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Measuring Technical Efficiency of KSFE Branches

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1. Introduction

The Indian financial sector has witnessed the emergence of wide range of financial institutions over the year that caters to the economy's diverse financial needs. The Non Banking Financial institutions (NBFIs) play a very important role among the financial institutions. A Nonbanking financial institution facilitates bank related financial services such as investment, contractual savings and market brokering. The NBFI along with the banking sector contribute to the inclusive growth and development of the economy by increasing the access to financial services, enhancing competition and diversifying financial sector among others.

Kerala State Financial Enterprises is the only miscellaneous nonbanking financial institution in Kerala which runs chit business. KSFE was established by the government of Kerala in 1969 with the objective of providing an alternative to the private chit promoters' in order to bring in social control over the chit fund business, so as to save the public from the clutches of unscrupulous fly-by-night chit fund operators. The Paid up capital then was Rs. 2 Lakhs. Total number of employees at the start was 45. Now the Paid up Capital is Rs. 100 Crores,total number of employees is 6782.The number of customers is more than 33 Lakhs. The turn Over as on september.2017 is Rs33801Crores.A most remarkable feature about KSFE is that all funds mobilized by it through its various deposit schemes and chitties are advanced wholly to the public in Kerala itself, where as other financial institutions and banks channel their deposits collected in Kerala for advance outside the state. KSFE is one of the most profit making public sector undertakings of the state.

The efficiency of KSFE depends on the operation of a network of branches that act as the key contact point between KSFE and its customers. Efficiency measurement at branch level poses big challenges to KSFE because it is difficult to define and measure inputs and outputs of the branches. It is in this context the present study makes an attempt to measure the efficiency of branches of KSFE using data envelopment analysis (DEA).

The objective of this paper is to measure technical efficiency of branches of KSFE and identify the sources of inefficiencies. The rest of the paper is structured as follows. Section 2 presents a brief review of the literature on the efficiency measurement using data envelopment analysis. Section 3 provides a conceptual framework for the measurement of efficiency. Section 4 describes the methodology used in the study. Section 5 discusses the empirical results and Section 6 concludes the study.

2. Review of Literature

The literature on the efficiency of bank branches in the country has grown rapidly in the recent years. But the researches in branch efficiency of nonbanking finance companies are scanty. This section discusses the different strands of literature on the efficiency based on DEA model.

Howland and Rowse (2006) employed DEA to assess the efficiency of branches of a major Canadian Bank (Canbank). First a DEA model of American bank branch efficiency is utilised to build a model with Canbank data, then the model outcomes are compared to the outcomes of the US study and differences explained.

PradeepKaur and Gian Kumar (2010) have studied the cost efficiency of Indian commercial banks by using DEA technique over the period 1991-2008. The findings of their study revealed that average cost efficiency of public sector banks is 73.4% and for private sector banks it is 76.3%. The results of their study indicate that to some extent merger program has been successful in Indian banking sector.

MuhammedAftab et al. (2011) investigated the relationship between the bank efficiency and share performance in Pakistan employing DEA. The results of their study showed that a positive and significant relationship exists between bank efficiency and share performance.

Feroze and Sumisha (2014) measured the efficiency of State Co-operative Banks (SCBs) in India for the year 2010-11 using DEA. The results of their study revealed that state co-operative banks operate at 83 per cent efficiency in Model 1 and at 86 per cent in Model 2. They observed that SCBs have improved their efficiency when Non-Performing Assets are taken as additional input in Model 2.

3. Measurement of Efficiency: Data Envelopment Analysis approach

Data Envelopment Analysis is a linear programming based technique for measuring the performance efficiency of organisational units which are termed as Decision Making Units (DMUs). This technique aims to measure how efficiently a DMU uses the resources available to generate a set of outputs (Charneset al.1978).

The efficiency measure proposed by Farrell in 1957 did not receive much attention until Charnes, Cooper and Rhodes formulated a mathematical programming approach to frontier estimation in 1978.They coined the term DEA for the first time. The DEA model developed by Charnes, Cooper, and Rhodes had an input orientation and assumed constant return to scale (CRS). The CRS model offers best solutions only when all firms are operating at optimum scale. Subsequent studies by Banker, Charnes and Cooper have considered alternative sets of assumption and introduced a variable return to scale (VRS) model. The VRS model measures technical efficiency devoid of scale efficiency (SE) effects.

CRS model generates technical efficiency scores under the assumption of constant returns to scale. CRS efficiency score is a measure of TE. VRS model provides efficiency score which is a measure of PTE devoid of SE. SE measures the divergences of DMUs from the Most Productive Scale Size (MPSS). MPSS indicates the size of operation where output is maximized per unit of input. SE is obtained by dividing CRS score by VRS score (SE = TE score/ PTE score).

The performance of DMUs is assessed in DEA using the concept of efficiency which is the ratio of total outputs to total inputs. Efficiencies estimated using DEA are relative i.e., relative to the best performing DMU. The best performing DMU is assigned an efficiency score of unity or 100 percent and performance of other DMUs vary, between 0 and 100 percent relative to this performance.

There are two directions for DEA models - either an input orientation or an output orientation. An input orientation aims at reducing input amounts as much as possible while keeping at least the present outputs levels, while an output orientation aims at maximizing output levels without increasing the use of inputs (Cooper et al. 2000).

4. Methodology

The present study is designed as exploratory one based on primary data collected from the sample branches of KSFE. This study makes an attempt to measure TE scores in the conduct of chitty business using both CRS and VRS models of DEA with an output orientation. The study uses DEA based on production approach. The production approach views branches as producers of services, using resources such as labour, equipment and total operating expenses to service accounts and develop products such as chitty, loans, and other financial services. The study uses number of employees and computers as inputs and sala and number of subscribers as outputs in DEA-SOLVER Software developed by Cooper, Seiford and Tone.

KSFE has 600 branches spread across 14 districts of Kerala. For the purpose of the present study Kannur district has been selected purposively. Of the 35 branches in Kannur district 10 branches have been selected at random.

5. Results and Discussions

Table 1(see appendix) shows the results obtained under both CRS and VRS assumptions. Efficiency obtained from CRS model of DEA is known as technical efficiency (TE) and efficiency obtained from VRS model of DEA is known as pure technical efficiency (PTE). In DEA literature DMUs with TE score equal to 1 are called ‘globally efficient’ and DMUs with PTE score equal to 1 are called ‘locally efficient’ and DMUs with efficiency score equal to 1 under both CRS and VRS assumptions are called ‘most productive scale size’ DMUs.

The mean efficiency score of the sample branches is 0.74 under CRS assumption and 0.92 under VRS assumption. These results imply that inefficient branches can become fully efficient by augmenting outputs, on an average, by 26% without reducing the current level of inputs. It appears from the Table 1 that 6 branches (Thalassery, Mattannur, Iritty, kolakkad, Thalipparamba and Kelakam) have obtained 100 percent PTE score and attained the status of ‘locally efficient’ branches. Of these 6 locally efficient branches, Thalasseryand Thalipparambabranches have secured 100 percent TE score and become ‘globally efficient’branches of the sample branches.

Thalassery and Thalipparamba branches form efficiency frontier and appear in the reference set for inefficient branches. Thalassery branch appears 8 times and Thalipparamba branch 4 times in the reference set for inefficient branches. They are called peer with exemplary practices which may be emulated by inefficient branches to attain the status of fully efficient branches. A branch appearing in the reference set for inefficient branches most time is known as ‘Global leader’. Thalassery branch appears 8 times in the reference set and is elevated to the status of ‘global leader’ of efficiency among the sample branches.

As the TE score of Kolakkad (0.51) and Kelakam (0.50) are the most inefficient branches of the sample branches. These branches demand immediate attention of the management.

5.1 Sources of inefficiency in KSFE branches

This section explores the sources of inefficiency in the branches of KSFE. It is observed from Table 1 that 6 branches – Thalassery, Mattannur, Iritty, kolakkad, Thalipparamba and Kelakam have obtained PTE score equal to 1 and attained 100 percent managerial efficiency. However, of these only 2 branches, namely Thalasseryand Thalipparamba, have secured TE score equal to 1. These branches lie on the efficiency frontier under both CRS and VRS assumptions and operate at most productive scale size (MPSS).

Mattannur, Iritty, kolakkad, and Kelakamare 100 percent efficient branches under VRS assumption. Their source of inefficiency is not caused by managerial inefficiency but by inappropriate scale size. This would mean that these 4 branches have best practices in the utilisation of inputs but they failed to operate at MPSS. Analysing the TIE, PTIE and SIE, it may be concluded that nearly 8% technical inefficiency is caused by managerial under-performance and nearly 19% by divergence from MPSS (scale inefficiency).

5.2 Required improvements in efficiency

Table 2 provides the information on the reduction in inputs and augmentation in outputs to be attained by inefficient branches to become fully efficient. As per Table 2 Kelakam is the most inefficient branch which should increase the sala by 188%, subscribers by 125% and reducethe employees by 17% to attain 100% efficiency. Mattannur branch which is locally efficient should augment the sala by 7%, subscribers by 29% and reduce the use of employees by 9% to become globally efficient branch.

6. Conclusion

This paper measures the technical efficiency of a sample of 10 KSFE branches for the year 2015-2016 using DEA. The study uses the number of employees and computers as inputs and sala and subscribers as outputs. Mean efficiency score of sample branches is 0.74 under CRS assumption and 0.92 under VRS assumption. Two branches operate at MPSS and produce maximum output per unit of input. The decomposition of technical efficiency into pure technical efficiency and scale efficiency reveals that the technical inefficiency is mainly due to scale inefficiency. The study provides useful insights to management by identifying branches with excellent business practices and by unraveling the sources of inefficiency in the branches of KSFE.

Table 1: Efficiency Scores of Sample KSFE Branches for the year 2015-2016

SL.No.	Branches	TE	TIE	PTE	PTIE	SE	SIE
1	THALASSERY	1	0	1	0	1	0
2	MATTANNUR	0.921	0.079	1	0	0.921	0.079
3	PERAVOOR	0.6457	0.3543	0.7212	0.2788	0.872	0.128
4	SREEKANTAPURAM	0.5828	0.4172	0.7023	0.2977	0.7902	0.2098
5	IRITTY	0.8231	0.1769	1	0	0.8231	0.1769
6	KARIKOTTAKARI	0.6802	0.3198	0.8674	0.1326	0.9035	0.0965
7	KOLAKKAD	0.5172	0.4828	1	0	0.5172	0.4828
8	THALIPARAMBA	1	0	1	0	1	0
9	KELAKAM	0.5062	0.4938	1	0	0.5062	0.4938
10	AZHIKODE	0.6524	0.3476	0.9224	0.0776	0.7676	0.2324
	AVERAGE	0.7418	0.2582	0.9212	0.0788	0.8148	0.1852

Source: Data Analysis

Table 2: Required Improvements in Efficiency for KSFE Branches

Name of the Branch	TIE	Input Reduction (%)		Output Addition (%)	
		Employees	Computers	Sala	Subscribers
MATTANNUR	0.921	9	0	6.82	28.62
PERAVOOR	0.6457	0	0	65.84	50.28
SREEKANTAPURAM	0.5828	11.52	0	100.5	104.5
IRITTY	0.8231	28.95	0	19.2	19.2
KARIKOTTAKARI	0.6802	0	0	62.5	30.93
KOLAKKAD	0.5172	0	12.64	148.52	113.42
KELAKAM	0.5062	37	0	188.44	124.68
AZHIKODE	0.6524	0	8.11	54.12	41.12

Source: Data Analysis

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