USING DATA ENVELOPMENT ANALYSIS (DEA) TO EVALUATE THE EFFICIENCY OF TEN VIETNAMESE COMMERCIAL BANKS IN FOUR LASTEST QUARTERS

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1. INTRODUCTION

Over the last twenty years in Vietnam, it is witnessed the dramatic development in Vietnamese banking system regarding number, size, asset value, deposit, credit, interest rate, etc. Thanks to transferring of Vietnamese banking system from a monopoly system into a diversified system, the efficiency of commercial banks also have been increasing. In other words, customers have more alternatives to satisfy and meet their financial needs. However, so far, there have still a limited number of researches to investigate the efficiency of Vietnamese commercial banks. In this paper, I would like to present an empirical research, using data envelopment analysis to evaluate the efficiency of 10 Vietnamese commercial banks during four latest quarters (quarter 3rd/2015; quarter 4th/2015; quarter 1st/2016; and quarter 2nd/2016).

2. METHODOLOGY

- Using data envelopment analysis (DEA) to evaluate the efficiency of 10 Vietnamese commercial banks.

The efficiency can be measured by the ratio between outputs and inputs which are used to produced them

$$P = \frac{Out}{In} \qquad (1)$$

Where P: productivity (or efficiency)
Out: output variables
In: input variables

In this paper, we use data envelopment analysis (DEA) which is a nonparametric approach to measure the efficiency of 10 Vietnamese commercial banks.

- Analysis the results and give comments on these results.

Farrel (1957) extended the equation (1) for the case of multiple inputs and outputs variables. In this case, assumed that each decision making unit (DMU) could use x inputs to produce y outputs. Therefore, the efficiency of an individual DMU is defined by:

$$EF = \frac{\Sigma m u_m.y_m}{\Sigma_k v_k.x_k} \text{ or } EF = \frac{u_1.y_1 + u_2.y_2 + ... + u_m.y_m}{v_1.x_1 + v_2.x_2 + ... + v_k.x_k} \qquad (2)$$

Where:
EF: Efficiency
u: output weight of y, hence $0 \le u_m \le 1$.
v input weight of x, hence $0 \le v_k \le 1$.

For a set of n number of DMUs, the efficiency of the j-th DMU ($1 \le j \le n$) can be calculated by:

$$EF = \frac{u_1.y_{1j} + u_2.y_{2j} + ... + u_m.y_{mj}}{v_1.x_{1j} + v_2.x_{2j} + ... + v_k.x_{kj}} \qquad (3)$$

Charnes, Cooper and Rhodes (1978) developed the model of Farred by assumed that there was a constant returns to scale (CRS) situation under an input orientation. Hence, j-th DMU can maximize its efficiency by solving the model:

Max u, v ($\Sigma_m u_m.y_{mjo}$)
Subject to

$$\Sigma_k v_k.x_{kjo} = 1 \qquad (4)$$

$EFj \le 1, 1 \le j \le$
$0 \le \quad i, \quad \le 1$

Some computer programs can be used to deal with this DAE problem in (4). In this paper, we used the DAEP.

3. RESULTS

3.1. Identify input and output of model

Inputs: Total asset (TA), ROA, ROE, EPS
Output: Total profit after taxes.

3.2. Evaluate the efficiency of 10 Vietnamese commercial banks.

Table 3.1: List of 10 top banks in Vietnam

No.	Name	Code
DMU 1	Asia commercial bank	ACB
DMU 2	Bank for investment and development of Vietnam	BID
DMU 3	Bank for foreign trade of Vietnam	VCB
DMU 4	Military bank	MBB
DMU 5	Kienlongbank	KienlongBank
DMU 6	Sacombank	STB
DMU 7	Saigon-Hanoi commercial joint stock bank	SHB
DMU 8	VPBank	VPbank
DMU 9	Vietnam technological and commercial joint stock bank	Techcombank
DMU 10	Vietnam Join stock commercial bank for industry and trade	CTG

Source: Author's collection

Table 3.2. Efficiency summary by DEAP

N$^{o.}$	Code	CRS TE	VRS TE	Scale
1	ACB	0.516	0.980	0.526
2	BID	1.000	1.000	1.000
3	VCB	1.000	1.000	1.000
4	MBB	1.000	1.000	1.000
5	KienlongBank	0.609	1.000	0.609
6	STB	0.340	1.000	0.340
7	SHB	0.420	1.000	0.420
8	VPbank	1.000	1.000	1.000
9	Techcombank	0.870	1.000	0.870
10	CTG	1.000	1.000	1.000
Mean		0.775	0.998	0.776

Source: Author's calculation

Where:
crste = technical efficiency from CRS DEA
vrste = technical efficiency from VRS DEA
scale = scale efficiency = crste/vrste

The result of DEAP shows that among 10 Vietnamese commercial banks in the list, there are 5 commercial bank operating efficiently namely: VPbank, BIDV, Vietinbank, Vietcombank, and Military bank (with technical efficiency from CRS DEA equal to 1). These banks have already used optimally their inputs.

Among these 10 Vietnamese commercial banks, Sacombank has a lowest technical efficiency index from CRS DEA with just only 0.340, followed by Saigon-Hanoi commercial joint stock bank (SHB) and Asia commercial bank (ACB) with 0.420 and 0.516, respectively. In other word, Sacombank, SHB, and ACB used inefficiently their inputs and need to concern more on systematic solutions in the future.

The average efficiency score of all banks is relatively high, which means that they mainly producing close to the frontier. Under CRS analysis, the mean efficiency score is 0.775 while it is 0.998 under VRS analysis, and that makes the mean of Scale efficiency is 0.776.

Table 3.3: Projection summary for SHB and Techcombank

Unit: million VND

SHB	Original value	Radial movement	Slack movement	Projected value
Total profit after taxes	856600.000	1183213.735	0.000	2039813.735
TA	803710222.000	0.000	0.000	803710222.000
ROA	0.110	0.000	0.000	0.110

SHB	Original value	Radial movement	Slack movement	Projected value
ROE	1.897	0.000	-0.306	1.592
EPS	920.750	0.000	0.000	920.750
Techcombank	**Original value**	**Radial movement**	**Slack movement**	**Projected value**
Total profit after taxes	2047819.000	306556.786	0.000	2354375.786
TA	778915552.000	0.000	0.000	778915552.000
ROA	0.263	0.000	0.000	0.263
ROE	3.063	0.000	0.000	3.063
EPS	1905.500	0.000	-43.989	1861.511

Source: Author's calculation

On the one hand, there are several reasons lead to a low technical efficient index of Sacombank. The first and foremost reason is that it was forced into the merger and acquisition process with other banks. It has been usurped the role of leader by Eximbank since 2012. Eximbank accounted for more than 51% of total stocks and has predominated in making important decisions of Sacombank. One more M&A deal was with Southern bank since 1/10/2015. In addition, the restructuring process after the scandal of Tram Be family, who is the largest individual shareholder of Sacombank, still has several operation problems. Moreover, the operation of this bank has not been good as its bad debt is on the rise; credit growth is low, etc. As reported by Southern Bank, its pre-tax profit in 2014 was only VND 17.12 billion, only 4.76% of the plan completed.

On the other hand, Vietcombank, Viettinbank, Military bank has high technical efficiency index due to their development history with many advantages from Vietnamese government. Moreover, they have a high standard to recruit new employees and rotate current employees as well. Therefore, they have obtained a very high qualified staffs with excellent knowledge and experience in banking sector.

4. CONCLUSIONS

This paper illustrates one of the most efficient methods to evaluate the efficiency of 10 Vietnamese commercial banks in the fours latest quarters. The data were collected through the official reports of Vietstock Finance, which was carefully checked by independent office before publishing, in fours keys inputs: total assets, ROA, ROE, EPS and in a major output: total profit after taxes. This paper presented the deeper analysis regarding efficiency on top 10 Vietnamese commercial banks with recent information (in four latest quarters).

5. REFERENCES

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