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越南商業銀行標竿績效與信用風險評等之衡量

Credit Risk Rating and Performance Benchmarking of Vietnamese Banks

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ABSTRACT

Vietnamese banking industry has been developing progressively in the recent years, playing a key role in the economic development process. The most typical and profitable services in Vietnamese commercial banks are credit activities which are considered to be high risk. To evaluate credit risk of Vietnamese banks, the financial analyst must consider financial factors to gain the most accurate credit rating. Therefore, the relationship between financial factors and credit rating of Vietnamese banks is studied in this paper with a desire to contribute a reference for credit rating system of Vietnamese banks. The research data includes 21 Vietnamese banks' financial information from 2009 to 2011 provided by Bankscope and Moody' website. In this research, the DEA (data envelopment analysis) method will be used. That results point out financial factors, especially debt ratio, ROA, ROE, equity to asset ratio, loans to asset ratio play important roles in determining credit rating. Our results are consistent with credit rating level of Vietnamese banks from Bankscope and credit rating agencies in general. Following these result, which Vietnamese bank has the highest credit rating is the most efficient bank and vice versa.

Keywords: Credit Rating, Bank Credit Risk, CAMEL, Financial Ratio, and DEA

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CHAPTER ONE

INTRODUCTION

1.1 Research Background and Motivation

Integration into international trade and investment agreement such as Vietnam Bilateral Trade Agreement (BTA) in 2001 and World Trade Organization (WTO) in 2007 had provided Vietnam many opportunities to improve and promote national economic, especially banking industry. Therefore, Vietnamese banking industry has been developing progressively in the recent years, playing a key role in the economic development process. From 1999 to 2009, the country's GDP grew at an average of 7.04%, the banking industry got a 16% of growth in GDP. Besides that, it is specified in the agreement of international trades (BTA, ASEAN Free Trade Agreement (AFTA), WTO) that foreign banks can do business in Vietnam with full of role, powers and responsibilities as local banks.

Nowadays, foreign branches and Vietnamese banks have the same condition, under the same regulation and the same authorities to provide services (Ho and Baxter, 2011). This means, consistent with opportunities, Vietnamese banks will have a lot of challenges in the future because of the competitiveness between them and foreign banks. To overcome obstacles, Vietnam banking system need to be restructuring, attract foreign investment, the partial privatization of state-owned banking institutions, and enhance the capitalization.

Therefore, during the recent years, a lot of new foreign and Vietnamese banks have been established in Vietnam. These banks are going to improve their performance in Vietnamese banking industry. However, comparing with banks in other Asian markets, Vietnamese banks is having more challenges in their funding and liquidity

management because the government's monetary policies changes more often and the credit grow is quite high. According to Standard and Poor's (S&P), Vietnamese bank credit grew about 28% in 2010, exceeding the government's target of 25%. In addition, inflation in the country rose to above 12% in January 2011 from 7.1% in 2009 based on the website of Reuters.

The State Bank of Vietnam is at the top of the Vietnamese banking system. It is a government agency responsible for issuing currency, control monetary policies and structure for the Vietnam's government. All of state-owned commercial banks are under State Bank of Vietnam's control. For detail information, the Vietnamese commercial bank system includes: 5 state-owned commercial banks, 34 joint-stock commercial banks, 4 joint-venture banks, 35 branch offices of foreign banks and representative offices, 6 financial companies and foreign banks. Among them, the biggest Vietnamese banks includes: Vietnam Bank for Agriculture and Rural Development (Agribank), Bank for Investment and Development of Vietnam (BIDV), Vietnam Joint Stock Commercial Bank for Industry and Trade (Vietinbank), Joint Stock Commercial Bank for Foreign Trade of Vietnam (Vietcombank) and Vietnam Technological and Commercial Joint Stock Bank (Techcombank). These banks are on the way to improve and develop their performance in banking industry. All of these banks have been assessed the performance in this study.

Besides that, the most popular foreign banks in Vietnam are HSBC, ANZ and Citibanks. The system of commercial banks in Vietnam is entering a new competition using modern banking technology developed with the goal of providing quality services, thus greatly benefit both Vietnamese customers and foreigners. The most typical and profitable services in Vietnamese commercial banks are credit activities

which are considered to be high risk. Some famous credit rating agencies such as: Moody, Standard & Poor (S&P), Fitch, etc. have been using financial factor in order to assess credit risk of Vietnamese banks. Generally speaking, Vietnamese banks often get a low credit rating because of the bad reflection of inflation, weak capital and profit, poor risk management standard, and the shortcoming of systems.

Recently year, the credit worthiness of local banks and foreign banks will be assessed quarterly. These credit rating results, based on criteria related banks' performance strongly such as CAMEL (capital adequacy, asset quality, management, earning, and liquidity), will be publicized. The central bank aim to divided banking industry into 4 groups: Group A (healthy), Group B (moderately healthy), Group C (unhealthy) and Group D (weak) in order to assign different credit growth rates. Currently, in Vietnam there are some agencies and CIC (Credit Information Center of the State Bank of Vietnam) that is assessing bank credit rating.

However, in this research, only famous international credit rating agencies' results such as Moody, Standard & Poor, Fitch is used to evaluate Vietnamese bank credit risk because Vietnamese rating agencies has not meet all standard of professional and reliable organization. Three famous rating agencies claim that they provide both stable and accurate rating system by rating through the cycle. That means their rating should be stable over time and independent of the state of the business cycle, conditional on its underlying financial and business characteristic of Vietnamese banks. They assess Vietnamese bank credit risk base on relevant publicly available information such as bank financial annual reports and financial statement as well as confidential information directly provide by the rated issuer.

1.2 Research Objectives

In order to help investor obtain independent analysis on this credit risk of Vietnamese banks, the credit rating agencies have been establishing credit rating system to measure creditworthiness of these banks. To doing so, the financial analyst must consider financial factors to gain the most accurate credit rating. Therefore, "credit risk rating and performance benchmarking of vietnamese banks" is studied in this paper with a desire to contribute a reference for credit rating system for Vietnamese banks. Specifically, the objectives of this research are as follow:

1. To examine the difference of Vietnamese banks' performance from 2009 -2011.

2. To determine what important financial factors that Vietnamese banks need to improve in order to enhance their credit rating.

3. To provide recommendations on how to improve credit rating of Vietnamese banks.

This study will be a reference paper for the related study or research in the near future. Vietnamese banks can also consider this study for improving the performance of operation and activities in order to be able to compete with other famous foreigner bank in Vietnam.

1.3 Research Procedure

At the beginning of research, relevant literature and information need to be collected and reviewed for gathering the background of topic. Based on these literature, the objective and motivation of this study was identified and followed by the development of the conceptual framework and research structure. After that, collecting and classifying data processing was conducted. Using DEA method, data analysis has been done with the significant results that was studied and discussed in the penultimate part of research. Lastly, the conclusion and recommendation are

reported such as the references for the related future research. The procedure was presented in Figure 1.1.

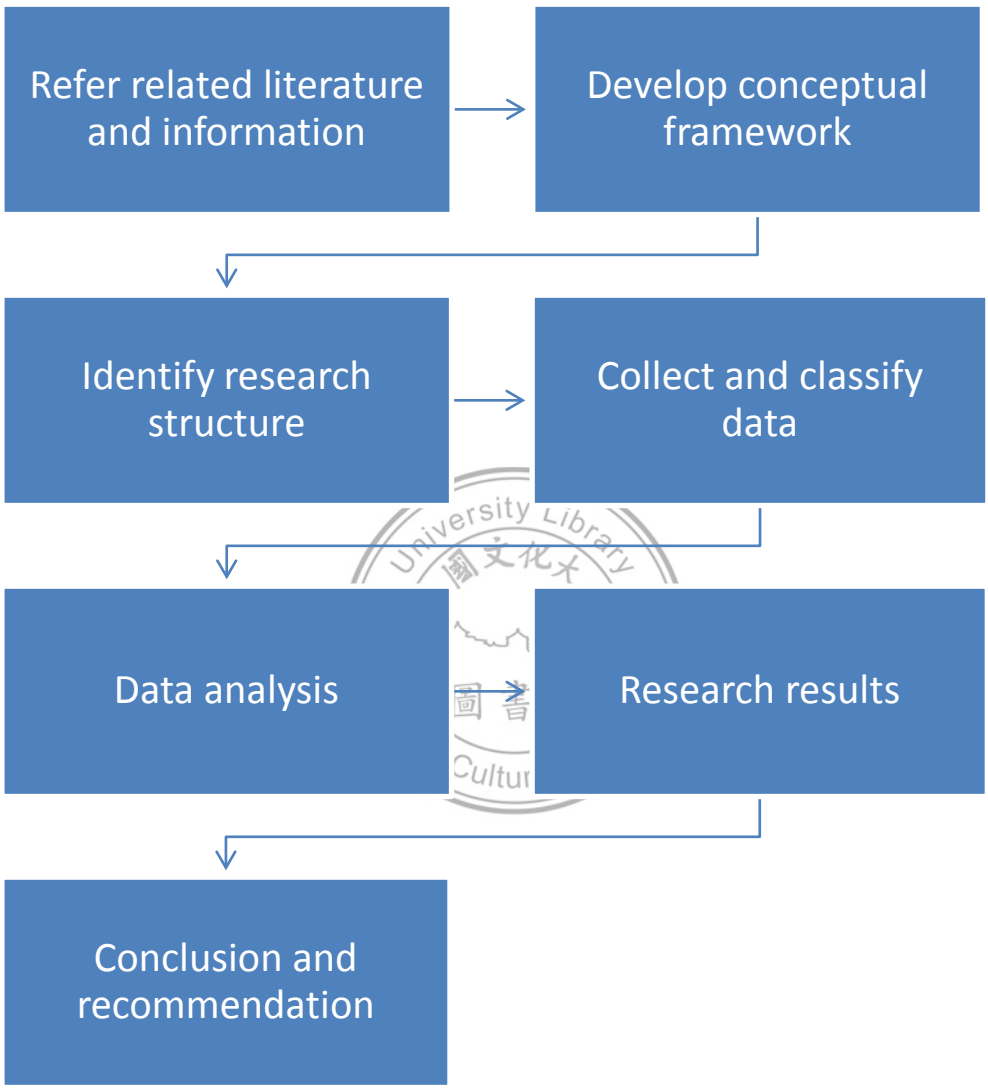

Figure 1.1. Research Procedure of The Study

1.4. Structure of the Study

This study contains five chapters as below:

Chapter 1 is introduction including research background and motivation,

research objectives and contributions, scope of study, research procedure, and structure of the study. This chapter outlines the research review as well as summarized study' conceptual framework and structure.

Chapter 2 is literature review. Chapter two presents the literature related to the relationship between financial factor and credit rating. This chapter points out the crucial issues among relevant literatures, as well as theoretical framework of this topic.

Chapter 3 is research design and methodology. Chapter 3 provides a research design of determination of financial factors to credit rating of Vietnamese banks. In order to find out the research results which are discussed in chapter 4, this study use DEA method to work on data analysis process with 5 independent variables and 1 dependent variable. This chapter also presents what DEA method is and how to classify data in this study, the sampling plan, data sources and some of measurements of variables and data collection techniques.

Chapter 4 is research result presenting research results based on data analysis. At the aim to find out the effects of different levels of financial factors on credit rating of Vietnamese banks, this chapter also provide the future vision of Vietnamese banks' credit rating after referring research results of this study. Furthermore, using the research result to determine what the financial factor is the most important on credit rating process of Vietnamese banks.

Chapter 5 is conclusions. From the significant findings in chapter 4, some conclusions and recommendations are presented in Chapter 5. This chapter also provides implication for future research and limitation of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Financial Factors

Financial index has been used to assign credit rating by rating agencies. The most necessary factor for bank rating are summarized in five key word (CAMEL) that are capital adequacy, asset quality, management, earning, and profitability, funding and liquidity (Mizen and Tsoukas, 2008).

CAMEL assessing system is a system to measure strength status of credit institution. This system was created by NCUA (National Credit Union Administration) and used by not only USA but also other countries in the world. However, establishing an indicator system according to CAMEL standard and using it as a tool to monitor and preventing risk in banking activities are the new issue forward to Vietnamese banks. After Asian economic crisis in 1997, IMF (The International Monetary Fund) and the World Bank recommended CAMEL such as one of methods to restructure financial sector. Furthermore, financial analysts can measure financial status of banks wholly through examination rating system according to CAMEL standard in order to find an effective method for potential risks.

Barr, Seiford and Siems (2002) supposed that “CAMEL rating has become a concise and indispensable tool for examiners and regulators”. However, according to Hirtle, Beverly and Lopez (1999), CAMEL rating system is too confidential to be public; only relevant senior management or supervisory of bank can get the details of bank’s CAMEL rating.

CAMEL system is assessing bank strength as criteria below. It measures the safety, profitability and liquidity of banks as below:

- Safety is ability that banks can compensate every expense and meet all of their obligations. These criterions were measure through capital adequacy, asset quality and management.

- Profitability is ability that whether banks can gain an income ratio from owner' investment.

- Liquidity is ability that banks can meet all of the demand for capital as planned or unusual.

Paying attention to financial reports cannot provide full of information and financial analyst need to assess safety, profitability and liquidity of banks. Therefore, need to combine the CAMEL analysis with qualitative assessment of the bank to get the analyzed bank results effectively and precisely.

Each factor of bank is assigned a level score from one (best) to five (worst) by bank supervisory. If the average scores of banks lower than two, those banks are assigned a high quality credit institution. Besides that, if the banks have the average scores greater than three, those banks are considered as unsafe and unsound credit institution.

CAMEL as a tool of performance evaluation for banking institutions includes 5 criteria as below:

- Capital adequacy (Equity/Assets): Mitchell (1984) confirm that withdraw the deposit with a large amount of money suddenly is a major risk of capital adequacy; hence, the capital adequacy is included in capital-deposit ratio.

- Asset quality (Loans/Assets): According to Sundarajan and Errico (2002), this term is valued under the set of criteria such as "risk assets, the volume of marginal and inferior assets, bank growth experience, plans, and prospects; and the strength of

management in relation to all the above factors".

- Management: Sundarajan and Errico (2002) stated that management included in CAMEL is assessed based on some criterias such as "technical competence, leadership, and administrative ability". Furthermore, under banking regulations and rulers, it is the ability to control and adapt with every circumstance if there is any change and ready to meet any essential needs of the society.

- Earning: Uniform Financial Institutions Rating System (1997) confirm that earning ability rating indicate "quantity and trend in earning"; besides that "the sustainability of earning" also might be affected by this rating.

- Liquidity, profitability and funding: Duttweiler (2009) affirmed that the liquidity is bank's ability to meet all of its obligations. According to Uniform Financial Institutions Rating System (1997), there should be maintain the liquidity's degree that significant enough to meet its entire financial obligation timely and can get the minimum value of loss when liquidating assets.

Among them, capital adequacy, asset quality, and liquidity are the three most important factors. However, the important factor in rating is found to be profitability (measured by return on equity) (Öğüt, Doğanay, Ceylan and Aktaş, 2012). Moreover, “financial ratios constructed on the basic of accounting data and reflecting the quality of assets, as well as the bank's profitability and liquidity, are the key predictors” (Hammer, Kogan and Lejeune, 2012). In the same way, Poon, Firth and Fung (1999) recognized profitability is one of the key variables beside assets management and risk measures.

Therefore, in this research, capital adequacy, asset quality and profitability were choose as financial factors that supposed to be impact strongly to credit rating of

banks. Furthermore, in order to carry out data analysis, financial analysts need important financial indicators that reflect above criteria (capital adequacy, asset quality and profitability) were presented as below figure 2-1:

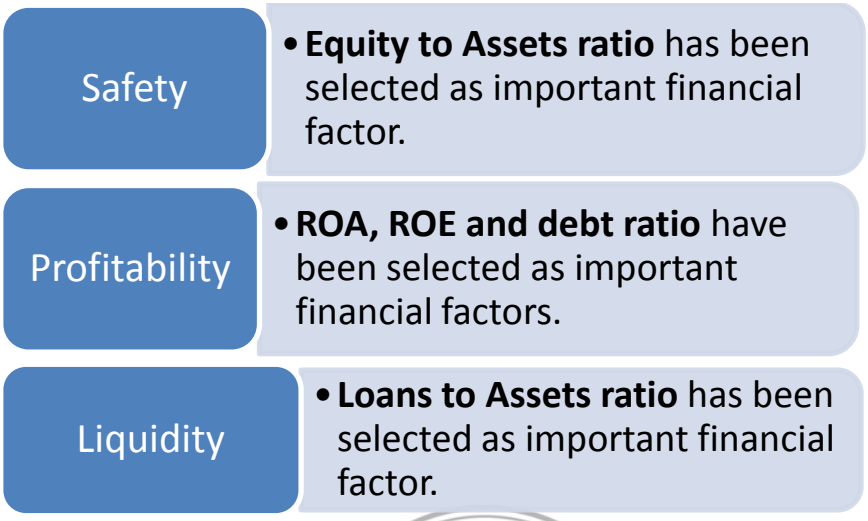

Figure 2-1. Financial Factors in The Study

Most of these financial variables have been also selected by De Laurentis, Maino and Molteni (2010) to do the analysis and develop the credit rating system of financial institutions.

2.2 Credit Rating

2.2.1 Objective and Effects

Banks are financial institution in charge of credit activities such as: lending money, investment, controls bank accounts, etc. At the aim of attracting potential investor, banks need to improve their credit rating that investor consider as the most important factor to make their investment decision. Credit rating is an effective way to indicate the soundness as well as the credit risk of banks. In Vietnam, credit rating systems has not developed strongly. Vietnamese banks as well as other banks in the world have been assessed by the most famous credit rating agencies in the word who are Moody's, Standard and Poor (S&P) and Fitch.

Credit rating is a common index that shows the credit worthiness, investment risk and financial strength of banks (Chen, 2012). Furthermore, based on the credit rating of banks, the investors will have an overview of banks' ability to meet their financial obligation. According to Chen (2012), the credit rating process and set of their financial variables are both complicated and take time; hence, it is very difficult for banks to manipulate the scale of credit rating. As a result, credit rating normally assesses the soundness of bank precisely.

Credit rating agencies' objectives is to help investors measure accurately the risk involved in operations of the financial institution they rate. Kisgen (2006) suggested that credit rating agencies act as "information gathering agencies", "screening agents" or "information processing agencies" that is professional in gathering and evaluating financial information. Through data processing, these rating agencies assess a lot of financial variables in order to determine the best set's financial factor that predicts bank's credit rating most accurately. Then, based on these results, banks will have information fully to establish adequate strategies at the aim of improving their credit rating dramatically in the bank industry.

2.2.2 CREDIT RATING PROCESS

Despite of different objectives among credit rating agencies, the process of making rating is quite alike that is presented in Figure 2-2.

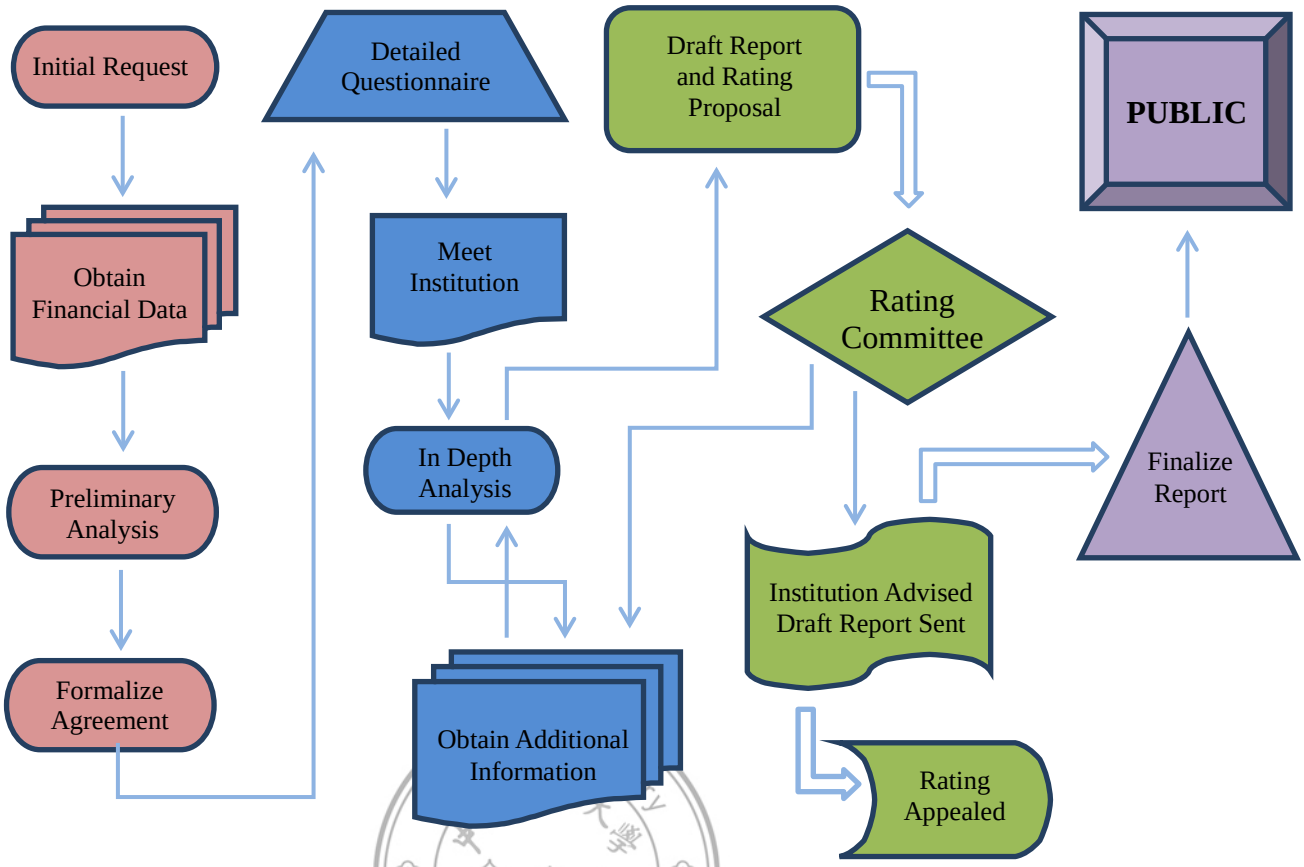

Figure 2-2. Credit Rating Process of Rating Agencies

Source: ("Rating Process | Capital Intelligence (CI) | Credit Analysis & Ratings,")

It is credit rating process applied in Capital Intelligence that is one of the most famous rating agencies in the world, besides Fitch, S&P, and Moody's. Generally, rating steps and process is quite the same among them. In the study, we used this process as the rating common sample for 3 rating agencies such as: Fitch, S&P, and Moody's.

Credit rating agencies have common standard for process of rating and the rating committees' opinion. The process in Figure 2-2 is described in detail as below:

1. Initial request: at the beginning of this process, rating agencies have received rating request from credit institutions in order to classified and assess their credit risk.

2. Obtain financial data: first step of process is obtaining financial data that play an important role in releasing credit rating level. All of financial information related to credit institutions' strength should be collected and calculated for supporting the results. The financial data has been collected from all available sources; including financial statements, information and indexes in the stock market and financial market.

3. Preliminary analysis: after receiving request, rating agencies will send a comprehensive questionnaire to credit institutions that assented to attend a rating process. For credit entities did not participated in rating process, rating agencies need to find financial information in publicly available sources. The primary analyst who release rating result for particular credit entity, have to in charge of conducting the analysis process and presenting all related issued to the rating committee. After the rating assigned, the primary analyst also must responsible for supervising development of rated credit entity. This person needs to ensure that he or she does not have any related purpose or interest with the rated credit entity. If not, he or she does not a right to do analysis, attend any rating committee meeting or vote any related issues.

4. Formalize agreement: the issuer signs the detailed rating agreement and provides initial information as well as rating fees. The conditions, policies and regulations related to the purpose of using rating, of withdrawal, cancellation, and any possible situations for rating activities are clearly communicated.

5. Detailed questionnaire: after every regulation, condition and policy are clear, the rating agencies send a detailed questionnaire to credit entities that agreed to participate in rating process. It is a very important step because the questionnaire must be designed at the aim of obtaining valuable financial information as much as possible.

Therefore, it is easier for rating agencies to get the most precise rating.

6. Meet institution: after getting information of rated entity from detailed questionnaire, the primary analyst generally arranged a meeting with rated entity's board of directors in order to investigate and have an understanding of the entity's operations, activities and strategies. Through this meeting, they also discuss the important factors may affect the rating of entity.

7. In depth analysis: based on background of operation, strategies, activities and financial information, the primary analyst did analysis deeply. He or she need to consider all of relevant information, group and classify data and then, do analysis using some methods.

8. Obtain additional information: finishing analysis process, the primary analyst obtained additional information.

9. In depth analysis: this is the second time the primary analyst has done analysis. This time, he or she used the additional information instead of primary information in the first analysis. All of necessary and relevant information, included qualitative and quantitative factors should be analyzed deeply in order to get the significant results. It is the key step to assign the rating.

10. Draft report and rating proposal: after finish two times analysis, rating agencies got the initial rating. Then, they made the draft report and rating proposal that will be discussed and reviewed to release the last significant results.

11. Rating committee: draft report and rating proposal has been sent to rating committee and examined by them. This report is reviewed internally for analytical consistency and accurate usage of figures and subsequently amended where necessary. All of rating actions, including upgrades, downgrades, rating affirmations and

changes in outlook that would be determined by rating committees and never by an individual analyst. Rating committees are consisted of rating analysts who have insight knowledge and rich experience in rating field; and therefore are able to give the meaning recommendation about rating issues. During the meeting time of rating committee, the primary analyst made a presentation to provide knowledge fully as well as specifically about credit rating situation of rated credit entity. After that, some discussion may be occurred around his or her presentation. Then, a vote is taken on the proposed rating. In the case of a tie, the chairman of the rating committee may exercise an additional casting vote. If there is necessary for getting more information to have a last decision, the rating committee will be postponed until the primary analyst has full of required and relevant information. When the rating has been consistently confirmed, the chairman of the rating committee announces the rating proposal.

12. Institution advised draft report sent: the rated credit entity was sent a draft of the rating report in order to give the comment back and correct where necessary. This work is generally taken several days. Concurrently, the primary analyst prepares a credit rating announcement which is drawn from the credit rating report. The rated credit entity is sent a copy of this announcement.

13. Rating appealed: the rated credit entity can appeal the rating committee's rating decision before it is published. However, the appeal action is limited in time. If the primary analyst and chairman of committee recognize any information has been missed, incorrect or misinterpreted, the rating committee will be organized again to discuss more. After that, original decision may be kept or replaced by the new rating decision.

14. Finalize report: report will be finalized after every appeal, changes, meeting of rating committee in order to get the consistent agreed about rating.

15. Public: release rating of the rated credit entity publicly.

Furthermore, after publishing the rating, rating agencies still have to do some steps as following:

16. Monitoring and Updating Ratings: monitors rated entity in order to ensure that they continue to provide a reliable opinion of rated entity's creditworthiness. The primary analyst, who is responsible for doing analysis and releasing the initial credit rating report, is also in charge of maintaining regular supervision the rated entity.

Primary analysts are expected to review the financial statements of rated entities within their portfolio on a regular basis. He or she may initiate a rating review whenever they recognize some factors that can affect or change credit quality of the rated entity. He or she can also discuss with senior management of the rated entity. If any rating action is required to do, a rating committee may be summoned.

All of published credit rating must be reviewed and examined periodic every 12 months. As part of the review process, the primary analyst meets senior management to discuss the entity's situation in the previous year and mission of entity in the short to medium term. The primary analyst needs to prepare an updated credit rating report and make his or her presentation that provides recommendation to the rating committee.

When the rating committee agreed a rating action, they will provide a draft credit rating report and an advance copy of the credit rating announcement to the rated entity. The rated entity may appeal any decision to change the rating.

17. Suspending and withdrawing ratings: rating agencies suspend a credit rating when

the information provided by the rated entity is not fully reliable.

A credit rating may be withdrawn in case the rated entity does not want to declare publicly its information that is a material or necessary factors in order to get a credible assessment of its credit quality.

2.2.3 Credit Rating Determinants

In bank credit rating, credibility is supposed to be ability to meet their financial obligation. Through credit rating indicators, investor can check the credit risk as well as bank' financial strength. External credit ratings by rating agencies can measures risk wholly because they combine all of the related and relevant risk factors. Initial assessment of this work generally used financial ratios or indexes to explain and predict ratings and its change. As an example, by combining six financial variables, Moody's ratings and S&P ratings was predicted by the model of Horrigan (1966) with approximately accuracy in turn are 58% and 52%.

Besides financial indicators or indexes, additional market information such as bond market value that used as the explanatory variable by West (1970), therefore enhanced the prediction accuracy of Moody' rating from 58% to 62%. Furthermore, according to Pinches and Mingo (1973,1975) and Altman and Katz (1976), approximately two-third of ratings can be predicted based on a small number of financial statistics. The same results were also demonstrated by Pogue and Soldofsky (1969), Kaplan and Urwitz (1979), Cluff and Farnham (1984), and Ederington (1985).

In addition, Blume, Lim and Mackinlay (1998) indicated that accounting ratios and market risk data were a important determinants of larger entities' ratings. Estrella (2000) denoted that there is a strong connection between capital ratios and external debt rating, and so, balance sheet and size data could replicate a part of the

debt rating from S&P. Tabakis and Vinci (2002) examined ratings of 67 European banks from Moody's, Fitch, and S&P and observed that their ratings assigned based on balance sheet information, the country of incorporation, and the bank's specialization. Moreover, the relationship between corporate governance and the debt rating as well as the financing cost of the debt issued was investigated in some studies such as Sengupta (1998), Bhojraj and Sengupta (2003), Bradley, Chen, Dallas and Snyderwine (2008).

Many methodologies and Liner regression (Horrigan, 1966 and West, 1970) has been improved year by year in order to analyze the external rating process. Other methodologies such as linear discriminant analysis was examined by Pinches and Mingo (1973, 1975), logit and probit by Altman and Katz (1976), and Jackson and Boyd (1988); ordered logit and ordered probit by Kamstra, Kennedy and Suan (2001), Altman and Rijken (2004), Amato and Furfine (2004), Alejandro and Analia (2008), and Bellotti, Matousek and Stewart (2011b), artificial intelligence techniques by Dutta and Shekhar (1988), Surkan and Singleton (1990), Kim, Eeistroffer and Redmond (1993), and Kwon, Han, and Lee (1997). Kim (2005), Huang, Chen, Hsu and Wu (2004) and Lee (2007) argued that artificial intelligence techniques (particularly neural networks and support vector machines) do not provide superior predictions of bond ratings compared with standard ordered-choice methods.

Many methodologies have been developed in recent years which analyze the external rating process such as linear regression (Horrigan, 1966 and West, 1970), linear discriminant analysis (Pinches and Mingo, 1973, 1975), logit and probit (Altman and Katz, 1976; Jackson and Boyd, 1988) ordered logit and ordered probit (Kamstra, Kennedy and Suan, 2001; Altman and Rijken, 2004; Amato and Furfine,

2004; Alejandro an Analia, 2008; Bellotti, Matousek and Stewart, 2011b), artificial intelligence techniques (Dutta and Shekhar, 1988; Surkan and Singleton, 1990; Kim, Eeistroffer and Redmond, 1993; Kwon, Han and Lee, 1997). Kim (2005), Huang, Chen, Hsu and Wu (2004) and Lee (2007) show that artificial intelligence techniques (particularly neural networks and support vector machines) do not provide superior predictions of bond ratings compared with standard ordered-choice methods.

2.2.4 Credit Rating Change

Analysis of credit rating has a long pedigree and its objectives is assessing the relationship between rating and financial as well as business risk (Pogue and Soldofsky, 1969; Pinches and Mingo, 1973; Kaplan and Urwitz, 1979). Many prior researches did the samples to measure credit rating behavior over time such as Amato and Furfine (2004) and Blume, Lim and Mackinlay (1998) which document stated that credit ratings, on average, become worse over time. Similarly, Blume, Lim and Mackinlay (1998) argued that standards and criteria of rating agencies have become more strictly through time. On the other hand, Amato and Furfine (2004) pointed out the contrasted opinion that there is no secular change in standards of rating agencies. In detail, they observed that these standards have been more facile over time. Now, the discussion and argument about this issue is still going on.

Actually, rating changes frequently is not good for investors. According to Amato and Furfine (2004), rating agencies confirmed that their rating is stable through time and independent of the state of the business cycle. Furthermore, rating reversals are seldom even at year horizon. In fact, rating agencies normally do not want to revise their ratings, especially downward, on a timely basis.

2.3. Relationship between Financial Factors and Credit Rating

Financial ratios are important tools used by a company's management to make financial decisions. The ratios are made up of simple fractional division. The numbers used in the fraction can be the entity's total assets or its total equity among other possible items. The resulting quotient is used to track a company's performance over time and to make assessment's about the entity's success and performance in the area that the ratio measures.

Kick and Koetter (2007) select a set of financial ratios to predict the credit risk level of German banks. They demonstrate that the various levels/categories of bank credit risk have different sensitivities to predictors, and reject the use of binary or ordered logit regression models to assess the bank distress level. Regardless of the type (i.e., statistical, machine learning) of model, it appears that financial ratios constructed on the basis of accounting data and reflecting the quality of the assets, as well as the bank's profitability and liquidity, are the key predictors. Using variables describing a bank's financial position and the credit risk rating of the country where a bank operates, Bellotti, Matousek and Stewart (2011b) show that ordered logit and probit outperform support vector machine regression in predicting the rating of a bank. We refer the reader to Ravi Kumar and Ravi (2007) and the references therein for a detailed review of models derived with the goal of evaluating the financial strength of banks and the risk for a bank to go bankrupt.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Conceptual Framework

The conceptual model of this study has been created to examine the effect of important financial factors that are debt ratio, return on total asset (ROA), return on equity (ROE), equity to asset ratio and loans to asset ratio have on credit rating level of rating agencies. These financial indexes and ratios were assigned as input variables in the research. Similarly, output variable is credit rating. This research has used DEA method to analysis these input and output variables. In this study, CCR-I model has been used. There are several types of DEA with the most basic being CCR based on Charnes, Cooper and Rhodes (1978).

The main purpose of this study is to determine the performance benchmarking of Vietnamese banks by examine financial indexes and ratios. Therefore, DEA was used as a non-parametric programming technique for ranking Vietnamese banks. DEA identified a set of corresponding efficient units that can be utilized as benchmarks for improvement. Consequently, inefficient Vietnamese banks can make any necessary adjustment to improve their rating; and establish strategy planning in the future.

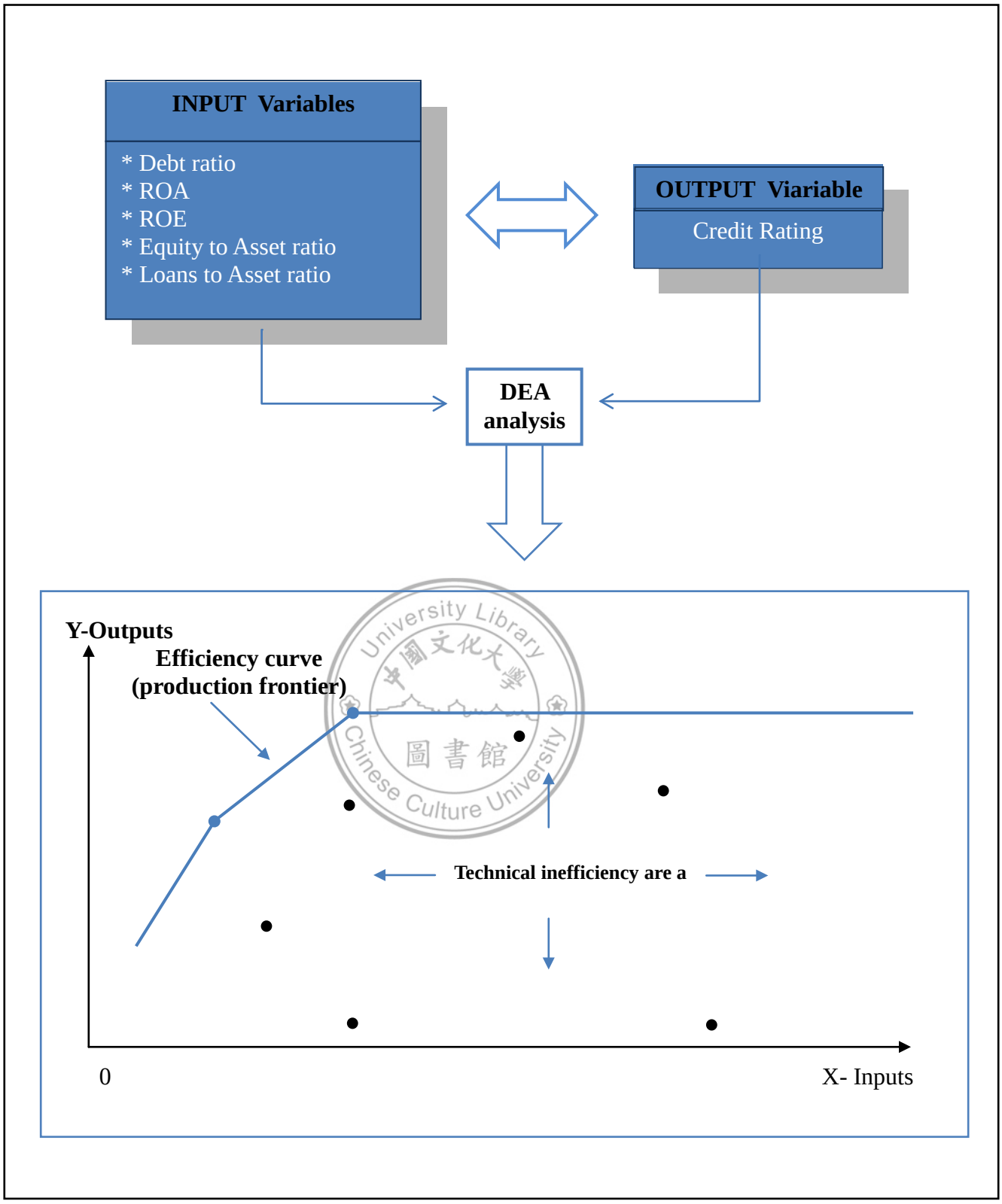

Figure 3-1. The Research Conceptual Framework

prescribe any reengineering strategies to make inefficient units efficient. Such

improvement strategies must be studied and implemented by managers by understanding the operations of the efficient units. DEA also allows for computing the necessary improvements required in the inefficient unit's inputs and outputs to make it efficient.

However, kindly perceive that DEA is primarily a evaluating tool and does not provide any mandatory adjustment to make inefficient units become effective. Any adjustment or reengineering strategies need to be considered and implemented by managers who have profound knowledge about the operation of company. Based on the purpose and structure of this study, a research conceptual framework is developed shown in Figure 3-1.

3.2. Research Design

The purpose of this study is examining the effects of different levels of financial factors on credit rating of Vietnamese banks in the amount of time from 2007 – 2009 and then in order to provide recommendations on how to improve credit rating of Vietnamese banks. Because of this purpose, data envelopment analysis (DEA) method has been used to assess the performance of Vietnamese banks from 2009 to 2011. DEA is a nonparametric method has been applied to measure technical efficiency. The technical efficiency looks at the level of inputs or outputs. In running DEA in this research, we chose the set of financial indicators as input variables and 1 output variable namely credit rating to run analysis year by year in turn.

Units in DEA model can be divided into efficient and inefficient. The model will show the target value of input and output which lead to efficiency for every inefficient units. The most basic type of DEA is CCR model (Charnes, Cooper and

Rhodes, 1978) that was applied to do analysis in this study. In order to determine the efficiency score of each unit, these will be compared with a peer group consisting of a linear combination of efficient DMUs.

3.3. DEA Model for Banks' Creditworthiness

In this study, Vietnamese banks have been assessed step by step that presented in Figure 3-2. It consists of five stages. Firstly, we need to gather all of relevant information from banks' financial statement and other reliable sources. Secondly, we choose financial indicators and their measurement scales from that huge of data. During the choosing process, it is very necessary to review and refer to many prior related papers as well as study in order to determine which factor and information is important. This process is very time-consuming that required implementing carefully because more valuable data, more significant finding. These databases have to derive from reliable sources such as financial statement, famous rating agencies and Bankscope.

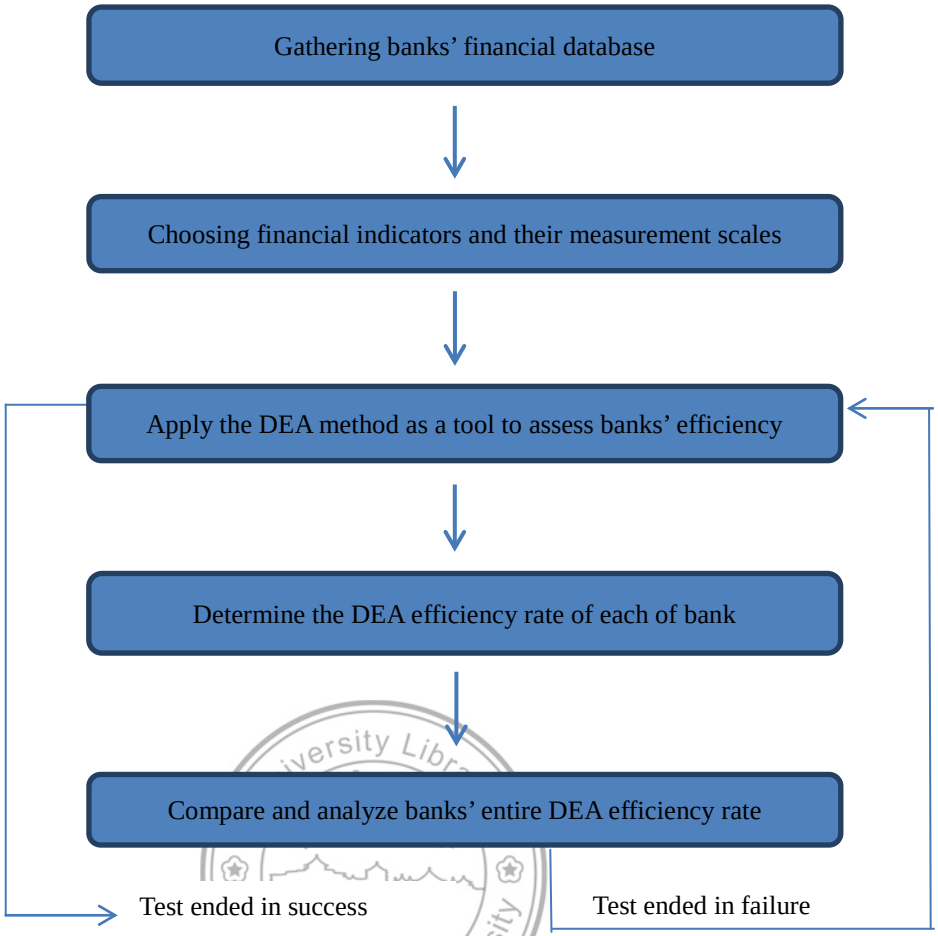

Figure 3-2. The Method of Assessing Strength of Banks by The DEA Method

After all of necessary information has been collected in groups according to period of time from 2009 to 2011, DEA was applying to do analysis. Database has been divided into sets of input and output variables that are indispensable in analysis process by using DEA. Once this process was finished successfully, we got the efficiency rate of each of bank. Otherwise, when this process was failed, analysis process needs to be implemented again until the significant results have been provided. Finally, banks' entire DEA efficiency rate has been compared and analyzed in order to find out performance benchmarking of Vietnamese banks from 2009 to 2011. After that, we had a comparison among Vietnamese banks and the result

primarily provided appropriate adjustment and benchmarking for inefficiency Vietnamese bank in order to improve their rating in the future.

3.4 Data Selection

3.4.1 CRITERIA

Vietnam has many commercial banks that are on the way to develop and contribute greatly in national economic. However, most of them are not a very strong banks and do not have a full of financial indicators. Consequently, it is very difficult to select and gather a set of adequate and reliable database of Vietnamese banks. Financial indicators and related index in this study were collected mostly from Bankscope and Moody's website according to the following criteria:

1. Financial indicators: banks have financial indicators publicly trade: to get financial indicators clearly and adequately, we must choose Vietnamese banks that issue their annual financial reports publicly. Many financial indexes and factors are presented in financial statements, especially annual financial reports. However, pay attention that financial reports cannot provide full of information that financial analyst need to assess strength of banks. Therefore, need to combine the CAMEL analysis with qualitative assessment of the bank to get the analyzed bank results effectively and precisely. CAMEL assessing system is a system to measure strength status of credit institution. This system was created by NCUA (National Credit Union Administration) and used by not only USA but also other countries in the world.

2. Credit rating data: banks have credit ratings that were defined by credit rating agencies: most of Vietnamese banks have their financial statement publicly but only a few of them has credit rating from famous credit rating agencies. In this research, only credit ratings were issued by 3 credit rating agencies: Moody's, Fitch, and

Standard and Poor were used and analyzed. They are stable and reliable to support a practical assessment scale; and consequently provide an adequate result.

3. Criteria to exclude: banks with full of necessary financial information during our sample period from 2009 to 2011. Some Vietnamese banks do not have credit rating during this time are not included in the study. Finally, there are 21 Vietnamese banks meet above these requirements.

3.4.2 Final Database

Firstly, Table 3-1 provides an overview of database that pointed out set of Vietnamese banks included in this study. There are 5 Vietnamese banks in 2009, 7 banks in 2010 and 9 banks in 2011.

Table 3-1. Sample of Vietnamese Banks from 2009 to 2011

Year	No.	Name of Bank	Abbreviation Name
2009	01	VN Bank for Agriculture & Rural Development	Agribank
	02	Bank for Investment & Development of VN	BIDV
	03	VN Technological & Commercial Joint-Stock Bank	Techcombank
	04	Asia Commercial Joint-Stock Bank	ACB
	05	VN International Bank	VIB
2010	01	Bank for Investment & Development of VN	BIDV
	02	Joint Stock Commercial Bank for Foreign Trade of VN	Vietcombank
	03	Military Commercial Joint Stock Bank	MB
	04	VN Technological & Commercial Joint-Stock Bank	Techcombank
	05	Asia Commercial Joint-Stock Bank	ACB
	06	Saigon-Hanoi Commercial Joint Stock Bank	SHB
	07	VN International Bank	VIB
2011	01	VN Joint-Stock Commercial Bank for Industry & Trade	Vietinbank
	02	Bank for Investment & Development of VN	BIDV
	03	Joint Stock Commercial Bank for Foreign Trade of VN	Vietcombank
	04	Saigon-Thuong Tin Commercial Joint-Stock Bank	Sacombank
	05	Military Commercial Joint Stock Bank	MB
	06	VN Technological & Commercial Joint-Stock	Techcombank

		Bank	
	07	VN International Commercial Joint-Stock Bank	VIB
	08	Asia Commercial Joint-Stock Bank	ACB
	09	Saigon-Hanoi Commercial Joint Stock Bank	SHB

Furthermore, table 3-2 presented the definition of input and output variables that have been used in the research. This table also provides their formula correspondingly. As shown in the table, there are 5 input variables that debt ratio, return on total asset, return on equity, equity to asset ratio and loans to asset ratio. Besides that, there is only 1 output variable namely credit rating that has been assigned by rating agencies based on a lot of financial information.

Table 3-2. Inputs and Output Variables

	Name	Formula
Inputs	Debt ratio	$Debt\ Ratio = \frac{Total\ Debt}{Total\ Assets}$
	ROA	$ROA = \frac{Net\ Income}{Total\ Assets}$
	ROE	$ROE = \frac{Net\ Income}{Shareholder's\ Equity}$
	Equity to Asset ratio	$Shareholder\ Equity\ Ratio = \frac{Total\ Shareholder\ Equity}{Total\ Assets}$
	Loans to Asset ratio	$Loans\ to\ Assets\ ratio = \frac{Loans}{Total\ Assets}$
Output	Credit rating	Defined by Credit Rating Agencies based on above financial factors mostly.

3.5 Definition of Variables

3.5.1 DEBT RATIO

Debt Ratio is a financial ratio that indicates the percentage of a company's assets that are provided via debt. It is also point out the status of potential risks that the credit institution may face in term of its debt-load. If this ratio greater than 1, that

means this organizations has assets less than debt and so have much credit risk. Besides that, the organization has less risk if their debt ratio lowers than 1. Hence, investors can use debt ratio to assess organization's level of risk.

When the organizations have the lower debt ratio, it can avoid the difficulties such as heavy interest and principal repayment burden. Meanwhile, the financial organization chooses to use its assets without any debt will miss the tax reduction effect of interest payments. Therefore, organizations need to consider both of above issues to have decision to make debt ratio adequately.

Debt ratio is calculated by dividing the company's total debt by its total assets as below:

$$Debt\ Ratio = \frac{Total\ Debt}{Total\ Assets}$$

To measure the financial risk, credit rating agency Fitch has used some financial indicators such as cash flow, coverage ratio and leverage. "The first measure is leverage defined as total debt over total assets" that is debt ratio. (Mizen and Tsoukas, 2008). This ratio indicates the overall indebtness of the company. Higher ratio, higher risk that company may face. Therefore, it is an important factor in assessing credit rating of banks.

3.5.2 ROA

The return on assets (ROA) percentage shows how profitable a company's assets are in generating revenue. ROA is calculated by company's net income over its total assets as below:

$$ROA = \frac{Net\ Income}{Total\ Assets}$$

Sometimes this index is called "return on investment". This index indicates

how the company using and control its assets to make profit. It was used to compare level of the effective among companies in the same industry. This will indicate "the capital intensity of the company". Companies have small assets and need a large initial investment will hold a low ROA index. Majorities of banks' assets have a value is close to their actual market value and so, ROA has been known such as a common index to assess performance of banks. For this reason also, this indicator cannot be used to compare the companies in the different industries or between industries.

The higher the ROA, the more profit company get and vice versa, the lower the ROA index, the less profit companies get. Because the high ROA indexes show that company has ability to make much money based on little assets. The bank managements need to be wise to make a right decision in allocating banks assets. Anybody can make a profit by using a ton of money at an issue, but very few people good at earning a lot of money from little investment.

Investors should also pay attention to the interest rate that the company must pay for the loans. It is not a good sign if a company does not earn more than the amount money that spent on investment activities. Conversely, if company has the high ROA index, it means that the company gains a large profit.

3.5.3 ROE

Return on equity (ROE) measures the rate of return on the ownership interest (shareholders' equity) of the common stock owners. Meanwhile ROA measure the company's ability to make profit from its assets, ROE also measure its ability from shareholders' equity that is calculated by net assets or assets minus liabilities. ROE figure indicate how well a company makes a profit from its investment funds. Levels of ROE from 15% to 20% are considered as good enough indexes.

ROE is equal to the company's net income divided by total shareholder's equity as below:

$$ROE = \frac{Net\ Income}{Shareholder's\ Equity}$$

This figure also known as "return on net worth" (RONW). Similar to ROA or some others financial ratios, ROE is best used to compare companies in the same industry because there are much difference indicators among difference industries and so, difficult to compare them.

This index is a good indicator that helps investors measure the quality of their investment. It is also considered as one of the most important index in investing business. Generally to say, the higher ROE company has, the higher company's ability of making profit internally. And so, the lower ROE index shows the lower company's ability to generate profit.

Warren Buffett is one of the most successful investors in the world. He pointed out that it is easy to get higher earning each year. However, the investors need to consider ROE index to choose the best suitable company for their investment.

If a company has no liabilities, the ROA and ROE figures will be the same because total equity is equal by total assets minus total liabilities.

While ROA was selected as important financial variable because it reflects profitability (Shen, Huang and Hasan, 2012), ROE has been selected as the key variable measured the same factor – profitability (Öğüt et al., 2012).

3.5.4 Equity to Assets Ratio

The equity to assets ratio has been defined as a financial ratio that indicates the relative proportion of equity used to finance a company's assets. This ratio also used

to determine how much shareholders will receive in case the company is liquidated totally. It is equal by total shareholder equity over total assets as below:

$$Shareholder\ Equity\ Ratio\ = \frac{Total\ Shareholder\ Equity}{Total\ Assets}$$

The investor can get the numerical of the company's equity and assets from its annual balance sheets or financial reports to calculate this ratio. Equity is the amount of the company that the shareholders own and is equal by total assets minus total liabilities.

For making the right choices, investors need to examine the company's financial ratios. It is supposed to be an excellent starting point. Among of financial ratios, equity ratio provides most of fully assessment about financial health of credit institutions, namely banks. The bank's solvency is known as ability to meet its financial needs in the long time can be assessed through this ratio. The higher this ratio, the less of the company is owned by the creditors and vice versa. If the companies has this ratio too low, that means they are at risk and these companies mostly owned by someone else. And so, it is difficult for them to borrow capital or attract investment sources.

Equity to assets ratio has been selected as the financial variable to reflect financial factor – asset quality (Hammer, 2012). It was also considers as one of the most potential predictors of credit institutions such as banks.

3.5.5 Loans to Assets Ratio

The loan to assets ratio has been known as the financial ratio presented as percentage that measure the relation of the company's total loan outstanding to the total assets. This ratio is often applied for credit institutions like banks.

This ratio is determined as follows:

$$Loans\ to\ Assets\ ratio\ = \frac{Loans}{Total\ Assets}$$

As mentioned before, the most typical and profitable services in banks are credit activities that including providing loans for their clients. It is supposed to be a main function of commercial banks and so, most of banks' assets is loans. Both of business clients and retail clients can borrow money from banks. However, which type or clients should be provided loans depends on the banks' strategies.

Loans are low liquid assets comparing with other financial assets. Consequently, if the bank has the high loans to assets ratio, it will be at risk. In addition, loans are the most profitable assets of the bank and so, bank has the high loans to assets ratio will have high net interest income. In other words, the high loans to assets ratio show that a bank is loaned up and it has a low liquidity. The higher the ratio, the more risky that a bank may face.

The same token with loan to assets ratio, loans to assets ratio was also selected as one of the essential financial variable that has impacted strongly to credit rating of credit institution, for example, banks (Hammer, 2012).

3.6 Data Analysis Procedure

At the aim of achieving the objective of this study and get the significant finding, the DEA method were employed to do analysis the sampling data. This procedure was conducted as following:

1. Review many prior researches and papers that related to this study in order to determine a relevant set of variables.

2. Calculate the financial ratios based on reliable financial information: all of input variables in this study are the financial indexes and ratios which have been calculated from other financial indicators. Because of so, calculating carefully to get the most

precise ratios is very important step to have fully variables.

3. Check the robustness of input and output variables by reviewing reliable sources such as financial statements, rating agencies' website and Bankscope.

4. Running DEA method, apply CCR model by using input and output variables. This step needs to do year by year separately.

5. Check the finding and then, make the conclusion.

This study applied only DEA methodology with its CCR model; because of so, data analysis procedure is not complicated to implement. However, the first and second steps are very time-consuming and need to be carrying out carefully. Because they are two key steps in analysis process. The less valuable of data, the less significant of the finding.

CHAPTER FOUR

EMPIRICAL RESULTS

This chapter presents the significant results of Vietnamese banks' efficiency during the period from 2009 to 2011 based on the database and their credit rating respectively. There are three groups of results corresponding with database in three years from 2009 to 2011. Hence, this chapter divided into three sections. Each section shows the comparison of performance among five, seven, and nine Vietnamese banks according to their credit rating in three years respectively.

4.1 Vietnamese Banks' Efficiency in 2009

4.1.1 GROUP OF SAMPLE IN 2009

There are five Vietnamese banks in 2009 which are presented as table 4-1.

Table 4-1. Sample of Vietnamese Banks in 2009

No.	Full Name of Bank	Abbreviation Name	Type
01	VN Bank for Agriculture & Rural Development	Agribank	The largest joint-stock commercial bank
02	Bank for Investment & Development of VN	BIDV	joint-stock commercial bank
03	VN Technological & Commercial Joint-Stock Bank	Techcombank	joint-stock commercial bank
04	Asia Commercial Joint-Stock Bank	ACB	joint-stock commercial bank
05	VN International Bank	VIB	joint-stock commercial bank

- VN Bank for Agriculture & Rural Development (Agribank): among five Vietnamese banks, VN Bank for Agriculture & Rural Development (Agribank) is known to be the biggest joint-stock commercial bank in terms of assets, capital, networks, staff and

customer base. Until 30/11/2012, Agribank has total assets of over 560,000 billion, total capital reached on 513 000 billion, total loans of over 477,000 billion economy. As commercial banks play a key role in capital investment in agriculture and rural areas, Agribank always spend 70% of the total outstanding investment in this area based on website of Bao Dat Viet ("BAODATVIET.VN | Agribank – Top 10 doanh nghiệp lớn nhất Việt Nam năm 2012," n.d.). Hence, it should be the most efficiency bank in 2009 and the detailed index and analysis of its will be mentioned later in this chapter.

- Bank for Investment & Development of VN (BIDV): is the second largest commercial bank by the total volume of assets in and is Vietnam's fourth-largest by UNDP report in 2007, as well as is the best bank at revenue. It is a kind of special state enterprise which has been organized by the State Corporation and has business cooperation with more than 800 banks in the world.

- VN Technological & Commercial Joint-Stock Bank (Techcombank): is one of the major joint-stock commercial banks in Vietnam, was established in 1993 with initial capital of 20 billion VND ("Trang chủ :: Cổng thông tin doanh nghiệp," n.d.). Through 19 years of continuous development, Techcombank has gained much success and became a major bank in Vietnam, with a capital of 6932 billion DVN. It is a member of: Vietnam Banking Association, Asian Bankers Association, Global payment organizations Swift, International card organizations Visa, and International card organizations MasterCard.

- Asia Commercial Joint-Stock Bank (ACB): officially went into business after June 4, 1993. It consists of 280 branches and transaction offices in the developing economic cities in Vietnam.

- VN International Bank (VIB): was established on September 18, 1996. After 15 years of operation, VIB has become one of the leading commercial banks in Vietnam with total assets of over 100 trillion VND, capital of 4,250 billion VND, equity reached 8,200 billion VND. VIB currently has 4,300 employees serving customers in 160 branches and transaction offices in 27 provinces/cities in the country. During the operation time, VIB was recognized as a reputed institutions with many honors and awards, such as the: reputed Vietnamese brand name, bank with the best retail services, excellent international bank payment, the bank has the best quality of customer service, ranking third of the 500 largest private enterprises in Vietnam in terms of revenue by VietnamNet newspaper voted.

4.1.2 SUMMARY OF INPUT AND OUTPUT VARIABLES

Table 4-2. Statistic on Input / Output Data in 2009

	Debt Ratio	ROA	ROE	Equity/Assets	Loans/Assets	Credit Rating
Max	0.9587	0.0224	0.2686	0.0790	0.7522	4
Min	0.9210	0.0042	0.0972	0.0413	0.3685	2
Average	0.9411	0.0123	0.1961	0.0588	0.5461	2.9
SD	0.0123	0.0062	0.0598	0.0123	0.1455	0.6633

Table 4-3. Correlation Between Variable in 2009

	Debt Ratio	ROA	ROE	Equity/Assets	Loans/Assets	Credit Rating
Debt Ratio	1	-0.9183	-0.9128	-1	0.5526	-0.1840
ROA	-0.9183	1	0.9440	0.9183	-0.7830	0.5306
ROE	-0.9128	0.9440	1	0.9128	-0.8136	0.5213
Equity/Assets	-1	0.9183	0.9128	1	-0.5526	0.1840
Loans/Assets	0.5526	-0.7830	-0.8136	-0.5526	1	-0.8608
Credit Rating	-0.1840	0.5306	0.5213	0.1840	-0.8608	1

4.1.3 RESULT OVERVIEW

Table 4-4. Result of Vietnamese Banks' Efficiency in 2009

No.	DMU I/O	Score Data	Projection	Difference	%
Agribank	1	1			
	Debt Ratio	0.9587	0.9587	0	0.00%
	ROA	0.0042	0.0042	0	0.00%
	ROE	0.0972	0.0972	0	0.00%
	Equity/Assets	0.0413	0.0413	0	0.00%
	Loans/Assets	0.7522	0.7522	0	0.00%
	Credit Rating	2.5	2.5	0	0.00%
BIDV	2	0.648346			
	Debt Ratio	0.9385	0.608473	-0.330027	-35.17%
	ROA	0.009	5.84E-03	-3.16E-03	-35.17%
	ROE	0.192	0.101892	-9.01E-02	-46.93%
	Equity/Assets	0.0615	3.15E-02	-3.00E-02	-48.78%
	Loans/Assets	0.681	0.379048	-0.301952	-44.34%
	Credit Rating	2	2	0	0.00%
Techcombank	3	0.765228			
	Debt Ratio	0.921	0.704775	-0.216225	-23.48%
	ROA	0.0224	0.012	-0.0104	-46.43%
	ROE	0.2686	0.1845	-0.0841	-31.31%
	Equity/Assets	0.079	0.045225	-0.033775	-42.75%
	Loans/Assets	0.4506	0.276375	-0.174225	-38.67%
	Credit Rating	3	3	0	0.00%
ACB	4	1			
	Debt Ratio	0.9397	0.9397	0	0.00%
	ROA	0.016	0.016	0	0.00%
	ROE	0.246	0.246	0	0.00%
	Equity/Assets	0.0603	0.0603	0	0.00%
	Loans/Assets	0.3685	0.3685	0	0.00%
	Credit Rating	4	4	0	0.00%
VIB	5	0.983848			
	Debt Ratio	0.9479	0.843182	-0.104718	-11.05%
	ROA	0.01	9.84E-03	-1.62E-04	-1.62%
	ROE	0.177	0.163425	-0.013575	-7.67%
	Equity/Assets	0.0521	4.66E-02	-5.53E-03	-10.61%
	Loans/Assets	0.4786	0.47087	-7.73E-03	-1.62%
	Credit Rating	3	3	0	0.00%

Numeric data in Table 4-4 showed that the most efficiency Vietnamese bank is

ACB and Agribank that has the coefficient 0% in all of financial ratio. These banks are the benchmarking of Vietnamese banks in 2009 among 5 above banks. It is also provide coefficient of other banks with the same financial objects in 2009. The different between coefficients of banks measure standard's level of banks compare with the most efficiency bank that are ACB and Agribank in 2009. The less gradient of coefficients, the less adjust bank's structure; and vice versa, the more gradient of coefficients, the more adjust bank's structure. Other banks need to consider the gradient of coefficient to restructure their system and consider ACB and Agribank as standard banks. The least efficiency bank in 2009 is Bank for Investment & Development of VN (BIDV). That means this bank has to adjust mostly.

4.1.4 ADJUSTMENT AND IMPROVEMENT

Table 4-5. Scores of Financial Indicators of Vietnamese Banks in 2009

DMU	Score	Debt Ratio	ROA	ROE	Equity/Assets	Loans/Assets
1	1	0	0	0	0	0
2	0.6483	0	0	2.26E-02	8.37E-03	6.25E-02
3	0.7652	0	5.14E-03	2.10E-02	0.0152	6.84E-02
4	1	0	0	0	0	0
5	0.9838	8.94E-02	0	1.07E-02	4.69E-03	0

Benchmarking in DEA method allows for the identification of targets for improvements. For every inefficient DMU, DEA identifies a set of corresponding efficient units that can be utilized as benchmarks for improvement. As mentioned before, any bank has coefficient equal to one is considered as benchmarking; that means these banks is efficient bank in this time. Among this group of data, there are two out of five banks which are the efficient banks. They are VN Bank for Agriculture & Rural Development (Agribank) and Asia Commercial Joint-Stock Bank (ACB) with scores at one and all other variables at zero. Looking at the table 4-3, all of three

remain banks have the coefficient less than one but greater than zero. Hence, they need to be improved their inputs base on benchmarking to get the best output. The different of coefficients show the ratio of adjustment or improvement. The large different, the much adjustment and vice versa; the small different, the less adjustment.

Assessing the scores, beside two banks has the score at one, VN International Bank (VIB) has the highest score and then VN Technological & Commercial Joint-Stock Bank (Techcombank) and Bank for Investment & Development of VN (BIDV) with the score in turn at 0.983848, 0.765228, 0.648346. Therefore, VIB has the least adjustment and BIDV has the most adjustment. Similarly, assessing coefficient of inputs to see how much each of bank has to promote. About the debt ratio, only VIB need to adjust coefficient from 0.0894 to 1. Techcombank need to do the adjustment about ROA from 0.0051 to 1. The next one is ROE, there are three banks (BIDV, Techcombank, VIB) need to improve with their coefficient in turn at 0.0225, 0.021, 0.01. In the same way, it is easy to clarify the rate of adjustment about Equity to Assests ratio and Loans to assets ratio with the scores at 0.0083, 0.0152, 0.0046 (BIDV, Techcombank, VIB) and 0.0624, 0.0684 (BIDV, Techcombank).

4.1.5 THE COMPARISON

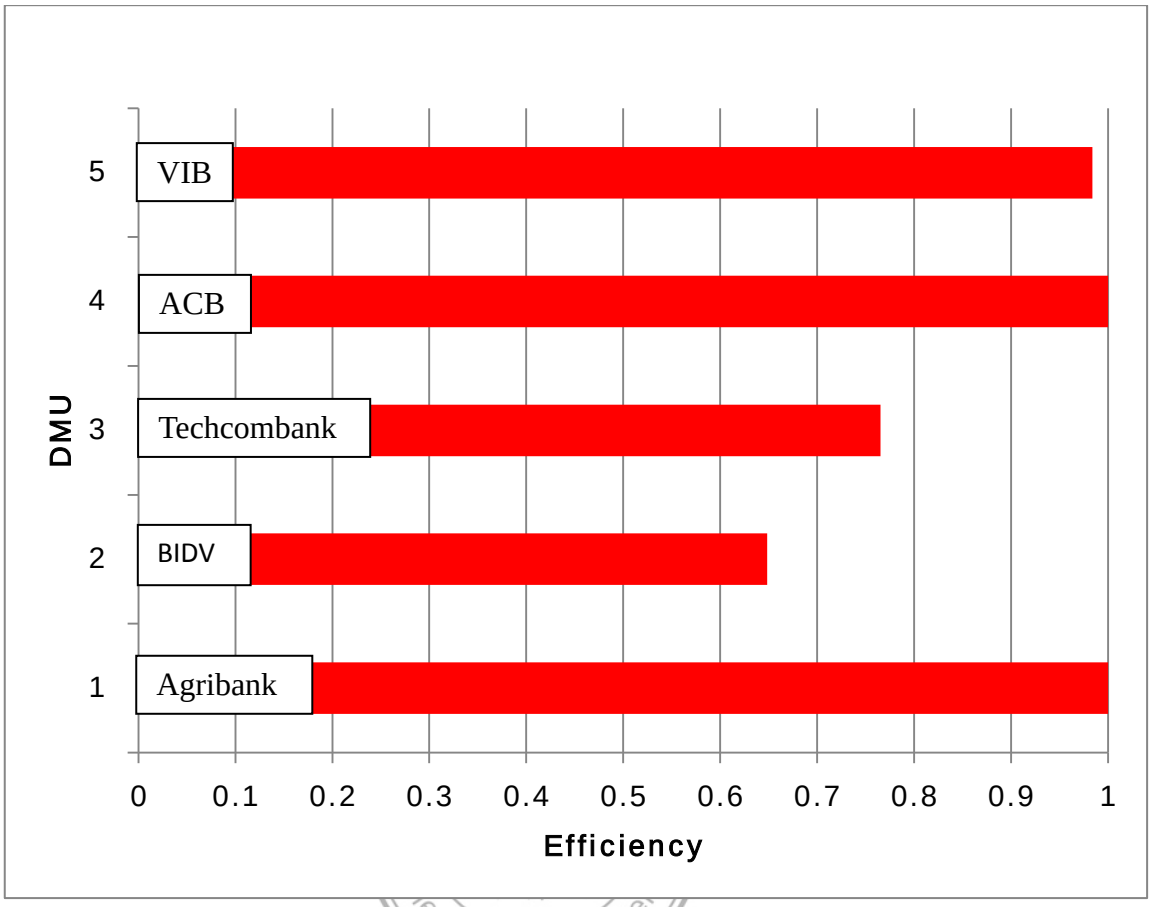

Figure 4-1. Ranking Results of Vietnamese Banks in 2009

This graph shows the comparison about efficiency of five Vietnamese banks. It is easy to recognize that the first one and the fourth one are the best bank in 2009 that are Agribank and ACB. And the next are VIB, Techcombank, BIDV. Among them, VIB is the closest bank with the benchmarking. BIDV and Techcombank have the quite big gap with the benchmark.

Table 4-6. Ranking and Scores of Vietnamese Banks in 2009

Rank	DMU	Score
1	ACB	1
1	Agribank	1
3	VIB	0.9838
4	Techcombank	0.7652
5	BIDV	0.6483

The table presented in detail about ranking of five Vietnamese banks with their score respectively. Accordingly, two best bank have the same score at 1 and three remain banks have the score in turn at 0.983848, 0.765228, 0.648346.

4.2. Vietnamese Banks' Efficiency in 2010

4.2.1 GROUP OF SAMPLE IN 2010

There are seven Vietnamese banks in 2009 which are presented as table 4-7.

Table 4-7. Sample of Vietnamese Banks in 2010

No.	Full Name of Bank	Abbreviation Name	Type
01	Bank for Investment & Development of VN	BIDV	joint-stock commercial bank
02	Joint Stock Commercial Bank for Foreign Trade of VN	Vietcombank	joint-stock commercial bank
03	Military Commercial Joint Stock Bank	MB	joint-stock commercial bank
04	VN Technological & Commercial Joint-Stock Bank	Techcombank	joint-stock commercial bank
05	Asia Commercial Joint-Stock Bank	ACB	joint-stock commercial bank
06	Saigon-Hanoi Commercial Joint Stock Bank	SHB	joint-stock commercial bank
07	VN International Bank	VIB	joint-stock commercial bank

- Joint Stock Commercial Bank for Foreign Trade of VN (Vietcombank): is the third largest bank (after Agribank and BIDV) and is a second largest joint stock commercial banks (after BIDV) by a total volume of assets. According to the UNDP report, Vietcombank is the sixth largest enterprises of Vietnam (after Agribank, VNPT, EVN, BIDV and VietsovPetro). It was established in 1963 as state-owned commercial banks. Previous name of this bank is the Bank for Foreign Trade of Vietnam. It is a member of: Vietnam Banking Association, Asian Bankers Association, Global payment organizations Swift, International card organizations Visa, International card

organizations MasterCard.

- Military Commercial Joint Stock Bank (MB): is joint-stock commercial bank, as well as an enterprise of the People's Army of Vietnam. The Bank's main shareholder is Vietcombank, Viettel and Corporation Flying Service of Vietnam. Currently, the Military Bank has a nationwide network of over 100 outlets. The Bank also has a branch in Laos.

- Saigon-Hanoi Commercial Joint Stock Bank (SHB): was established on 13, November, 1993. After 19 years of construction, development and growth, SHB constantly endeavor to bring to their customers banking services with the best quality and most professional service style. Its charter capital is approximately 9,000 billion VND ("Giới thiệu chung," n.d.).

4.2.2 SUMMARY OF INPUT AND OUTPUT VARIABLES

Table 4-8. Statistic on Input / Output Data in 2010

	Debt Ratio	ROA	ROE	Equity/Assets	Loans/Assets	Credit Rating
Max	0.9479	0.0190	0.2490	0.0889	0.6844	8
Min	0.9111	0.0090	0.1593	0.0521	0.3481	2
Average	0.9296	0.0135	0.1964	0.0703	0.4801	3.7142
SD	0.0112	0.0031	0.0312	0.0112	0.1013	1.8294

Table 4-9. Correlation Between Variables in 2010

	Debt Ratio	ROA	ROE	Equity/Assets	Loans/Assets	Credit Rating
Debt Ratio	1	-0.1679	0.3664	-1	-0.0832	0.1936
ROA	-0.1679	1	0.7915	0.1679	-0.6296	0.2457
ROE	0.3664	0.7915	1	-0.3664	-0.4406	0.4552
Equity/Assets	-1	0.1679	-0.3664	1	0.0832	-0.1936
Loans/Assets	-0.0832	-0.6296	-0.4406	0.0832	1	0.0917
Credit Rating	0.1936	0.2457	0.4552	-0.1936	0.0917	1

4.2.3 RESULT OVERVIEW

Table 4-10. Result of Vietnamese Banks' Efficiency in 2010

No.	DMU I/O	Score Data	Projection	Difference	%
BIDV	1	0.416667			
	Debt Ratio	0.9316	0.233	-0.6986	-74.99%
	ROA	0.009	0.00375	-0.00525	-58.33%
	ROE	0.168	0.056375	-0.111625	-66.44%
	Equity/Assets	0.0684	0.017	-0.0514	-75.15%
	Loans/Assets	0.6844	0.139125	-0.545275	-79.67%
	Credit Rating	2	2	0	0.00%
Vietcombank	2	1			
	Debt Ratio	0.932	0.932	0	0.00%
	ROA	0.015	0.015	0	0.00%
	ROE	0.2255	0.2255	0	0.00%
	Equity/Assets	6.80E-02	6.80E-02	0	0.00%
	Loans/Assets	0.5565	0.5565	0	0.00%
	Credit Rating	8	8	0	0.00%
MB	3	0.476021			
	Debt Ratio	0.9111	0.3495	-0.5616	-61.64%
	ROA	0.0159	0.005625	-0.010275	-64.62%
	ROE	0.2025	0.084563	-0.117938	-58.24%
	Equity/Assets	0.0889	0.0255	-0.0634	-71.32%
	Loans/Assets	0.4384	0.208688	-0.229713	-52.40%
	Credit Rating	3	3	0	0.00%
Techcombank	4	0.599504			
	Debt Ratio	0.9375	0.3495	-0.588	-62.72%
	ROA	0.019	5.63E-03	-0.013375	-70.39%
	ROE	0.249	8.46E-02	-0.164438	-66.04%
	Equity/Assets	0.0625	0.0255	-0.037	-59.20%
	Loans/Assets	0.3481	0.208688	-0.139413	-40.05%
	Credit Rating	3	3	0	0.00%
ACB	5	0.659986			
	Debt Ratio	0.9479	0.466	-0.4819	-50.84%
	ROA	0.0114	0.0075	-0.0039	-34.21%
	ROE	0.205	0.11275	-0.09225	-45.00%
	Equity/Assets	0.0521	3.40E-02	-1.81E-02	-34.74%
	Loans/Assets	0.4216	0.27825	-0.14335	-34.00%
	Credit Rating	4	4	0	0.00%
SHB	6	0.530838			
	Debt Ratio	0.918	0.3495	-0.5685	-61.93%
	ROA	0.0132	0.005625	-0.007575	-57.39%

	ROE	0.1593	0.084563	-0.074738	-46.92%
	Equity/Assets	0.082	0.0255	-0.0565	-68.90%
	Loans/Assets	0.4723	0.208688	-0.263613	-55.81%
	Credit Rating	3	3	0	0.00%
VIB	7	0.511364			
	Debt Ratio	0.9297	0.3495	-0.5802	-62.41%
	ROA	0.011	0.005625	-0.005375	-48.86%
	ROE	0.166	0.084563	-0.081438	-49.06%
	Equity/Assets	0.0703	0.0255	-0.0448	-63.73%
	Loans/Assets	0.4397	0.208688	-0.231013	-52.54%
	Credit Rating	3	3	0	0.00%

Smilarly, Vietcombank is the most efficiency Vietnamese bank because it has the coefficient 0% in all of financial ratio. It is a benchmarking of Vietnamese banks in 2010 among 7 above banks. The least efficiency bank in 2010 is Bank for Investment & Development of VN (BIDV). That means this bank has to adjust mostly. Pay attention that, BIDV is the worse bank in 2009 according to the result; and in 2010, it still keep being the last one in the list of Vietnamese bank. This demonstrates that operation mechanism of BIDV is not effective and this bank needs to restructure in order to being better. The gradient between coefficients is quite big; therefore, adjustment of Vietnamese bank should be large in order to homogeneous with the benchmarking bank.

4.2.4 ANALYSIS AND ADJUSTMENT

Table 4-11. Scores of Financial Indicators of Vietnamese Banks in 2010

DMU	Score	Debt Ratio	ROA	ROE	Equity/Assets	Loans/Assets
1	0.4166	0.1551	0	0.0136	0.0115	0.1460
2	1	0	0	0	0	0
3	0.4760	8.42E-02	1.94E-03	1.18E-02	1.68E-02	0
4	0.5995	0.2125	5.77E-03	6.47E-02	1.20E-02	0
5	0.6599	0.1596	2.38E-05	2.25E-02	3.85E-04	0
6	0.5308	0.1378	1.38E-03	0	1.80E-02	0.0420
7	0.5113	0.1259	0	3.24E-04	1.04E-02	1.62E-02

In a way, each DMU attempts to "promote" the inputs and outputs where it is best (and demote the rest). In the majority of cases this does not suffice to achieve an efficiency of 1, simply because the inputs and outputs levels are not good enough. The efficient frontier is defined precisely and shows off the potential improvement for some inefficient Vietnamese banks. According to the efficient frontier, the inefficient DMUs can move to the efficient point in frontier and then become to the efficient DMUs. This method also provides guidelines for improvement for the inefficient Vietnamese banks based on the database and the results of analysis.

Among seven Vietnamese banks, there is only one Vietnamese bank has been considered as an efficient DMU with the score at 1. It is Joint Stock Commercial Bank for Foreign Trade of VN (Vietcombank). Looking at the table 4-9 it is very clear that remain Vietnamese banks that are the inefficient banks have the low score compare with Vietcombank (the highest one is 0.659986 and the lowest one is 0.416667). That means there are the big gaps about the efficient level among seven Vietnamese banks. Regarding the Debt ratio input, Military Commercial Joint Stock Bank has the lowest score while the others are approximately equal (from 0.1259 to 0.2125). Hence, Military bank has to adjust this input variable mostly. Next ratio is ROA, there are three banks achieve the best one and four others have to adjust to promote their score. In detail, Techcombank need to promote mostly with the score at 0.0057. In the similar way, there are five banks need to improve ROE scores beside two banks has the efficient score at 0 that are Vietcombank and SHB. Continue analyzing, all of banks in this sample group need to improve their Equity to assets ratio to achieve the score at 1. The last ratio is Loans to assets ratio that has the best result with only three inefficient

score belong to BIDV, SHB and VIB with the scores at 0.146, 0.042 and 0.0161 respectively. Generally to say, beside Vietcombank, the six other banks need to adjust most of their input ratios variables while the loans to assets ratios have the least adjustment.

4.2.5 THE COMPARISON

The table 4-10 pointed out clearly how efficient status among seven Vietnamese banks. According to calculation, there is only Vietcombank achieve the best score at 1 while six other banks have the score from 0.4 to 0.7. In addition, each pair of banks has the approximately equal score such as BIDV and MB ($0.4 < scores < 0.5$), SHB and VIB ($0.5 < scores < 0.6$), Techcombank and ACB ($0.6 \leq scores < 0.7$).

The lowest score is belong to BIDV that has the biggest gap to the most efficient one. In the other way to see the rank, the table shows the level based on detailed numerical scores of seven banks.

Table 4-12. Ranking and Scores of Vietnamese Banks in 2010

Rank	DMU	Score
1	2	1
2	5	0.6599
3	4	0.5995
4	6	0.5308
5	7	0.5113
6	3	0.4760
7	1	0.4166

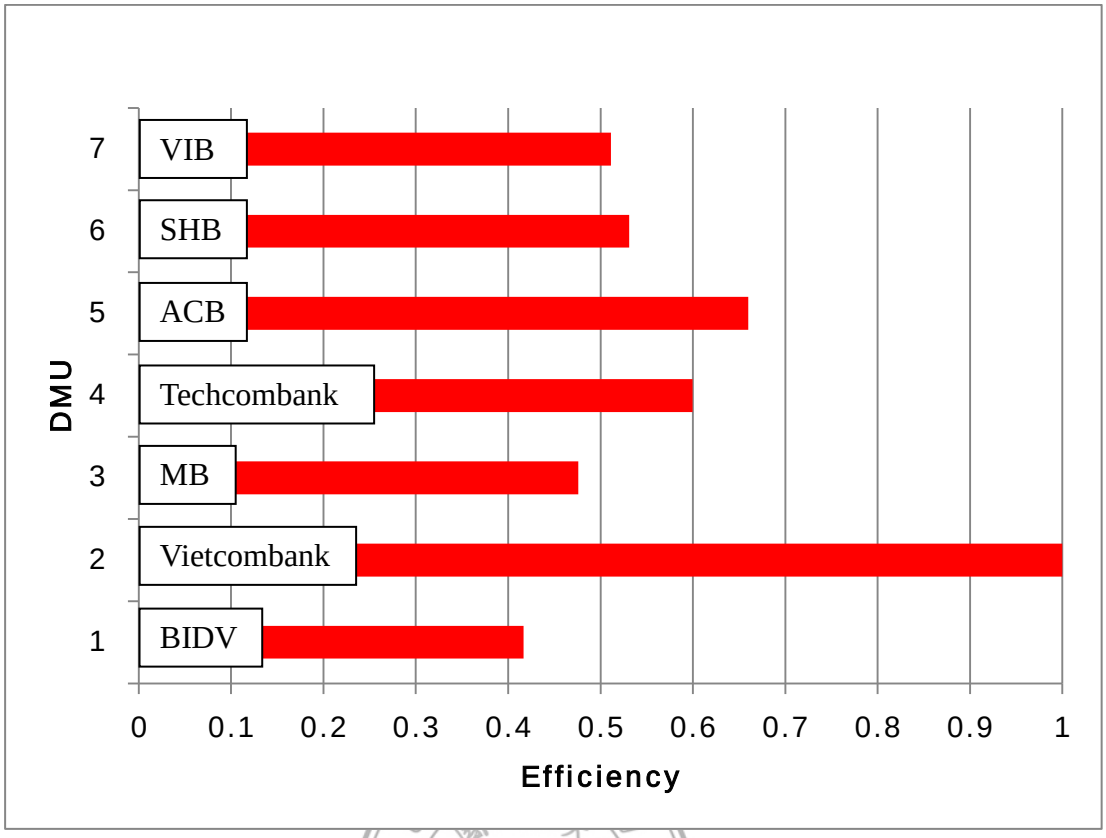

Figure 4-2. Ranking Results of Vietnamese Banks in 2010

4.3. Vietnamese Banks' Efficiency in 2011

4.3.1 GROUP OF SAMPLE IN 2011

There are nine Vietnamese banks in 2011 which are presented as table 4-13.

Table 4-13. Sample of Vietnamese Banks in 2011

No.	Full Name of Bank	Abbreviation Name	Type
01	VN Joint-Stock Commercial Bank for Industry & Trade	Vietinbank	joint-stock commercial bank
02	Bank for Investment & Development of VN	BIDV	joint-stock commercial bank
03	Joint Stock Commercial Bank for Foreign Trade of VN	Vietcombank	joint-stock commercial bank
04	Saigon-Thuong Tin Commercial Joint-Stock Bank	Sacombank	joint-stock commercial bank
05	Military Commercial Joint Stock Bank	MB	joint-stock commercial bank
06	VN Technological & Commercial Joint-Stock Bank	Techcombank	joint-stock commercial bank
07	VN International Commercial Joint-Stock Bank	VIB	joint-stock commercial bank
08	Asia Commercial Joint-Stock Bank	ACB	joint-stock commercial bank
09	Saigon-Hanoi Commercial Joint Stock Bank	SHB	joint-stock commercial bank

- VN Joint-Stock Commercial Bank for Industry & Trade (Vietinbank): was

established in 1988 after being separated from the State Bank of Vietnam. It is large commercial banks, plays an important role, and is the pillar of the banking sector in Vietnam. There are national network consist of 01 main transaction central, 150 branches and over 1000 transactions offices/ savings funds ("Tổng quan về Ngân hàng Công thương Việt Nam - VietinBank," n.d.). It has agency relationships with over 900 banks and has financial institutions in more than 90 countries and territories in the world.

- Saigon-Thuong Tin Commercial Joint-Stock Bank (Sacombank): is a joint-stock commercial banks of Vietnam, founded in 1991. Currently, Sacombank has a charter capital of 4,494 billion VND.

4.3.2 SUMMARY OF INPUT AND OUTPUT VARIABLES

Table 4-14. Statistics on Input / Output Data

	Debt Ratio	ROA	ROE	Equity/Assets	Loans/Assets	Credit Rating
Max	0.9574	0.0211	0.3600	0.1016	0.7099	7
Min	0.8984	0.0066	0.0782	0.0426	0.3286	2
Average	0.9274	0.0142	0.2051	0.0725	0.4960	2.6666
SD	0.0159	0.0049	0.0907	0.0159	0.1227	1.5634

Table 4-15. Correlation

	Debt Ratio	ROA	ROE	Equity/Assets	Loans/Assets	Credit Rating
Debt Ratio	1	0.2996	0.7013	-1	-0.1290	0.0019
ROA	0.2996	1	0.8528	-0.2996	-0.2723	-0.0871
ROE	0.7013	0.8528	1	-0.7013	-0.4154	-0.0130
Equity/Assets	-1	-0.2996	-0.7013	1	0.1290	-0.0019
Loans/Assets	-0.1290	-0.2723	-0.4154	0.1290	1	0.1418
Credit Rating	0.0019	-0.0871	-0.0130	-0.0019	0.1418	1

4.3.3 RESULT OVERVIEW

Table 4-16. Results of Vietnamese Banks' Efficiency in 2011

No.	DMU I/O	Score Data	Projection	Difference	%
1	1	0.354322			
	Debt Ratio	0.9367	0.263286	-0.673414	-71.89%
	ROA	0.0203	3.57E-03	-1.67E-02	-82.41%
	ROE	0.2674	0.0488	-0.2186	-81.75%
	Equity/Assets	0.0633	2.24E-02	-4.09E-02	-64.57%
	Loans/Assets	0.637	0.163171	-0.473829	-74.38%
	Credit Rating	2	2	0	0.00%
2	2	0.45208			
	Debt Ratio	0.9393	0.263286	-0.676014	-71.97%
	ROA	0.0079	3.57E-03	-4.33E-03	-54.79%
	ROE	0.1312	0.0488	-0.0824	-62.80%
	Equity/Assets	0.0607	2.24E-02	-3.83E-02	-63.05%
	Loans/Assets	0.7099	0.163171	-0.546729	-77.01%
	Credit Rating	2	2	0	0.00%
3	3	1			
	Debt Ratio	0.9215	0.9215	0	0.00%
	ROA	0.0125	0.0125	0	0.00%
	ROE	0.1708	0.1708	0	0.00%
	Equity/Assets	0.0785	0.0785	0	0.00%
	Loans/Assets	0.5711	0.5711	0	0.00%
	Credit Rating	7	7	0	0.00%
4	4	0.355685			
	Debt Ratio	0.8984	0.263286	-0.635114	-70.69%
	ROA	0.0141	3.57E-03	-1.05E-02	-74.67%
	ROE	0.1372	0.0488	-0.0884	-64.43%
	Equity/Assets	0.1016	2.24E-02	-7.92E-02	-77.92%
	Loans/Assets	0.5667	0.163171	-0.403529	-71.21%
	Credit Rating	2	2	0	0.00%
5	5	0.383752			
	Debt Ratio	0.9247	0.263286	-0.661414	-71.53%
	ROA	0.0211	3.57E-03	-1.75E-02	-83.07%
	ROE	0.2834	4.88E-02	-0.2346	-82.78%
	Equity/Assets	0.0753	2.24E-02	-5.29E-02	-70.21%
	Loans/Assets	0.4252	0.163171	-0.262029	-61.62%
	Credit Rating	2	2	0	0.00%
6	6	0.496566			
	Debt Ratio	0.9351	0.263286	-0.671814	-71.84%
	ROA	0.0183	3.57E-03	-1.47E-02	-80.48%

	ROE	0.2887	4.88E-02	-0.2399	-83.10%
	Equity/Assets	0.0649	2.24E-02	-4.25E-02	-65.44%
	Loans/Assets	0.3286	0.163171	-0.165429	-50.34%
	Credit Rating	2	2	0	0.00%
7	7	0.624041			
	Debt Ratio	0.9158	0.263286	-0.652514	-71.25%
	ROA	0.0066	3.57E-03	-3.03E-03	-45.89%
	ROE	0.0782	0.0488	-0.0294	-37.60%
	Equity/Assets	0.0842	2.24E-02	-6.18E-02	-73.36%
	Loans/Assets	0.4486	0.163171	-0.285429	-63.63%
	Credit Rating	2	2	0	0.00%
8	8	0.789738			
	Debt Ratio	0.9574	0.394929	-0.562471	-58.75%
	ROA	0.017	5.36E-03	-1.16E-02	-68.49%
	ROE	0.36	0.0732	-0.2868	-79.67%
	Equity/Assets	0.0426	3.36E-02	-8.96E-03	-21.03%
	Loans/Assets	0.3658	0.244757	-0.121043	-33.09%
	Credit Rating	3	3	0	0.00%
9	9	0.396625			
	Debt Ratio	0.9178	0.263286	-0.654514	-71.31%
	ROA	0.0106	3.57E-03	-7.03E-03	-66.31%
	ROE	0.1291	0.0488	-0.0803	-62.20%
	Equity/Assets	0.0822	2.24E-02	-5.98E-02	-72.71%
	Loans/Assets	0.4114	0.163171	-0.248229	-60.34%
	Credit Rating	2	2	0	0.00%

In 2011, the worse bank is Vietinbank and the most efficiency bank is Vietcombank. Vietcombank still did very well from 2010 and keep going in 2011. Besides that, Vietinbank in prior time did not have credit rating; so it was not included in the sample. Other banks have the large gradient of coefficient compare benchmarking bank, usually over than 60%. Generally, the system of bank's operation is quite different; therefore the lever of bank's efficiency is also not the same. Bank has the highest credit rating is the bank has the most efficient operation. In 2011, there are some banks such as Sacombank, Vietinbank did not have credit rating before. These banks were not successful in the market and having some challenges in the developing

process in the future. It should be good for them to consider Vietcombank and ACB as the benchmarking bank to improve and restructure their operation system.

4.3.4 ANALYSIS AND ADJUSTMENT

Table 4-17. Scores of Financial Indicators of Vietnamese Banks in 2011

DMU	Score	Debt Ratio	ROA	ROE	Equity/Assets	Loans/Assets
1	0.3543	6.86E-02	0.0036	4.59E-02	0	6.25E-02
2	0.4520	0.1613	0	1.05E-02	5.01E-03	0.1577
3	1	0	0	0	0	0
4	0.3556	5.63E-02	1.44E-03	0	1.37E-02	3.84E-02
5	0.3837	9.16E-02	4.53E-03	6.00E-02	6.47E-03	0
6	0.4965	0.2010	5.52E-03	9.46E-02	9.80E-03	0
7	0.6240	0.3082	5.47E-04	0	3.01E-02	0.1167
8	0.7897	0.3611	8.07E-03	0.2111	0	4.41E-02
9	0.3966	0.1007	6.33E-04	2.40E-03	1.02E-02	0

Similar to the result of 2010, there is only one DMU is the efficient bank that is BIDV with the score at 1 and all of ratios are 0. There are totally nine Vietnamese banks in this sample in 2011 and generally to say, they have the low score in average (most of them have the score from 0.3 to 0.4; only ACB and SHB have the score at 0.624 and 0.7897 respectively). Therefore, the adjustment of input variables of these banks is relatively large. Debt ratio is the input variable that needs the biggest improvement. There are five banks have the approximately equal with the lowest is 0.0562 and the highest is 0.3611. BIDV is the unique bank has the efficient score at 1 of ROA ratio beside the efficient DMU (Vietcombank). The seven banks have the approximately equal scores. That means their improvement levels quite the same. There are five banks need to improve their ROE ratios that are Vietinbank, BIDV, MB, Techcombank, ACB, SHB with the score at 0.0459, 0.0105, 0.0599, 0.0945, 0.2111, 0.0024 respectively.

Continue assessing the Equity to assets ratio to check how efficiency of banks, two banks such as Vietinbank and ACB achieve the best score at 0. Six others banks need to improve the ratio to achieve the best score at 0 are BIDV, Sacombank, MB, Techcombank, VIB, SHB. Loans to assets ratio is the most efficient input variable with four banks have the score at 0 including the benchmarking one (Vietcombank). In this variable, the least banks need to adjust. Five banks are Vietinbank, BIDV, Sacombank, VIB, ACB have the score at 0.0625, 0.1577, 0.0383, 0.1167, 0.0441 respectively.

4.3.5 THE COMPARISON

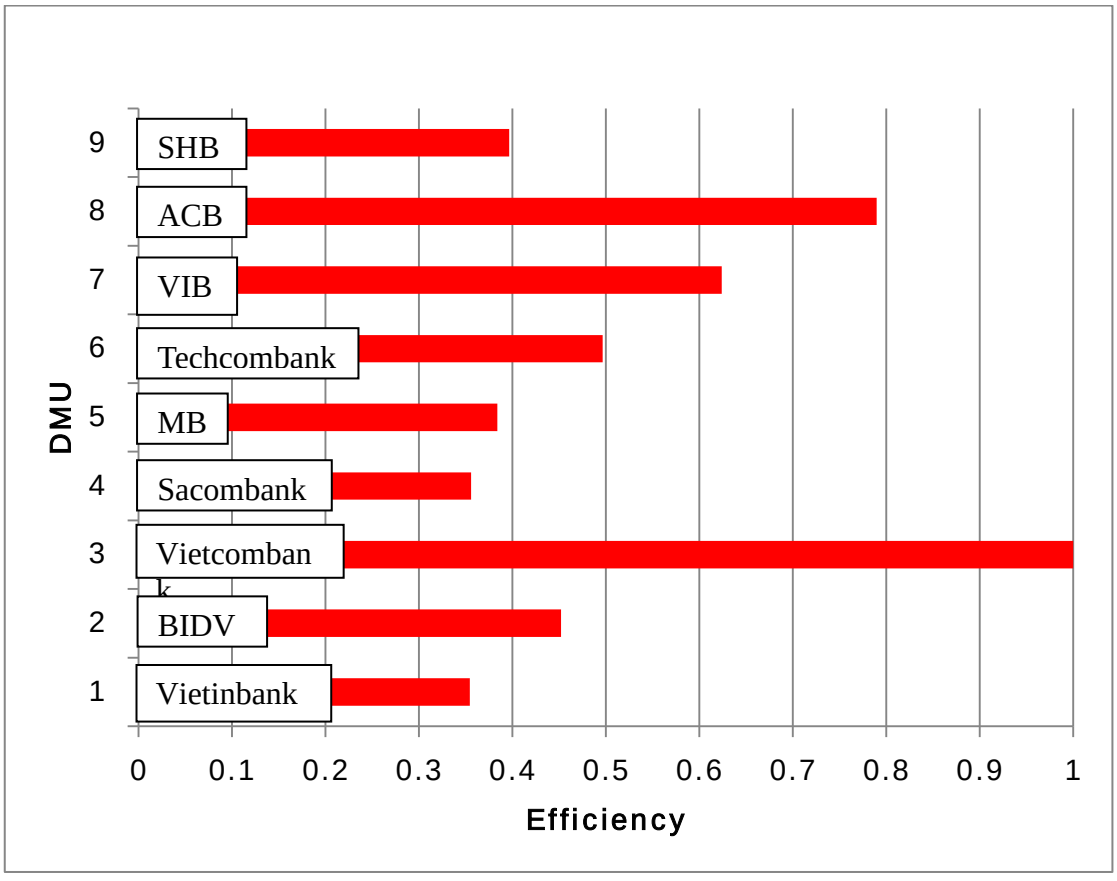

Figure 4-3. Ranking Results of Vietnamese Banks in 2011

The most efficient bank is Vietcombank with the score at 1. The others' rank is presented in the figure 4-3. Accordingly, the worst bank in 2011 is Vietinbank with the

score at 0.354322 and the others' ranking with the detailed numerical scores are shown in table 4-3. Beside the benchmarking with the score at 1, there are some groups of banks have the approximately equal score such as four banks (Vietinbank, Sacombank, MB and SHB) have the scores at 0.354322, 0.355685, 0.383752, 0.396625 respectively, BIDV andTechcombank (0.4 < scores < 0.5), VIB and ACB (0.6 < scores < 0.8). Among them, ACB has the smallest gap to the most efficient one because it keeps the highest score under 1.

Table 4-18. Ranking and Scores of Vietnamese Banks in 2011

Rank	DMU	Score
1	3	1
2	8	0.7897
3	7	0.6240
4	6	0.4965
5	2	0.4520
6	9	0.3966
7	5	0.3837
8	4	0.3556
9	1	0.3543

CHAPTER FIVE

CONCLUSION

5.1. Research Conclusions

Generally, list of Vietnamese banks used in the study is quite the same during the period time from 2009 to 2011. The results also keep intact from 2010 to 2011 .The most efficiency Vietnamese bank in this period are ACB, Agribank (2009), Vietcombank, ACB (2010) and Vietcombank, ACB. These results demonstrate that these Vietnamese banks still keep going on the way to develop and did not fall down in economic market. However, other banks have signs of going down, underdeveloped over the time because their scores have the big gap to the efficient score.

At the aim of determine the important financial factor and assess the benchmarking Vietnamese bank, the study used DEA method to analyze 21 banks from 2009 to 2011. These results pointed out clearly which bank is efficiency and which one is not. According to numeric data, it showed the necessary adjustment of each of bank follow some benchmarking banks. The gradient of coefficient between banks is quite high, the highest is 83.10 % of ROE of VN Technological & Commercial Joint-Stock Bank (Techcombank) in 2011; and the lowest is 21.03% of equity to asset ratio of Asia Commercial Joint-Stock Bank (ACB) in 2011. Some of the most efficient banks such as Asia Commercial Joint-Stock Bank (ACB), VN Bank for Agriculture & Rural Development (Agribank), Joint Stock Commercial Bank for Foreign Trade of VN (Vietcombank) keep doing well and become benchmarking bank year by year.

The DEA method in this study correctly predicts the possible financial difficulties, including a bankruptcy and credit risk of Vietnamese banks from 2009 to 2011. After getting these significant results, the study has confirmed the universal value of the DEA method in analyzing a large spectrum of credit risk uncertainty. It not only measures efficiency in respect to the use of financial risk indicators, but also facilitates an accurate credit risk classification for corporations in the credit application process. It is safe to presume that this method will become a central tool in credit risk assessment for corporations as well as credit institution such as banks. Using DEA method, we got the significant results along with many useful guidelines, adjustment and improvement for groups of sample such as Vietnamese banks during three years from 2009 to 2011 such as data analysis, score calculation, summary of results, summary of data, ranking of banks with the numerical score, improvement percent, and so on.

5.2. Conclusion Correspond to Research Objectives

5.2.1.THE EFFICIENCY VIETNAMESE BANKS

Generally to say, in recent years, less and less Vietnamese bank has been considered as the efficient bank in the market although they have improved their performance. Furthermore, the gap between the best efficient bank and the other banks larger and larger along the time. That means only some specific banks are running in the right way while the others bank still face a lot of challenges and shortage necessary adjustment to run their operation. The groups of banks that are doing well year by year according to analysis process are Agribank, ACB, VIB (2009), Vietcombank, ACB (2010), Vietcombank, ACB (2011). Among them, there are two

banks (Vietcombank, ACB) keep standing in the three top efficient banks during three years from 2009 to 2011 in this study. Therefore, their strategy and operation system has been run in the efficient way. They are all joint-stock commercial bank; and among them, Agribank is the largest one.

5.2.2. IMPORTANT FINANCIAL FACTORS

Following the result, ACB, Agribank and Vietcombank' financial indexes such debt ratio, ROA, ROE, equity to asset ratio, loans to asset ratio are the important indicators for other bank consider restructuring the operation mechanism and business system. Vietnamese bank need to improve these indicators in order to enhance their credit rating in the future. Based on these results, the others bank will have an overview of establishing the adequate strategy and long-term plan in order to improve their credit rating and are able to prevent the potential credit risk in the future.

5.2.3. RECOMMENDATIONS

This study also provides some recommendation at the aim of enhancing Vietnamese banks' efficiency as well as credit rating. Some sort of restructuring plan for Vietnam's banks is clearly needed.

A proposal to allow foreign banks to increase their shareholdings in local banks and even permit eventual majority ownership seems like a good idea. But with many such banks already facing problems at home, the scheme may not attract the necessary capital. One alternative is some form of government-financed bailout. Such a move certainly seems more practical now than it would have been a few years ago. Less and less Vietnamese bank has become benchmarking with the efficient score over the time. That said, Vietnam's banks are clearly in trouble. The situation requires

careful monitoring.

The restrictions on JVBs and foreign banks need to be relaxed in the future. Many other challenges and obstacles have to be solved quickly. Legal and regulatory reforms should be enacted. The authorities have to put appropriate procedures in place to ensure that the State-owned banks are run on a commercial basis, including procedures to facilitate careful internal assessment and monitoring of the credit risk. The Government has to set up short-term and long-term action plans for these reforms and must be steadfast in their implementation. SBV can grade each bank according to criteria set up a priori. The criteria can include soundness, assets quality, liquidity, profitability, growth, productivity, etc.

The law on credit institutions also needs to be improved and restructured to level the playing field for foreign banks and JVBs vis-a-vis the domestic banks. Some suggestions like: foreign banks are subject to special capital requirements, deposit restrictions, and collateral rules; they have no access to the SBV refinance facilities. At the same time, the credit law does not provide a regulatory framework for the foreign bank branches that have thus far been governed by the operating licenses.

The Government should prepare audit regulations to improve the assessment of the financial standing of banks based on their financial statements. At the same time, the activities of foreign banks and accounting firms should be encouraged to increase expertise and competition. Good accounting is also important for improvement of the profit of financial institutions.

In summary, improving the credit rating and prevent the potential financial crisis are the difficult goal and require a very complicate as well as time-consuming strategy and action plan. Therefore, Vietnamese government and SVB need to assess every

bank’s strength precisely and then have the basic information in order to establish the regulation as well as policy that support them to achieve the best profit. All of information and results in this study will be a reference for any future research in the field of credit rating of credit institution.

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