THINK INDIA JOURNAL

ISSN:0971-1260

Vol-22-Issue-10-November-2019

Efficiency Measurement Of Assam Gramin Vikash Bank: A Branch Level Analysis

Mohuya Deb Purkayastha
Research Scholar (PhD), Department of Commerce, Assam University, Silchar

INTRODUCTION

As banking sector plays a pivotal role in the economic development of a country it is very important to increase the efficiency of this sector especially in the recent cut throat competitive era. In the present technology driven environment the main motto of every organization is to reduce its costs of production to increase its profitability and efficiency. Under such circumstances the present study focuses to measure the efficiency of Assam Gramin Vikash Bank at its branch level which is one of the RRBs operating in the state of Assam with its largest network of branches. The study also identifies the factors which are responsible for efficiency/ inefficiency. The non-parametric DEA model is used to measure the efficiency and the Tobit Regression model is used to estimate the determinants of efficiency/inefficiency.

THEORETICAL FRAMEWORK

Historical Background of AGVB

In Assam all together five RRBs were operational at different points of time beginning with Pragjyotish Gaonlia Bank. Govt. of India vides its Notification No. F.1. (25)/2005 dated 12th January 2006 amalgamated the four Regional Rural Banks (viz. Pragjyotish Gaonlia Bank, Lakhimi Gaonlia Bank, Cachar Gramin Vikash Bank and Subansiri Gaonlia Bank) sponsored by the United Bank of India in the state of Assam to form Assam Gramin Vikash Bank (AGVB).

AGVB is covering 27 districts of Assam with mass coverage of citizen of the state. Moreover, the bank has a direct impact on the economy of the place. Thus it is of utmost important to measure the efficiency of this bank from different perspectives.

Efficiency

Efficiency is typically used to analyze how well a bank is using its assets and its liabilities internally. It can be simply defined as the ratio of output to input.

$$\text{Efficiency} = \frac{\text{Actual Output}}{\text{Standard Output}}$$

Efficiency may be of different categories like:

1. Operational efficiency
2. Technical efficiency
3. Managerial efficiency
4. Financial efficiency
5. Debt-service management efficiency
6. Allocative efficiency
7. Cost efficiency.

Reasons for Measuring Efficiency

The purpose of measuring efficiency is to evaluate the overhead structure of a financial institution. The efficiency measures how effectively a bank is operating and how profitable it is. These are simply defined as expenses as a percentage of revenue (Expenses / Revenue). Enhanced efficiency in banking can result in greater and more appropriate innovations, improved profitability as well as greater safety and soundness.

ISSN:0971-1260
Vol-22-Issue-10-November-2019

Moreover, efficiency measures could act as leading indicators for evolving strengths or weaknesses of the banking system and could enable pre-emptive steps by the regulator when necessary.

Technical Efficiency
Technical efficiency is the effectiveness with which a given set of inputs is used to produce an output. A firm is said to be technically efficient if a firm is producing the maximum output from the minimum quantity of inputs, such as labour, capital and technology.

Technical efficiency can be further categorized as:

1) Pure technical efficiency and 2) Scale efficiency

Pure Technical Efficiency
Pure technical efficiency refers the managerial efficiency of an organization about how efficiently they are managing their inputs to get their output.

Scale Efficiency
A unit is said to be scale efficient (SE) when its size of operations is optimal so that any modifications on its size will render the unit less efficient.

Cost Efficiency
The Cost efficiency score indicates how efficiently the branches are trimming its cost without compromising the standard and producing the maximum quantity of its output. It finds out the possibility of reduction in costs that a bank can achieve by increasing its technical and allocative efficiency.

Allocative Efficiency
Allocative efficiency means the right mix of input (s) given the input price. A decision making unit enjoys allocative efficiency only when it can use inputs in optimal proportions, given their respective prices and production technology.

STATEMENT OF THE PROBLEM
Most of the studies on banks have analyzed the efficiency of banks as a whole rather than individual branch may be due to lack of easy accessibility to branch level data. With the same level of input and output some branches are more efficient compared to the other branches under the same organizational setup. Moreover, the business of a bank comes from its branches, thus it is important to have a proper study on the efficiency of the branches from different perspectives.

REVIEW OF LITERATURE
Review of literature focuses on the earlier studies on financial performance and efficiency of banks with special focus to branch level efficiency. These studies are helpful in identifying the existing research issues pertaining to the subject and the research gap thereof.

Ncube, M. (2009) examined the South African banking sector efficiency where the researcher focused on cost and profit efficiency of banks in South Africa. Applying stochastic frontier model, the paper examined cost and profit efficiency of four small and four large banks. Results indicated that over the study period (2000-2005) South African banks significantly improved their cost efficiencies with no significant gains on profitability fronts. The results also indicated that there was a weak positive correlation between cost and profit efficiency of South African Banks. Similar study was undertaken by Alkhathlan, K. & Malik, S. A. (2010) on the efficiency of Saudi Banks using DEA that is CCR and BCC model for the period 2003- 2008 for ten out of twelve commercial banks operating in Saudi Arabia found that majority of Saudi banks efficiently managed their financial resources and the mean efficiency during the year 2007 was 86.17 percent and 93.97 percent as per CCR and BCC approach respectively. In 2007 it was found that five banks as per the CCR Score and six banks as per BCC Score were positioned on the efficient frontier. With similar methodology but in different perspectives, Ally, Z. (2013) studied efficiency analysis of commercial banks in Tanzania using Data Envelopment Analysis approach for the Regional & small banks from 2006-2012. The findings identified four banks (57.1 percent) as fully efficient in the year 2006, three banks in 2007 and 2008, one bank in 2009, 2010 and 2011 and four banks in the year 2012. The overall mean efficiency of banks was

ISSN:0971-1260
Vol-22-Issue-10-November-2019

90.4 percent; this means that, banks could have reduced the inputs by 9.6 percent without affecting the level of output. Ray, (2014) in his paper analyzed the overall cost efficiency of a network of branches of a single large public sector bank in India within the city of Calcutta using the data for the year 2012 with the help of DEA. The findings of his study revealed that there was a considerable amount of potential cost savings through restricting the branches within a district.

RESEARCH GAP

So far as literature reviewed for the present study scanty works in this field can be identified. Given the lack of easy access to branch level data due to its confidentiality very few studies were done at this aggregated level. However, no such studies can be identified for the efficiency of Assam Gramin Vikash Bank from different perspective at its branch level. Thus there remains a wide scope of research in the proposed field.

RESEARCH OBJECTIVES

1) To determine the efficiency at which the selected branches operate and also to find out the cost saving potentialities.

2) To determine the factors responsible for efficiency/inefficiency.

DATA AND METHODOLOGY

The present study comprises data for eight years ranging from 2011 to 2018 for all the forty eight branches operational in Barak Valley which is the Southern part of Assam. For measuring the efficiency, the state of the art technique Data Envelopment Analysis (DEA) is used. Further, for determining the factors responsible for efficiency/inefficiency Tobit Regression model is used.

Data Envelopment Analysis (DEA)

Data Envelopment Analysis (DEA) is a very powerful service management and benchmarking technique originally developed by Chames, Cooper and Rhodes in 1978 to evaluate nonprofit and public sector organizations. DEA determines a comparative ratio of the weighted sum of outputs to the weighted sum of inputs for each unit under evaluation. It is used to determine the relative efficiency of a DMU compared to all other DMUs under study following the best practice.

RESULTS AND EMPIRICAL ANALYSIS

Branch Level Efficiency

This section primarily deals with estimating the efficiency scores that is TE (Technical Efficiency), CE (Cost Efficiency) and AE (Allocative Efficiency) at which individual branches operate and also to find out the cost saving potentialities of the selected branches.

Year wise Technical Efficiency (TE) Scores under Input Oriented VRS Assumption (2011-2018)

Table 1 exhibits the year wise TE scores of the selected branches. It can be seen that the mean TE of all the branches is 69 percent with standard deviation of 0.05. This implies that there exist cost saving potentialities on the part of sample branches to the extent of 31 percent (1-0.69) following the best practice. Thus, the overall technical inefficiency of branches came out to be almost 31 percent. This indicates that the branches can curtail their input expenditures on deposits, fixed assets and labour by 31 percent by adopting best practices. The branches exhibit an increasing trend in TE over the years except for the year 2014 and 2018.

Table-1: Year wise TE Scores under Input Oriented VRS Assumption

Year	Technical Efficiency (TE) under BCC model
2011	0.65
2012	0.71
2013	0.73
2014	0.60
2015	0.69
2016	0.71
2017	0.73
2018	0.69

ISSN:0971-1260
Vol-22-Issue-10-November-2019

Mean	**0.69**
SD	**0.05**

Source: Estimated using DEA based on data pertaining to Branch Financial Statements (2011-2018)

TE AND ITS DECOMPOSITION

Year wise Pure Technical Efficiency (PTE) Scores under Input Oriented VRS Assumption (2011-2018)

Table 2 reflects the PTE scores of the selected branches. It is seen that the mean PTE scores of all the branches is 83 percent with standard deviation measure of 0.02, which indicates that there is a scope for potential cost saving to the tune of 17 percent (1-0.83) on the part of sample branches under study. This indicates that out of 31 percent of TIE (Technical Inefficiencies) 17 per cent is due to PTIE (Pure Technical Inefficiencies) which causes due to the incapability of the management to utilize the resources. The rest part of the TIE may be attributed to the fact that the branches are operating at below the optimal level. Further, the branches exhibit a fluctuating trend in the PTE score from 2011 to 2018.

Table-2: Year wise PTE Scores under Input Oriented VRS Assumption

Year	Pure Technical Efficiency (TE) under BCC model
2011	0.87
2012	0.847
2013	0.806
2014	0.838
2015	0.858
2016	0.811
2017	0.825
2018	0.818
Mean	**0.83**
SD	**0.023**

Source: Estimated using DEA based on data pertaining to Branch Financial Statements (2011-2018)

Year wise Scale Efficiency (SE) Scores under Input Oriented VRS Assumption (2011-2018)

Table 3 below shows the mean SE score at 82 percent with standard deviation of 0.06 for the year ranging from 2011 to 2018 which implies that average scale inefficiency (SIE) as much as 18 per cent (1-0.82) is due to the choice of sub-optimal level of operation. The table depicts a fluctuating trend from 2011-2018 however the highest increase in scale efficiency is in the year 2013.

Table-3: Year Wise SE Scores of Branches under Input Oriented VRS Assumption

Year	Scale Efficiency (SE) under BCC model
2011	0.75
2012	0.84
2013	0.89
2014	0.71
2015	0.79
2016	0.87
2017	0.88
2018	0.83
MEAN	**0.82**
SD	**0.06**

Source: Estimated using DEA based on data pertaining to Branch Financial Statements (2011-2018)

Year wise Cost Efficiency (CE) Scores under Input Oriented VRS Assumption (2011-2018)

Table 4 reflects the mean CE score at 60 percent with standard deviation of 0.08 for the selected branches under study which implies that there exists cost saving potentialities which is termed as X-inefficiency to the

ISSN:0971-1260
Vol-22-Issue-10-November-2019

extent of 40 percent (1 - 0.60). CE score finds out the possibility of reduction in costs that a bank can achieve by increasing its technical and allocative efficiency.

Table-4: Year wise Cost Efficiency (CE) Scores under VRS Assumption

Year	Cost Efficiency (CE) under BCC model
2011	0.63
2012	0.66
2013	0.68
2014	0.56
2015	0.60
2016	0.43
2017	0.61
2018	0.63
MEAN	**0.60**
SD	**0.08**

Source: Estimated using DEA based on data pertaining to Branch Financial Statements (2011-2018)

Year wise Allocative Efficiency (AE) scores of Branches under Input Oriented VRS Assumption (2011-2018)

Table 5 depicts the mean AE score at 71 percent with standard deviation 0.09 which means that the branches are not using its input at optimal level given the input price and technology. To be in efficient frontier the branches has to increase their potentialities to the tune of 29 percent (1 – 0.71). Moreover, a fluctuating trend in AE score is followed over the years of study.

Table-5: Year wise Allocative Efficiency (AE) Scores of Branches

Year	Allocative Efficiency (AE) under BCC Model
2011	0.73
2012	0.77
2013	0.83
2014	0.66
2015	0.70
2016	0.51
2017	0.73
2018	0.76
MEAN	**0.71**
SD	**0.09**

Source: Estimated using DEA based on data pertaining to Branch Financial Statements (2011-2018)

Determinants of Efficiency/Inefficiency

The efficiency scores as obtained under TE, CE and AE are regressed over certain relevant explanatory variables. Since the DEA efficiency score lies in the interval 0 and 1, the dependent variable is ‘a limited dependent variable’. Therefore, it is apt to use the Tobit model, which is a censored regression model, applicable in cases where the dependent variable is constrained in some way.

Tobit Regression

The Tobit model is a statistical model proposed by James Tobin in 1958 to describe the relationship between a non-negative dependent variable and an independent variable (or vector). The term Tobit was derived from Tobin's name by truncating and adding -it by analogy with the probit model.

Selected Variables

The explanatory variables which are considered in the Tobit model to estimate the factors which determine efficiency of the selected branches are salary, total assets, non- interest income, net interest income and location as per table 6 follows.

ISSN:0971-1260
Vol-22-Issue-10-November-2019

Table-6: Description of Variables for Tobit Model

Variable	Description	Hypothesis
Dependent Variable: DEA Efficiency Scores obtained from Stage 1 of DEA	TE=Technical Efficiency Scores, CE=Cost Efficiency Scores, AE=Allocative Efficiency Scores	
Independent Variables:		
1. Salary	Employee cost	Increase in employee costs negatively impacts on efficiency
2. Total Assets	Volume of Total Assets	Large Sized Branches are more efficient.
3. Non-interest income	Income other than interest income	Increase in NOI positively impact on efficiency
4. Net-interest income	Interest earned deducted interest expended	More net interest income represent the efficient management of advances
5. Location	Urban = 1, Others=0	Urban branches are more efficient than rural branches

Table-7: Dependent & Explanatory Variables

Dependent Variables										
		Model I		**Model II**		**Model III**				
Measure		**TE**		**CE**		**AE**				
Explanatory Variables										
Size (TA)	**Expected Sign**	**Location (LOC) (Dummy)**	**Expected Sign**	**Employee Cost (SAL)**	**Expected Sign**	**NOI(Non-Interest Income)**	**Expected Sign**	**NII(Net Interest Income)**	**Expected Sign**	
Log Total Assets	(+)	Urban = 1 Rural = 0	(+) (-)	Log Salaries and Wages	(-)	Non-interest income	(+)	Net interest income	(+)	

Table 8 shows the efficiency scores changes by the coefficient of each unit increase in the corresponding predictor variable. Firstly, salary that is the cost of employees is found to have negative impact on technical efficiency. As increase in cost of employees ultimately increase the overall expenditure of a branch as it consist the lion's share of the total expenditure incurred by a bank. So in the present study salary can be considered as a determinant of inefficiency. Salary to an employee can be considered as an investment only when the productivity of the employee is greater than his salary. Total asset of the branches has no significant impact on the efficiency score. Further, NOI and NII have positive impact on the efficiency scores which means that the branches are efficient enough to manage their cross selling business as well as traditional banking activities. Lastly, location (LOC) has positive impact on all the measures of efficiency except TE where it is insignificant. Location represents urban and rural branch category where the Tobit result reveals that urban branches are more efficient than the rural branches mainly because urban branches account for higher deposit base compared to the rural branches and also the infrastructure and communication system are also favorable in case of the former branches.

Table-8: Results of Tobit Regression Model

	MODEL I: Dependent Variable TE	**MODEL II:** Dependent Variable CE	**MODEL III:** Dependent Variable AE
	Coefficient		
SAL	-6.99e-08**	-1.96e-08	-1.10e-08
TA	-5.00e-11	5.50e-11	4.58e-11
NOI	5.85e-08**	5.18e-08**	3.47e-08**
NII	2.06e-08**	1.87e-08**	0.1014359**
LOC	0.0254521	0.1236233**	1.35e-08**

*** Values are statistically significant at 5 percent.*

ISSN:0971-1260

Vol-22-Issue-10-November-2019

Source: Own calculation using STATA 12

Note: SAL indicates Salary, TA indicates Total Assets, NOI indicates Non-interest Income, NII indicates Net Interest Income, LOC indicates location.

SUMMARY OF THE FINDINGS AND CONCLUSION

The present study considers both the efficiency level as well as the cost saving potentiality of the selected branches of Assam Gramin Vikash Bank operating in the Barak Valley. To analyze the same non-parametric DEA technique is used. It shows that the selected branches are operating at 69 percent technical efficiency, 60 percent cost efficiency and 71 percent allocative efficiency level. Thus there remains scope to increase the efficiency of the branches by reduction in its input costs to the tune of 31 percent, 40 percent and 29 percent respectively following the best practice branch. It is also seen that the TIE (Technical inefficiency) is mainly driven by the scale inefficiency. The present study also identifies the factors responsible for efficiency/inefficiency of the selected branches with the help of Tobit Regression model. The findings are increase in salary cost inversely affect on efficiency so cost trimming has to be done by the bank. Total assets have no significant relationship with the efficiency score. Non- interest income as well as net interest income is showing positive impact on the efficiency because the bank is efficient in the management of its diversified business or cross selling business as well as the traditional banking activities. Location of the branches are showing positive influence on efficiency except TE where it has no significant impact on efficiency score, it means the urban branches are more efficient than the rural branches because urban branches account for higher deposit base compared to the rural branches and also the infrastructure and communication system are also favorable in case of the urban branches. Thus the management has to take measures to improve their managerial efficiency. The present study however leaves ample scope of research in this direction. Research is necessary to find out the lacunas in respect of shifting the branches towards the efficient frontier.

BIBLIOGRAPHY

- Ncube, M. (2009). Efficiency of the Banking Sector in South Africa. Paper presented at African Economic Conference: Fostering development in an Era of Financial and Economic Crisis, Addis, Ababa, Ethiopia. African Development Bank Group.
- Alkhathlan, K. & Malik, S. A. (2010). Are Saudi Banks Efficient? Evidence Using Data Envelopment Analysis (DEA). *International Journal of Economics and Finance,* Vol. 2, No. 2; May 2010.
- Ally, Z. (2013). Efficiency Analysis of Commercial Banks in Tanzania: An Application of Data Envelopment Analysis (DEA) Approach: The Case study of Regional & Small Banks. *European Journal of Business and Management* Vol.5, No.31.
- Ray, S. (2014). "Branching Efficiency in Indian Banking: An Analysis of a Demand-Constrained Network" working paper from University of Connecticut, Department of Commerce, *Retrieved from http://web2.uconn.edu/economics/working/2014-34*.
- *Website: www.agvb.co.in*