OPERATING EFFICIENCY MEASUREMENT OF COMMERCIAL BANKS OF BANGLADESH: A DEA APPROACH

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ABSTRACT

This paper attempts to measures the efficiency of some selected commercial banks (19) both from private (15) and public (4) sectors in Bangladesh with nonparametric method of Data Envelopment Analysis as a smart and powerful alternative to traditional efficiency measures. The performance evaluation of business has taken high profile in the climate of micro-economic reform in the recent past. The real wealth of banks can be increased by increasing the inputs available to the banks. That is by discovering new resources and using the existing resources more efficiently. Efficiency gains in the banking sector of the country will make the country domestically and internationally more competitive and capable of generating more income and employment opportunities in the country. An important objective of these measures is to assist to identify the way of increasing the operational efficiency of the banking sector as a whole as well as of individual institutions. In fact, policy makers are trying to identify the reasons of high level of cost of banking in Bangladesh that are usually viewed as a result of inefficiency. The study finds that among the sample banks Arab Bangladesh Bank is the star performers and Jamuna bank is the poor performers only in terms of the selected parameters. The study also identifies the areas of operational inefficiencies and efficiencies both for best and poor performers. This type of analysis can be used for a better quality-benchmark by the individual institutions than using industry averages or a particular peer bank as the benchmark.

Keywords: Data envelopment analysis (DEA), Efficiency, Bank, Decision Making Units (DMUs).

Introduction:

There is an increasing interest in measuring and assessing the efficiency of banks. Performance measures are used to deliver information to support decisions of the business. Business world becomes extremely complex due to the technological development in the field of operation along with the logical demand of the consumer groups for quality product at a minimum price. The banks are getting serious to incorporate all of these in a single package and want to increase their efficiency.

Adequate assessment of efficiency gains requires a range of financial, operational and economic indicators to be applied. It originally was developed by Charnes, Cooper, Rhodes (1978) with CRS and was extended by Banker, Charnes, Cooper (1984) to include variable returns to scale. So the basic DEA models are known as CCR and BCC. Since 1978 over 4000 articles, books and dissertation have been published and DEA has rapidly extended to returns to scale, dummy or categorical variables, discretionary and non-discretionary variables, incorporating value judgments, longitudinal analysis, weight restrictions, stochastic DEA, non-parametric Malmquist indices, technical change in DEA and many other topics. Up to now the DEA measure has been used to evaluate and compare educational departments (schools, colleges and universities), health care (hospitals, clinics) prisons, agricultural production, banking, armed forces, sports, market research, transportation (highway maintenance), courts, benchmarking, index number construction and many other applications.

So far the study made there has not been any serious study on DEA in the Banking sector of Bangladesh. The present study is an attempt to bridge this gap.

Objective of the Study:

For improving the efficiency, the Central Bank of Bangladesh (CBB) has adopted various reforms such as strengthening the role of the central bank in supervision and regulation both private and public sectors' commercial banks as suggested and guided by World Bank. Recently, the Governor of CBB stressed the need for an efficient banking sector. The CBB also urged that more research on the banking sector of Bangladesh to be conducted. Considering the above mentioned aspects, this study was conducted to measure the performance in terms of different input output parameters of selected Commercial banks both from private and public sector of Bangladesh. The following are the specific objectives of the study:

- To perform comparative efficiency studies of the Private and public sector Banks in Bangladesh.
- To identify potential improvement relative to targets set out on the basis of close peers.
- To perform reference comparison and reference contribution.
- To allocate resources more efficiently.
- To identify information for planning and strategy.
- To identify under achievers and star Performers.
- To perform overall improvement summary.

Review of Literature:

The study on the efficiency of financial institution is now quite largely happening in the recent origin. Several effective work are already been occurred depending on various factors and circumstances and it will help the financial institution to become more effective and advanced than the any previous worse situation. Banks are the main financial institution and several works and already been occurred to measuring their efficiency. Frontier inefficiency, some time called X-efficiency, at financial institutions accounts for a considerable portion of the total costs are a much greater sources of performance problems

than either scale or product mix inefficiencies and have a strong empirical association with hither probabilities of failures Bauer et. al. (1998).

Another important study work is done by Berger, A.N. and D.B. Humphrey (1997), on Bangladesh Journal of Political Economy named "Efficiency of Financial Institutions: International Survey and Directions for Future Research".

In another group of studies, bank efficiency measured b a number of financial indicators and compared over various categories of banks. For example Sarkar et. al. (1998) considered three bank groups-public, Bangladeshi private and foreign- for comparison purpose. After controlling for effects of some concomitant variables, they conducted regressing analysis to find that effect of ownership type on different efficiency measures. Rammohan (2002, 2003) also used financial measures for comparing operational performance of different categories of banks over a period of time.

Methodology of the study:

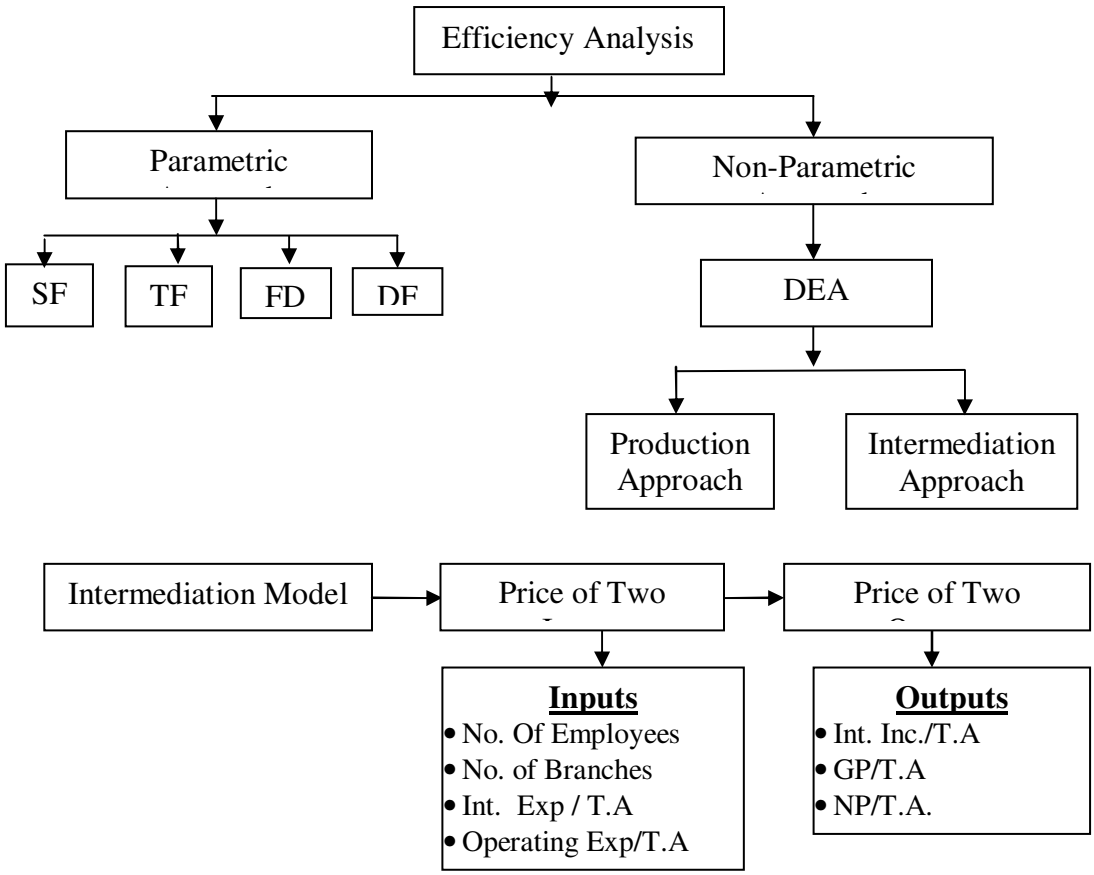
Considering data availability and easier communication opportunities for any queries the four public sector and fifteen private sector commercial banks were selected for the study. This study is made based on the secondary data collected from the annual report of Bangladesh bank and the relevant banks' during 2008-2009. The following (table-1) inputs, outputs and decision making units have been selected for the study and analyzed those data from many angles in terms of accounting ratios. To measure relative efficiency in terms of selected parameters values of the DMUs' were again analyzed by using KonSi-DEA Software. The findings so obtained were presented in different segments according to their categories and objectives set out to achieve.

Table-1: Parameters, Decision Making Units and Model Used

<table>
<tr><td>Input Parameters</td><td colspan="2">• Number of branches
• Number of employees
• Interest expense/total assets (Int. exp/ T.A.)
• Operating expense/total assets (Op. exp/ T.A.)</td></tr>
<tr><td>Output Parameters</td><td colspan="2">• Interest income/total assets (Int. Inc/ T.A.)
• Net profit/total assets (N.P. / T.A.)
• Gross profit/total assets (G.P/ T.A.)
• Interest income/total assets (Int. Inc/ T.A.)</td></tr>
<tr><td rowspan="12">Decision Making Units(DMUs)</td><td colspan="2">Private Sector Banks</td></tr>
<tr><td>AB Bank Ltd</td><td>Jamuna Bank Ltd</td></tr>
<tr><td>City Bank Ltd.</td><td>Trust Bank Ltd</td></tr>
<tr><td>South East Bank Ltd</td><td>Brac Bank Ltd</td></tr>
<tr><td>Prime Bank Ltd</td><td>Dhaka Bank Ltd</td></tr>
<tr><td>One Bank Ltd</td><td>Premier Bank Ltd</td></tr>
<tr><td>National Bank Ltd</td><td>Mutual Trust Bank</td></tr>
<tr><td>Dutch Bangla Bank Ltd</td><td>Mercantile Bank</td></tr>
<tr><td>IFIC Bank Ltd</td><td></td></tr>
<tr><td colspan="2">Public Sector Banks</td></tr>
<tr><td>Sonali Bank Ltd</td><td>Agrani Bank Ltd</td></tr>
<tr><td>Janata Bank Ltd</td><td>Rupali Bank Ltd</td></tr>
<tr><td>Model</td><td colspan="2">Input Oriented Model (Input Minimization)</td></tr>
</table>

Methods of Evaluating the Efficiency of Banks:

The following figure shows the different methods of efficiency analysis as developed by Coelli, T. (1996).



DMU		Inputs				Outputs		
Sl. No	**Banks**	**No. of Employees**	**No. of Branches**	**Int. Exp/T.A (%)**	**OP. Exp/T.A (%)**	**Int. Inc / T.A (%)**	**N.P/T .A. (%)**	**GP/T. A (%)**
1	AB Bank Ltd	1617	77	6.35	2.2	8.76	2.74	5.11
2	City Bank Ltd	1673	83	5.54	3.07	8.17	0.7	3.07
3	South East Bank Ltd	1402	66	7.65	1.26	9.28	1.09	2.65
4	Prime Bank Ltd	1550	84	6.45	1.75	8.24	1.11	3.48
5	One Bank Ltd	525	29	7.8	2.22	9.93	1.33	3.49
6	National Bank Ltd	2418	122	4.98	3.03	8.01	2.19	4.32
7	Dutch Bangla Bank Ltd	1600	71	5.99	2.8	8.99	1.35	3.19
8	IFIC Bank Ltd	1537	82	5.13	3.41	7.67	1.44	3.40
9	Jamuna Bank Ltd	1056	54	7.34	2.25	9.13	1.51	3.29

10	Trust Bank Ltd	979	37	4.54	1.39	6.71	0.85	1.82
11	Brac Bank Ltd	4192	68	6.72	3.95	11.07	1.34	4.38
12	Dhaka Bank Ltd.	868	48	7.33	1.9	10.08	1.18	3.56
13	Premier bank Ltd	281	38	7.51	2.3	9.91	1.68	3.29
14	Mutual Trust Bank Ltd	620	50	6.46	1.74	8.11	2.64	3.08
15	Mercantile Bank Ltd	554	53	7.18	2.39	9.17	1.22	2.89
16	Sonali Bank Ltd	26085	1183	2.61	1.3	5.4	0.33	3.99
17	Janata Bank Ltd	13593	850	3.48	1.73	4.85	1.19	4.35
18	Agrani Bankv Ltd	13269	903	2.80	1.82	5.1	1.41	3.38
19	Rupali Bank Ltd	14500	875	1.86	1.61	4.02	0.91	2.11
Source: Values of the parameters are collected from the annual reports of the relevant DMU and the ratios are authors' calculation.								

Results and Discussions:

Table 1: Name of the DMUs' and parameters with its values during the year 2008-09.

In the above table values of the parameters of the selected DMUs are given along with its performance in terms of accounting ratios. The following figures (figure-1 and figure-2) show the DMUs performance in terms of those ratios:

Figure-1

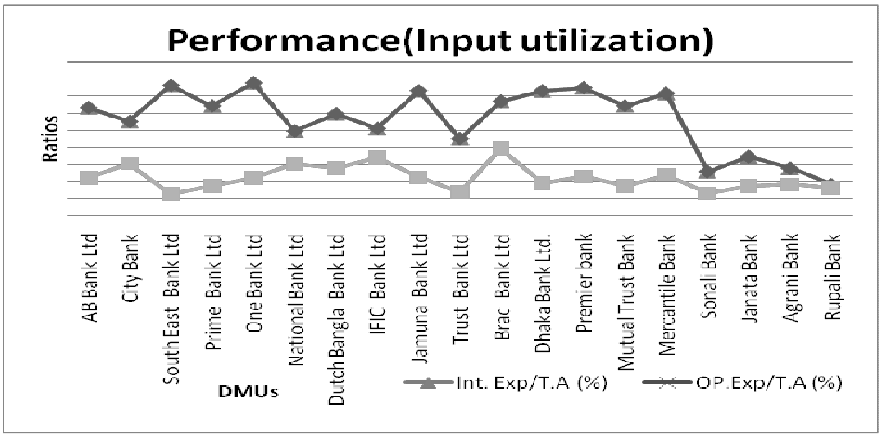
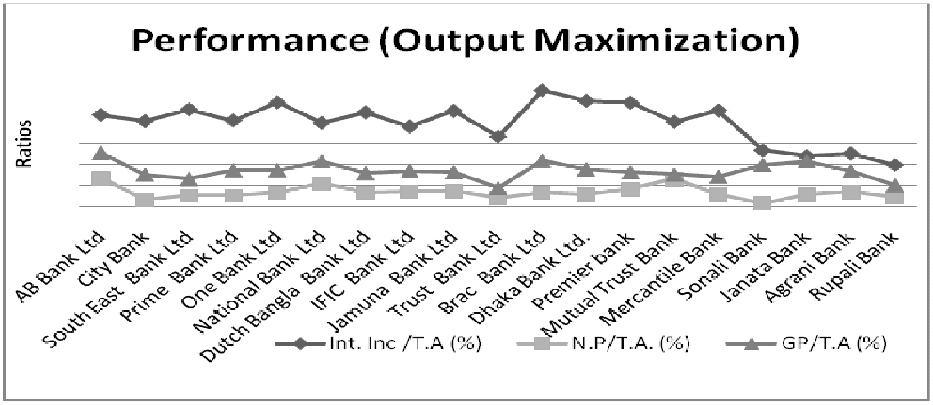


Figure-2



Input Utilization:

In terms of, operating expense to total assets minimization (figure-1) Sonali and South East bank are in the better position than others. In case of, interest expense to total assets one bank and South East bank are in the worse position. But Rupali bank comparatively is in the better position in utilizing both the inputs.

Output Utilization:

In terms of interest income to total assets maximization Brac bank is in the better position but AB bank is in the better position in maximizing both the NP/TA and GP/TA. (Figure-2)

Table-2: Efficiency Scores Report and Reference Set Frequencies during the year 2008-2009.

DMU		Efficiency Scores (%)	Status	Rank	Reference Set Frequency
Sl. No.	Banks				
1	AB Bank Ltd	100.00	Efficient	1	9 (Global Leader)
2	City Bank Ltd	97.11	Inefficient	2	0
3	South East Bank Ltd	100.00	Efficient	1	2
4	Prime Bank Ltd	96.77	Inefficient	3	0
5	One Bank Ltd	100.00	Efficient	1	2
6	National Bank Ltd	100.00	Efficient	1	5
7	Dutch Bangla Bank Ltd	100.00	Efficient	1	3
8	IFIC Bank Ltd	100.00	Efficient	1	2
9	Jamuna Bank Ltd	89.99	Inefficient	5	0
10	Trust Bank Ltd	100.00	Efficient	1	8
11	Brac Bank Ltd	100.00	Efficient	1	5
12	Dhaka Bank Ltd.	100.00	Efficient	1	3
13	Premier bank Ltd	100.00	Efficient	1	5
14	Mutual Trust Bank Ltd	100.00	Efficient	1	1
15	Mercantile Bank Ltd	94.36	Inefficient	4	0 (Poor Achiever)
16	Sonali Bank Ltd	100.00	Efficient	1	2
17	Janata Bank Ltd	100.00	Efficient	1	3
18	Agrani Bank Ltd	100.00	Efficient	1	2
19	Rupali Bank Ltd	100.00	Efficient	1	2
Source: Calculation made by the authors' using KonSi-DEA software.					

Note: Efficiency Score 100%= Efficient DMUs/Banks.

Efficiency Scores:

As per table-2, fifteen (15) banks are efficient, each of which scores 100%; whereas, rest of the banks (4) are inefficient (in comparison of the efficient bank with the given data set) who scores less than 100%. The above table shows that Jamuna Bank is the most inefficient DMU which scores only 89.99%.

Reference Set Frequencies:

Reference set frequencies shows how many times an efficient unit i.e, Reference Unit appear in an inefficient unit's reference set. The higher the frequency, the more likely the efficient unit is an example of good performance.

Reference Units:

Reference Units are the 100% efficient units against which each inefficient unit (below 100% efficiency) is compared. An inefficient unit will have one or more peers in its Reference Set. All the peers are efficient units.

As per table-2, Arab Bangladesh bank (AB bank) has the maximum Reference Set Frequency (9) which means this bank has been referred nine (9) times while measuring the efficiency of inefficient banks. This bank can be termed as ''Global Leaders'', which performs consistently will in comparison with other units. The banks having ''0'' Reference set frequency denotes that these banks are not at all referred in measuring efficiencies of inefficient banks.

It is to be clearly mentioned that the banks having 100% efficiency score may or may not have scope for further potential improvement and such cases actual and target values of some parameters may be same denoting no further improvement and vice versa. But banks having below 100% efficiency score have ample scope for further improvement.

In case of Inputs:

Potential improvement should be negative denoting that the Inefficient DMUs should reduce the input utilization to become 100% efficient and an efficient unit should do the same to remain competitive with its competitors. (Table-3)

In case of Outputs:

Potential improvement should be positive denoting that the inefficient DMUs should increase the level of output in order to become 100% efficient and an efficient unit should do the same to keep its competitiveness unaffected.(Table-4)

Table-3 & 4, given below shows the details of potential improvement opportunity in input and output parameters both for efficient and inefficient DMUs. All DMUs whether it is efficient or inefficient have the opportunity for further improvement except AB bank and Brac Bank for both input and output parameters having ''0'' values in potential improvement column (table-6).

Table-5 an improvement summary of inefficient DMUs is given and in table-6 the same is shown for efficient DMUs. For example, the City Bank which has highest efficiency score (97.11%) among the inefficient DMUs must improve in all inputs utilization and must give emphasize in maximization NP/TA and GP/TA values over the original values as per table-5. The City Bank can improve its output level to great extent, e,g. NP/TA by 101.57% and GP/TA by 0.65% (Table-5) while the input utilization must be reduced e,g. No. of Employees by 2.89% , No. of Branches by 11.12 % , Int. Exp/TA by 2.89% and Op. Exp/TA by 19.09% (table-5).

Table-3: Efficiency Report (Inputs) of the Banks during the year 2008-2009

	Efficiency	Inputs											
		No. of Employees			No. of Branches			Int. Exp/T.A (%)			OP. Exp/T.A (%)		
Banks	Scores (%)	Actual	Target	Potential Improvement (%)	Actual	Target	Potential Improvement (%)	Actual	Target	Potential Improvement (%)	Actual	Target	Potential Improvement (%)
AB Bank Ltd	100.00	1617	1617	0	77	77	0	635.00	6.35	0	2.2	2.2	0
City Bank Ltd	97.11	1673	1624	-2.89	83	73.77	-11.12	5.54	5.38	-2.89	3.07	2.48	-19.09
South East Bank Ltd	100.00	1402	894.35	-36.21	66	45.39	-31.23	7.65	6.67	-12.84	1.26	1.78	41.19
Prime Bank Ltd	96.77	1550	1499.98	-3.23	84	70.64	-15.90	6.45	6.24	-3.22	1.75	1.69	-3.20
One Bank Ltd	100.00	525	674.12	28.40	29	42.81	47.63	7.8	7.38	-5.45	2.22	2.42	9.19
National Bank Ltd	100.00	2418	2553.38	5.60	122	137.75	12.91	4.98	5.62	12.91	3.03	2.47	-18.51
Dutch Bangla Bank Ltd	100.00	1600	1633.44	2.09	71	72.48	2.09	5.99	6.12	2.09	2.8	2.35	-16.11
IFIC Bank Ltd	100.00	1537	1551	0.91	82	72.33	-11.79	5.13	5.18	0.92	3.41	2.10	-38.36
Jamuna Bank Ltd	89.99	1056	950.25	-10.01	54	48.59	-10.01	7.34	6.61	10.01	2.25	2.03	-10.00
Trust Bank Ltd	100.00	979	676.67	-30.88	37	51.98	40.48	4.54	6.38	40.48	1.39	1.84	32.59
Brac Bank Ltd	100.00	4192	4192	0.00	68	68	0.00	6.72	6.72	0.00	3.95	3.95	0.00
Dhaka Bank Ltd.	100.00	868	1007.5	16.07	48	34.13	-28.89	7.33	7.66	4.47	1.9	2.45	28.84
Premier bank Ltd	100.00	281	1657.82	489.97	38	50.02	31.63	7.51	7.19	-4.29	2.3	2.62	14.00
Mutual Trust Bank Ltd	100.00	620	1490.96	140.48	50	73.32	46.64	6.46	6.46	0.00	1.74	2.21	26.95
Mercantile Bank Ltd	94.36	554	522.78	-5.64	53	40.16	-24.22	7.18	6.78	-5.64	2.39	2.14	-10.29
Sonali Bank Ltd	100.00	26085	12199	-53.54	1183	782.90	-33.82	2.61	3.59	37.43	1.3	1.79	37.46
Janata Bank Ltd	100.00	13593	15660.68	15.21	850	713.17	-16.10	3.48	4.00	15.20	1.73	1.82	5.03
Agrani Bank Ltd	100.00	13269	10182.41	-23.26	903	613.21	-32.09	2.80	3.30	17.71	1.82	2.12	16.54
Rupali Bank Ltd	100.00	14500	19202.33	32.43	875	1032.63	18.01	1.86	2.71	45.81	1.61	1.58	-1.93

Source: Calculation made by the authors' using KonSi-DEA software.

Table-4: Efficiency Report (Outputs) of the Banks during the year 2008-2009.

DMU	Efficiency Scores (%)	Outputs Parameters								
		Int. Inc/T.A			NP/T.A			GP/T.A		
Banks		Actua 1	Target	Potential Improvement (%)	Actua 1	Target	Potential Improvement (%)	Actua 1	Target	Potential Improvement (%)
AB Bank Ltd	100.00	8.76	8.76	0.00	2.74	2.74	0.00	5.11	5.11	0.00
City Bank Ltd	97.11	8.17	8.17	0.00	0.70	1.41	101.57	3.07	3.09	0.65
South East Bank Ltd	100.00	9.28	9.28	0.00	1.09	1.10	1.10	2.65	3.15	18.75
Prime Bank Ltd	96.77	8.24	8.34	1.20	1.11	1.72	54.95	3.48	3.48	0.00
One Bank Ltd	100.00	9.93	9.93	0.00	1.33	1.72	29.25	3.49	3.49	0.00
National Bank Ltd	100.00	8.01	8.04	0.42	2.19	2.19	0.00	4.32	4.32	0.00
Dutch Bangla Bank Ltd	100.00	8.99	8.99	0.00	1.35	1.48	9.70	3.19	3.63	13.70
IFIC Bank Ltd	100.00	7.67	7.67	0.00	1.44	1.73	20.0	3.4	3.40	0.00
Jamuna Bank Ltd	89.99	9.13	9.13	0.00	1.51	1.51	0.00	3.29	3.39	3.07
Trust Bank Ltd	100.00	6.71	8.08	20.46	0.85	2.57	201.88	1.82	3.1	70.33
Brac Bank Ltd	100.00	11.07	11.07	0.00	1.34	1.34	0.00	4.38	4.38	0.00
Dhaka Bank Ltd.	100.00	10.08	10.08	0.00	1.18	1.33	12.80	3.56	3.61	1.32
Premier bank Ltd	100.00	9.91	9.91	0.00	1.68	1.68	0.00	3.29	4.01	24.59
Mutual Trust Bank Ltd	100.00	8.11	8.87	9.35	2.64	2.64	0.00	3.08	4.938	60.32
Mercantile Bank Ltd	94.36	9.17	9.17	0.00	1.22	1.48	21.39	2.89	2.97	2.87
Sonali Bank Ltd	100.00	5.40	5.40	0.00	0.33	1.39	322.42	3.99	3.99	0.00
Janata Bank Ltd	100.00	4.85	6.73	38.80	1.19	1.28	7.82	4.35	4.35	0.00
Agrani Bank Ltd	100.00	5.10	5.57	9.20	1.41	1.41	0.00	3.38	3.38	0.00
Rupali Bank Ltd	100.00	4.02	5.24	30.32	0.91	0.91	0.00	2.11	3.66	73.55

Source: Calculation made by the authors' using KonSi-DEA software.

Table-5: Potential Improvement (%) Schedule of the Inefficient Banks during 2008-2009

Inefficient Banks	Efficiency Scores (%)	Inputs				Outputs		
		No of Employees (%)	No of Branches (%)	Int. Exp/ T.A. (%)	Op Exp/ T.A. (%)	Int. Inc. /T.A. (%)	N.P/T. A. (%)	GP/T. A. (%)
The City Bank	97.13	-2.89	-11.12	-2.89	-19.09	0.00	101.57	0.65
Prime Bank	96.77	-3.23	-15.90	-3.22	-3.20	1.20	54.95	0.00
Jamuna Bank	89.99	-10.01	-10.01	-10.01	-10.00	0.00	0.00	3.07
Mercantile Bank	94.36	-5.64	-24.22	-5.64	-10.29	0.00	21.39	2.87
Source: Table 3 & 4								

Table-6: Potential Improvement (%) Schedule of the Efficient Banks during 2008-2009

Inefficient Banks	**Efficiency Scores (%)**	**Inputs**				**Outputs**		
		No of Employees (%)	**No of Branches (%)**	**Int. Exp/ T.A. (%)**	**Op Exp/ T.A. (%)**	**Int. Inc. /T.A. (%)**	**N.P/T .A. (%)**	**GP/T. A. (%)**
AB Bank Ltd	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
South East Bank Ltd	100.00	-36.21	-31.23	-12.84	41.19	0.00	1.10	18.75

One Bank Ltd	100.00	28.40	47.63	-5.45	9.19	0.00	29.25	0.00
National Bank Ltd	100.00	5.60	12.91	12.91	-18.51	0.42	0.00	0.00
Dutch Bangla Bank Ltd	100.00	2.09	2.09	2.09	-16.11	0.00	9.70	13.70
IFIC Bank Ltd	100.00	0.91	-11.79	0.92	-38.36	0.00	20.0	0.00
Trust Bank Ltd	100.00	30.88	40.48	40.48	32.59	20.46	201.88	70.33
Brac Bank Ltd	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dhaka Bank Ltd.	100.00	16.07	-28.89	4.47	28.84	0.00	12.80	1.32
Premier bank	100.00	489.77	31.63	-4.29	14.00	0.00	0.00	24.59
Mutual Trust Bank	100.00	140. 48	46.64	0.00	26.95	9.35	0.00	60.32
Sonali Bank	100.00	-53.54	-33.82	37.43	37.46	0.00	322.42	0.00
Janata Bank	100.00	15.21	-16.10	15.20	5.03	38.80	7.82	0.00
Agrani Bank	100.00	-23.26	-32.09	17.71	16.54	9.20	0.00	0.00
Rupali Bank	100.00	32.43	18.01	45.81	-1.93	30.32	0.00	73.55
Source: Table 3 & 4								

Reference Contribution:

It shows the extent to which each Reference Unit has contributed in determining the efficiency of an inefficient unit. Reference unit are those unit which are considered to be 100% efficient and against which an inefficient unit has been directly compared. The contribution of each Reference unit to the targets of an inefficient unit's input or output is shown as percentage at the first row of the table 7(a) and 7(b). Furthermore, the deviation of an inefficient unit's input or output values from the input output values of peers are shown in subsequent rows. Reference Contribution provides information on which members f a unit's reference set have had the most influence to setting its targets for potential improvements. This helps to identify the key units to compare its performance against inefficient unit. The contribution for each variable is shown in percentage terms as well as the deviation from the peers. National bank, DBBL bank and Trust have been identified as peers for The City Bank Ltd (table-7a). On the other hand AB bank, South East Bank, Trust Bank and Janata bank have been identified as peer banks for Prime Bank limited.

Table-7(a): Reference Banks' Contribution to Inefficient DMUs and its deviation from the input output parameters value of Peers' (Efficient DMUS)

DMUs	The City Bank (Efficiency Score: 97.11%)	Total	Prime Bank (Efficiency Score: 96.77%)	Total (%)

Peer References	National Bank	Dutch Bangla Bank	Trust Bank	(%)	AB Bank	South East Bank	Trust Bank	Janata Bank	
Inputs/ Outputs	Contribution (22.86 %)	Contribution (51 %)	Contribution (26.14%)	100	Contribution (41.98%)	Contribution (30.63%)	Contribution (26.42%)	Contribution (0.98%)	100
	Relative Deviation from Peers'				Relative Deviation from Peers'				
No of Employees(%)	44.53%	-4.36	-41.48		4.32	-9.55	-36.84	776.97	
No of Branches(%)	46.99%	-14.46	-55.42		-8.33	-21.43	-55.95	911.90	
Int. Exp/ T.A.(%)	-10.11%	8.12	-18.05		-1.55	18.60	-29.61	-46.05	
Op Exp/ T.A.(%)	-1.30%	-8.79	-54.72		25.71	-28.00	-20.57	-1.14	
Int. Inc. /T.A.(%)	-1.96%	10.04	-17.87		6.31	12.62	-18.57	-41.14	
N.P/T.A.(%)	212.86%	92.86	21.43		146.85	-1.89	-23.42	7.21	
GP/T.A.(%)	40.72%	3.91	-4072		46.84	-23.85	-47.70	25.00	
Source: Calculation made by the authors' using KonSi-DEA software.									

Table-7(b): Reference Banks' Contribution to Inefficient DMUs and its deviation from the input output parameters value of Peers' (Efficient DMUS)

DMUs	Jamuna Bank: (Efficiency Score: 89.99%)						Total (%)	Mercantile Bank (Efficiency Score: 94.36%)			Total (%)
Peer References	AB Bank	Dutch Bangla Bank	Trust Bank	Brac Bank	Dhaka Bank	Premier Bank		Dutch Bangla Bank	Trust Bank	Premier Bank	
Inputs/ Outputs	Contribution (16.16%)	Contribution (1.83%)	Contribution (20.64%)	Contribution (2.64%)	Contribution (31%)	Contribution (27.73%)	100	Contribution (7.19%)	Contribution (21.06%)	Contribution (71.76%)	100
	Relative Deviation from Peers'							Relative Deviation from Peers'			
No of Employees (%)	53.13	51.52	-7.29	296.97	-17.80	-73.39		188.81	76.71	-49.28	
No of Branches (%)	42.59	31.48	-31.48	25.93	-11.11	-29.63		33.96	-30.19	-28.30	
Int. Exp/ T.A. (%)	-13.49	-18.39	-38.15	-8.45	-0.14	2.32		-16.57	-36.77	4.60	
Op Exp/ T.A. (%)	-2.22	24.44	-38.22	75.56	-15.56	2.22		17.15	-41.84	-3.77	
Int. Inc. /T.A. (%)	-4.05	-1.53	-26.51	21.25	10.41	8.54		-1.96	-26.83	8.07	
N.P/T.A. (%)	81.46	-10.60	-43.71	-11.26	-2185	11.26		10.66	-30.33	37.70	
GP/T.A. (%)	55.32	-3.04	-44.68	33.13	8.21	0.00		10.38	-37.02	13.84	
Source: Calculation made by the authors' using KonSi-DEA software.											

In case of The City Bank, it is found that DBBL has had the great influence as reflected by the contribution percentage (51%) shown in table (7a) and the National bank has had lowest influence among its peers DMUs. In case of Prime bank the highest contributor and lowest contributor are AB bank (41.98%) and Janata bank (0.98%) respectively.

In table-7(b) AB bank, DBBL bank, Trust bank, Brac bank, Dhaka bank and premier bank have had been identified as peers for Jamuna Bank. Among the peers of this bank Dhaka bank, Premier bank and Trust bank have had most influence representing by contribution percentage (31%, 27.73% and 20.64% respectively) and hence these banks are very good Reference Units under this circumstances. Deviation of inefficient DMUs parameters(input or output) values from the parameters(input or output) values of peer banks are shown under rows below the contribution percentage row. For example, Jamuna Bank has 53.13% more Employees and 42.59% more Branches than its peer AB bank. On the other hand, Jamuna bank's Interest Exp/TA, OP. Exp/TA and Int. Inc/TA are lower than the AB bank by 13.49%, 2.22% and 4.05% respectively. Besides that the bank has had 81.46% and 55.32% more NP/TA and GP/TA respectively than its peer AB bank.

Conclusion:

The DEA Analysis is a very effective approach to measure the efficiency of banks (DMUs), if the assumptions are realistic and model is perfect. Hence in this paper, the efficiency of the selected DMUs has been analyzed on the basis of four specific inputs and three specific outputs only. This study shows the performance of the each DMU relative to other DMUs under consideration and hence, it is not an absolute

measure of performance. This study may be extended further with inclusion of other inputs and outputs of the banks.

The following major observations were found in the above analysis:

- Out of 19 commercial banks in Bangladesh both from public and private sectors during the year 2008-2009, only 15 were found efficient (Table-2).
- AB Bank Limited were found as Star Perfrormars having maximum Reference Set Frequencies (Tabe-2).
- Jamuna Bank were found to be most Inefficient Banks among the Banks under study having efficiency scores only 89.99% (Table-2)
- The inefficient banks have to reduce the utilization of all inputs under consideration on the other hand, these bank have to increase maximization of some of outputs (Table-5).
- All the efficient banks except AB bank and Brac have to either increase or decrease the utilization of input and maximization of outputs to remain competitive in the market.
- All the inefficient banks are private commercial banks.

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