X-Efficiency Analysis of Problem Banks of Bangladesh

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Introduction

The banking sector in Bangladesh comprises four types of scheduled banks. As per the database, in the year 2001, there are 4 nationalised commercial banks, 5 Government owned specialised banks, 30 local private bank and 12 foreign private banks (Board of Investment, 2003). "It is dominated by the four nationalized commercial banks (NCBs)"(Bangladesh Bank, 2002). "Bangladesh Bank is the apex bank of the country responsible for healthy growth and development of the banking system. During the last three years a number of steps have been taken to strengthen the country's banking system for the improvement of the regulatory environment, enforcement of loan classification guidelines and re-capitalisation of the commercial banks" (Asia trades, 2002). Bangladesh bank uses CAMEL rating system to evaluate the Bangladesh banking system where CAMEL framework involves the analysis of following five indicators: Capital adequacy, Asset quality, Management soundness, Earnings and profitability and Liquidity. As of year-end 2001, 7 banks were rated as strong, 24 banks rated as satisfactory, 6 as fair and 14 as marginal. "A bank is identified as problem bank if it has a CAMEL composition score of 4 or 5" (Bangladesh Bank, Department for off-site Supervision of Banks). "The banks which were categorised as problem bank are Uttara Bank, National Bank Ltd, National Credit and Commerce Bank Ltd, United Commercial Bank Limited, The City Bank Ltd, Pubali Bank Ltd and Al Baraka Bank (The Oriental Bank). From these Uttara Bank gets rid of problem bank status (The Daily Star, June23, 2003)". So now the number of problem banks in Bangladesh is six.

An overview of the Bangladesh banking sector "It is dominated by the four nationalized commercial banks (NCBs) that held 46.5 percent of industry assets, five government owned specialized banks (DFIs) that held 9.5%, 30 private commercial banks (PCBs) that held 37.2% and 12 foreign commercial banks that held 7.8% of the industry assets as of year-end 2001". (Bangladesh Bank, 2002).

Table 1: Banking System Structure (Dec-2001)

Bank type	Number of banks	Number of branches	Net assets (billion taka)	% of industry asset	Deposits (billion taka)	% of industry deposits	% of total banking deposits
NCBs	4	3608	511.52	46.5	486.97	50.93	57%
DFIs	5	1298	104.50	9.5	53.96	5.64	
PCBs	30	1331	409.22	37.2	349.81	36.58	36%
FCBs	12	34	85.80	7.8	65.53	6.85	7%
Total	51	6271	1100.06	100.0	956.28	100.0	100%

Source: Bangladesh bank, 2002.

Purpose of the Study: In Bangladesh no study has been done to find the efficiency analyse of the banks through a non-parametric approach. So, the main objective of this study is to measure and to analyse the productive efficiency of problem banks of Bangladesh and to give some recommendations to improve their efficiency so that they can get rid of problem bank. To do this, the specific objects are

To find the efficiency score of the problem banks.

To find the potentiality of the individual problem banks and to find the total potentiality of the problem banks.

To find the correlation between input and output variables.

To analyse the frontier plot for both input minimization and output maximization

Comparing with two foreign commercial banks efficiently working in Bangladesh.

To give some suggestions so that the problem banks can improve their efficiency and can achieve the frontier plot.

Materials and Methods

In doing this the researcher is interested to work with microsoft excel and a non parametric approach Data Envelopment Analysis (DEA). DEA approach has been used since "recent research has suggested that the kind of mathematical programming procedure used by DEA for efficient frontier estimation is comparatively robust" (Seiford and Tharall, 1990). The present study uses the latest available data from the annual reports of all the problem banks (6) and two foreign commercial banks. So, in this sample there were 8 Decision Making Units (DMUs). To measure efficiency as directly as possible, that is, management's success in controlling costs and generating revenues (that

is, x-efficiencies) a model was developed for DEA analysis.

X-Efficiency Analysis: Modern efficiency measurement begins with Farrell (1957) who drew upon the work of Debreu (1951) and Koopmans (1951) to define a simple measure of firm efficiency which could account for multiple inputs. He proposed that the efficiency of a firm consists of two components: technical efficiency, which reflects the ability of a firm to obtain maximal output from a given set of inputs, and allocative efficiency, which reflects the ability of a firm to use the inputs in optimal proportions, given their respective prices. These two measures are then combined to provide a measure of total economic efficiency (Tim Coelli, 96). Scale and scope economies, however, only refer to the static effect of size and activity mix on costs. Based on the concept of technical efficiency, Leibenstein (1966) coined the term X-efficiency (Simon H. Kwan, 2001). As a concept it may be summarised as follows "for a variety of reasons, people and organizations normally work neither as hard nor as effectively as they could. In situations where competitive pressure is light, many people will trade the disutility of greater effort, or search for the utility of feeling less pressure and of better interpersonal relations" (Leibenstain, 1966). It is usual to measure the performance of banks using financial ration. Yeh (1966) notes that the major demerit of this approach is its reliance on benchmark ratios. These benchmarks could be arbitrary and may mislead an analyst. Further Sherman and Gold (1985) note that financial ratios don't capture the long-term performance and aggregate many aspects of performance such as operations, marketing and financing. In recent years, there is a trend towards measuring bank performance using one of the frontier analysis methods (Milind, 2001).

Data Envelopment Analysis: Frontiers have been estimated using many different methods over the past 40 years (Coelli, 1996). In frontier analysis, the institutions that perform better relative to a particular standard are separated from those that perform poorly. Such separation is done either by applying a non-parametric or parametric frontier analysis to firms within the financial services industry. The parametric approach includes Stochastic Frontier Analysis (SFA), the Free Disposal Hull (FDH), Thick Frontier Analysis (TFA) and the Distribution Free Approaches (DFA), while the non-parametric approach is Data Envelopment Analysis (Molyneux et al, 1996)
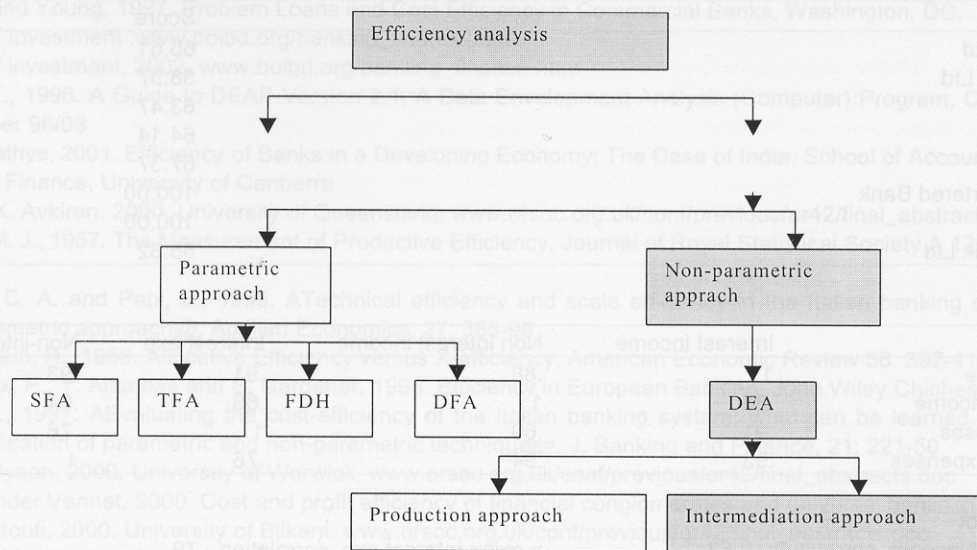
This DEA is clearly a useful decision-making tool in benchmarking. As a matter of sound managerial practice, profitability measures should be compared with DEA results and significant disagreements investigated. The DEA technique has been used in efficiency analysis of banks (rather than branches) some recent examples are Yue (1992) , Berg et al. (1993), Favero and papi (1995) , Wheelock and Wilson (1995) , Nukker abd Biykas (1996) , Resti (1997) , Berger and Young(1997), Rudi Vander Vennet (2000), Sathye (2001), Simon H. Kwan (2001). The choice of inputs and outputs in DEA is a matter of long standing debate among researchers. Two approaches exist. One is called the production approach while the other intermediation approach. The production approach uses number of accounts of deposits or loans as inputs and outputs respectively. This approach assumes that banks produce loans and other financial services. The intermediation approach on the other hand considers banks as financial intermediaries and uses volume of deposits loans and other variables as inputs and outputs. Most of the DEA studies follow an intermediation approach. This is strength of the technique, since it reveals which of the input-output variables need to be closely monitored by bank management to improve efficiency (Milind Sathye, 2001).

Problem Banks: Bangladesh bank used CAMEL rating system to evaluate the Bangladesh banking system where CAMEL framework involves the analysis of following five indicators: Capital adequacy, Asset quality, Management soundness, Earnings and profitability and Liquidity. As of year-end 2001, 7 banks were rated as strong, 24 banks rated as satisfactory, 6 as fair and 14 as marginal. A bank is identified as problem bank if it has a CAMEL composition score of 4 or 5(Bangladesh Bank, Department for off-site Supervision of Banks). Seven PCBs are on the Bangladesh Bank problem bank list. These banks were rated CAMEL 4 and put under strict supervision by the Problem Bank Monitoring Department of Bangladesh Bank (Bangladesh Bank, Annual Report, 2002). The banks which were categorised as problem bank are Uttara Bank, National Bank Ltd, National Credit and Commerce Bank Ltd, United Commercial Bank Limited, The City Bank Ltd, Pubali Bank Ltd and Al Baraka Bank (The Oriental Bank). From these Uttara Bank gets rid of problem bank status (The Daily Star, June23, 2003).

Capital Adequacy: Since 1996, banks in Bangladesh have been required to adopt the Basle minimum capital standard equal to 8 percent of risk weighted assets with core capital equal to at least 4 percent of risk weighted assets. The banking sector's average capital adequacy ratio showed downward trend since 1997 and declined to 6.65 percent as of year-end 2001   from 7.53 percent as of year-end 1997. (Bangladesh bank, 2002)

Earnings and Profitability: Strong earnings and profitability profile of a bank reflects its ability to support present and future operations. Earnings as measured by return on assets (ROA) vary largely within the industry. For 2001, NCBs

reported return on assets (ROA) of 0.33 percent, which is overstated. Though some PCBs do under-state provisions, many have made provisions more than required. Their 2001 ROA was 1.13. FCBs report a very high 2.80 ROA for 2001.

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Intermediation approach model: Price of two inputs   Price of two outputs

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                          │ Interest expenses    │      │ Interest income      │
                          │ Non-interest exp.    │      │ Non-interest inc.    │
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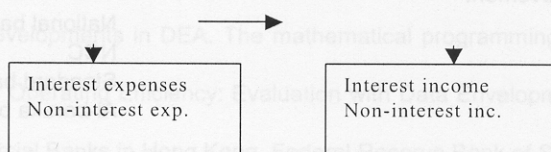
Table2: Profitability ratio

Banks	Return on Assets (ROA)					Return on Equity (ROE)				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
NCBs	0.04	0.01	-0.03	0.04	0.33	1.27	0.34	-1.08	1.50	12.26
PCBs	1.12	1.24	0.80	0.83	1.13	24.40	26.81	15.32	17.06	21.01
FCBs	4.82	4.66	3.52	2.68	2.80	38.21	40.71	41.84	26.88	32.39
Total	0.63	0.68	0.46	0.47	0.74	12.95	13.32	10.33	10.91	16.94

Source: Bangladesh bank, 2002

Table 3: Liquidity ratio

Banks	Liquidity ratio				
	1997	1998	1999	2000	2001
NCBs	22.65	24.39	25.24	26.47	25.71
DFIs	16.88	16.62	15.66	16.21	15.34
PCBs	24.18	24.76	25.87	24.79	24.24
FCBs	31.15	39.78	51.26	34.67	34.13
Total	23.33	25.24	27.02	26.08	25.27

Liquidity: Presently, the commercial bank's deposits are subject to a statutory liquidity requirement (SLR) of 20 percent, of which 4 percent as cash reserve requirement (CRR) with the Bangladesh Bank and the remainder as qualifying 'secure' assets under the SLRs, either in cash or government securities. Liquidity indicators measured by liquid assets/deposit and excess (shortfall) liquid assets/deposits indicated that all banks had excess liquidity during 1996-2001.

Results
Efficiency score

Unit	Score
Pubali bank Ltd	65.61
National bank Ltd	58.57
The city bank	63.47
NCC	64.14
UCBL	67.37
Standard Chartered Bank	100.00
HSBC Ltd	100.00
Al Baraka Bank Ltd	55.62

X-Y plot

Correlation	Interest income	Non interest income	Interest exp	Non-interest exp
Interest income	1	.88	.91	.93
Non-interest income	.88	1	.69	.94
Interest expenses	.91	.69	1	.76
Non-interest expenses	.93	.94	.76	1

X-efficiency plot

x-axis=Interest income, correlation -0.53   x-axis= Interest exp, correlation -.79

x-axis=non interest income, correlation= -.16   x-axis=non interest ex, correlation= -.32

Potential improvement

Pubali bank	National bank
The city bank	NCC
UCBL	Standard bank
HSBC	Al-baraka bank

Frontier plot for input minimization, input is interest expenses and outputs are interest income and non-interest income. Frontier plot for output max, output is interest income and inputs are interest expenses and non interest expenses.

Conclusion

Since commercial banks play important roles in the financial markets, it is important to evaluate whether banks operate efficiently. Moreover, given increased competition from non-bank financial institutions, commercial banks should operate more efficiently than they did previously. Commercial banks might operate more efficiently if they have superior information. If this is true, bank size should not matter to the operation of the bank (Yi-Kai Chen, 2001). In Bangladesh there are six problem banks. This paper uses the DEA, a non-parametric approach to investigate the efficiency of problem banks operating in Bangladesh. Based on the cross section estimation the average efficiency score of the problem banks is 62.46 and the efficiency score of the FCB is 100. So, the average x-efficiency score of the problem bank is 37.54. To be 100% efficient (compared to Standard Chartered and HSBC) the problem banks have to reduce their non interest expenses and interest expenses by 37 percent. On the other hand non interest income have to increase by 37 percent (except the Al Baraka Bank which has to increase non interest income by 306 percent). From the analysis of frontier plot for input minimization, the ranking of the problem banks are as follows, (1) The Pubali Bank, (2) National Bank, (3) UCBL, (4) The City Bank, (5) NCC, (6) Al Baraka Bank. For output maximization (Interest income) the position of Al Baraka Bank is also worst. If these problem banks want to be 100 percent efficient then they have to change their input and output variables as the potential improvement analysis.

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