.00	1.00	1.00	1.00	1.00	1.00
7	Central Bank of India	1.00	1.00	1.00	1.00	1.00	1.00
8	Corporation Bank	0.42	0.52	0.80	0.58	0.67	0.87
9	Dena Bank	0.31	0.47	0.66	0.28	0.42	0.66
10	Indian Bank	0.46	0.52	0.88	0.35	0.36	0.97
11	Indian Overseas Bank	1.00	1.00	1.00	1.00	1.00	1.00
12	Punjab National Bank	0.78	0.79	0.99	0.53	0.56	0.95
13	Oriental Bank of Commerce	0.42	0.56	0.75	0.79	0.82	0.97
14	Syndicate Bank	0.64	0.67	0.96	0.39	0.39	1.00
15	Union Bank of India	0.34	0.36	0.96	0.41	0.42	0.99
16	UCO Bank	1.00	1.00	1.00	0.46	1.00	0.46
17	United Bank of India	0.59	1.00	0.59	0.59	1.00	0.59
18	Vijaya Bank	0.83	1.00	0.83	1.00	1.00	1.00
19	Punjab & Sind Bank	0.59	1.00	0.59	0.54	0.69	0.79
20	IDBI Bank Limited	0.68	0.97	0.70	0.63	0.82	0.77

Table-3: Continued...

Table-3: Continued...

Sl. No.	Name of the Bank	Financing small businesses & start-ups			Financing Shishu (Micro Start-Ups)		
		Technical efficiency (CRS)	Technical efficiency (VRS)	Scale efficiency	Technical efficiency (CRS)	Technical efficiency (VRS)	Scale efficiency
22	State Bank of Mysore	0.44	0.55	0.80	0.05	0.10	0.50
23	State Bank of Bikaner and Jaipur	0.56	0.56	0.99	0.05	0.07	0.73
24	State Bank of Hyderabad	0.42	0.42	1.00	0.13	0.13	0.96
25	State Bank of Travancore	0.19	0.34	0.56	0.13	0.14	0.93
26	Yes Bank	0.11	0.11	0.96	0.00	1.00	0.00
27	Catholic Syrian Bank	0.01	1.00	0.01	0.01	0.01	0.83
28	Axis Bank	0.40	0.47	0.86	0.00	0.00	0.95
29	Federal Bank	0.04	0.04	1.00	0.06	0.08	0.83
30	IndusInd Bank	1.00	1.00	1.00	0.02	0.02	0.95
31	Jammu & Kashmir Bank	0.26	0.26	1.00	0.01	0.01	0.66
32	Karnataka Bank	0.16	0.17	0.95	0.00	0.01	0.72
33	City Union Bank	0.13	0.18	0.73	0.02	0.03	0.75
34	Karur Vysya Bank	1.00	1.00	1.00	0.00	0.01	0.46
35	Lakshmi Vilas Bank	0.05	0.12	0.44	0.84	1.00	0.84
36	South Indian Bank	0.12	0.16	0.76	0.77	1.00	0.77
37	Ratnakar Bank	0.76	1.00	0.76	0.42	0.43	0.97
38	Tamilnad Mercantile Bank	0.30	0.39	0.77	1.00	1.00	1.00
39	DCB Bank	0.15	1.00	0.15	0.01	0.01	0.97
40	ICICI Bank	1.00	1.00	1.00	1.00	1.00	1.00
41	Kotak Mahindra Bank	0.25	1.00	0.25	0.00	1.00	0.00
42	HDFC Bank	1.00	1.00	1.00	0.00	0.00	0.00

Source: <http://www.mudra.org.in>

Table-4: Results of Hypothesis testing -Mann-Whitney U Test

NH-1	Efficiency of providing loan under PMMY	Sum of ranks-Public sector banks	Sum of ranks-Private sector banks	U	μ_U	Standard Error	p value
	OTE	619	264	111	212.5	39.02	0.004***
	PTE	561	300	147	212.5	39.02	0.04**
	SE	645.5	168.5	15.5	212.5	39.02	0.000***
NH-2	Efficiency of providing loan under PMMY						
	OTE	657	245	92	212.5	39.02	0.001***
	PTE	613	289	136	212.5	39.02	0.024**
	SE	577	158	5	212.5	39.02	0.000***

Source: <http://www.mudra.org.in> Data using SPSS 16

***-1% significance level, **-5% significance level

Note: OTE- Overall Technical Efficiency, PTE-Pure Technical Efficiency, SE- Scale Efficiency

Table-5: Number of Banks in each Quartile of Efficiency Scores

Efficiency (%)	Loans to start ups and existing						Loans to start ups					
	Technical Efficiency	%	Pure technical efficiency	%	Scale Efficiency	%	Technical Efficiency	%	Pure Technical Efficiency	%	Scale Efficiency	%
0-25	9	21	6	14	2	5	16	38	14	33	3	7
25-50	12	29	8	19	2	5	9	21	8	19	2	5
50-75	9	21	9	21	6	14	6	14	4	10	6	14
75-100	12	29	19	45	32	76	11	26	16	38	31	74

Source: <http://www.mudra.org.in> Data using SPSS 16

Note: %-percentage of banks under each quartile of efficiency