MALAYSIA BANKING EFFICIENCY: A RESEARCH TOWARDS LOCAL BANK AND FOREIGN BANK

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgment has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

(4) The word count of this research report is 29351.

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DEDICATION

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LIST OF ABBREVIATIONS

ABM	Association of Bank Malaysia
ATM	Automated Teller Machine
BNM	Bank Negara Malaysia
CEO	Chief Executive Officer
DEA	Data Envelopment Analysis
DMUs	Decision Making Units
GDP	Gross Domestic Product
IMF	International Monetary Fund
M&A	Merger and Acquisition
MEPS	Malaysian Electronic Payment System
NPLs	Non-performing loan
PIDM	Perbadanan Insurance Deposit Malaysia
SMEs	Small and Medium Enterprises
SFA	Stochastic Frontier Analysis

PREFACE

Banks are essential for the economic growth all the time. Basically speaking, banks acts as an intermediary to transmit surplus funds units to those deficit funds units. Furthermore, banks resolve and simplified monetary problems by offering a variety of financial services, either for individuals or corporations. A bank is said to be efficient by generating a maximum output with minimum input. However, by how a bank can be considered as operating at its maximum capacity or efficient? Tons of researches believe that, banking efficiency can be applied as an indicator for this particular case. Thus, concern towards banking efficiency experienced a snowball effect over the decades as the stability of the banks might link with the occurrence of numerous financial problems. For instance, financial crisis.

The purpose for this research to be conducted is to provide the policy makers as well as bankers to obtain a different point of view or ideas to increase banking efficiency. The research aims to point out the weaknesses experienced by the inefficient sample banks. In addition, several implications or suggestions are also recommended in this research corresponding to the problems encountered which cause inefficiency in banks. In short, this research enables policy makers and bankers to have a better glance for origin of inefficiency as well as remedies for it.

The primary objective of this study is to determine the banking efficiency of local banks and foreign banks as well as making a comparison between them. Additionally, this study also gives light to whether bank size, government intervention as well as merger and acquisition activities will affect the banking efficiency in local banks when competing with foreign banks.

ABSTRACT

Malaysia banking sector is made up of multiple types of banks. As for commercial banks, basically it can be divided into two groups, which is local banks and foreign banks. The existence of banks are crucial for the regulation of daily activities. In order to survive through various competition as well as adaptability as the environment change, the bank has to be efficient in allocation of its resources to achieve maximum output. Therefore, the importance as well as concern towards banking efficiency exhibiting a snowball effect over the decades. The motivation for this research to be conducted is to determine the most efficient bank among the sample banks within the sample period. The banking efficiency of the banks determine the ability of the banks to generate maximum output with minimum input.

The primary objective of this paper is to determine the banking efficiency of local banks and foreign banks and make a comparison between them. Furthermore, instead of primary objective, this paper also deemed to find out whether bank size, government intervention and merger & acquisition activities of local banks will affect the banking efficiency in competing with foreign banks. The banking efficiency is estimate through the usage of a non-parametric frontier approach known as Data Envelopment Analysis (DEA) approach. The DEA approach is applied to examine the banking efficiency of the sample banks which consist of 7 local banks and 5 foreign banks, from year 2007 to 2014.

The findings for this study propose that, foreign banks are more efficient than local banks in terms of banking efficiency for this particular period. In addition, the result also revealed that larger banks are generally more efficient than smaller bank. Furthermore, this study also suggest that government intervention will deteriorate bank's efficiency. Last but not least, this study suggest that there is insufficient evidence to conclude that post-merger banks are superior compare with pre-merger banks in terms of banking efficiency. Based on the findings, this study implies that most of the inefficient banks should reduce the number of Automatic Teller Machines (ATMs) and branches in order to be efficient. Moreover, the inefficient banks are suggested to retrench unproductive employees to become efficient. Extension of services such

as e-banking services are also recommended for the banks to being more competent. Additionally, this study advised that government intervention should be minimized to create a free-to-compete market which will be beneficial for banks in terms of banking efficiency.

CHAPTER 1: RESEARCH OVERVIEW

1.0 INTRODUCTION

This paper will discussed about the bank efficiency between foreign banks and local banks in Malaysia, concisely. The purpose of this research is to estimate the bank efficiency between local and foreign banks in Malaysia and determine the factors that will affect the bank efficiency. In this chapter, the problem statement as well as the objectives of this particular research will be discussed. Furthermore, research questions, hypotheses and significance of study in this chapter will be included as well. As for the last, the chapter layout briefly outline with a conclusion as ending for this chapter.

1.1 RESEARCH BACKGROUND

The topic of the efficiency of banks should be taken in a more serious manner as it can affect the economic development of the country either directly or indirectly. Bank efficiency refers to how efficient the bank to allocate the scarce resources available to create the maximum outputs as possible as well as the ability to maintain their cost at a minimum level. In short, ability to generate maximum output with minimum input. Bank efficiency will determine the profitability, financial performances as well as the market shares for a bank in the industry. In other words, the bank efficiency reflect the survivability of a bank in the future as well as the profitability. Malaysia banking system can be classified for three main types such as commercial banks, Islamic banks, and investment banks. In this research, we will focus on the bank efficiency of local banks and foreign banks which is incorporated under the sector of commercial banks.

During the Asia financial crisis of mid-1990, numerous banks in Malaysia defaulted as the value of currency drop until half of its previous value before the crisis and the interest rate fluctuate which cause a serious downturn for the economic (Aghevli, 1999). Efficient management of the bank will increase the survivability of the bank as the wastefulness of the resources can be minimize. Meanwhile, the allocation of the scarce resources efficiently will enable the bank to significantly increase its profitability as well. To encourage enhancement in bank efficiency, bank merging and acquisition is greatly implemented in Malaysia. According to Sufian (2009), due to scale inefficiency, the overall efficiency of Malaysia banks decline drastically before the pre-merger period. However, the efficiency level has not only recovered but surpass the pre-merger period. Generally speaking, bank consolidation will be most likely to improve the bank efficiency as it enable the post-merged banks to be superior compare with its competitors in terms of assets, liquidity, operational costs and furthermore (Kumar, 2013).

The competition in the financial services industry are being intensified over the years due to constantly altering market in various ways. For example, advancement of technology, fluctuating interest rates, depositors' expectations and so on. Bank reformation, financial and economic development variables will lead to enhancement of bank competition (Lee & Hsieh, 2014). Initially, when the competition strengthened, the banks will suffered from a fall in cost efficiency, tailed with weakening in profit efficiency. Conversely, the banks will react to the competition pressure and improving its cost efficiency through the "contained" cost. With the uplifting in cost efficiency, profit efficiency will be improved as well. Furthermore, as proposed by Demsetz (1973), the efficient structure hypothesis predicts that under the competition pressure from the market, efficient firms overcome competition and able to grow further. Through the enlargement in size and assets, the firms obtain a greater market share with a higher profitability. Therefore, bank efficiency is a critical factor to sustain in the market as well as the competition.

To remain thrive in the financial service industry, both local and foreign banks must continuously being cautious to their bank efficiency. However, are the banks really doing their jobs efficiently? How does the local banks and foreign banks differ in terms of their bank efficiency? In this paper, to conduct a research on estimating the latest bank efficiency from both local and foreign banks in Malaysia, there are two approaches can be apply namely Data Envelopment Analysis (DEA) and Stochastic Frontier Approach (SFA).

1.2 Problem Statement

In this few decades, economist around the globe have put many efforts on analyse and understanding the bank efficiency. Undoubtedly, banking sector had occupied a very strong position in our daily life as it plays an important role in acting as financial intermediaries in the economy system. They facilitates in transferring excess fund from the surplus fund's party to the fund demander's party. Commercial bank mainly help customers in accepting deposit, honour the cheques and make payment transaction in their daily activities.

Since the subprime crisis burst out and following with the collapse of Lehman Brother Holdings in year 2008; the gigantic investment firm in United State, the bank's efficiency has grabbed the attention among the economists. This disaster had made it painfully clear that banks risk can emerge if the banks fail to manage its funding source and put it into effective profit generation ways (Asmild & Zhu, 2016). For this reason, the survival and persistently good performance of the banks is an issue of concern to all (San, Theng & Heng, 2011).

On the other sides, this also create public concern about the size of the financial institutions, worrying the impact if the giant fell down. Fuentes and Vergana (2003) conducted a research and found that the open corporation financial institution will tend to have higher efficiency from either the aspect of cost and profit. Open corporation

stated above referring to the banks that are public listed and the equity can be traded easily in the public market such as Bursa Malaysia. Such type of ownership structure can lead to higher assets composition and eventually a higher profit efficiency. In the developing countries such as Malaysia, such phenomena had been frequently questioning and worth to be research.

From the bigger size, greater efficiency kind of urban legend, many banks are keen to merge or acquire the other banks to enhance their own assets size and competitive ability. Banks will be able to achieve better cost structures benefiting from economies of scale and scope provided by their size and therefore improving the efficiency of their production (Karray & Chichti, 2013). In short, the better efficiency can be achieved. In Malaysia, merger and acquisition are popular trend and most welcomed by the Bank Negara Malaysia as it create a more controllable banking sectors and safety net that strong enough to brace another crisis. As most of the investors believed merger and acquisition can greatly improve the competitive ability when encounter the threat of entry of foreign banks.

Furthermore, the study on the bank efficiency in the country especially Malaysia is extremely important as Malaysia is operating under dual banking system where the Islamic banks are operates in parallel with the commercial banks. This made the banking sector became more and more competitive as the flow of funds is scarce. This may increase the cost of funding of banks and lead to reduction of their profit generation performance. From the study of Hamza and Kactouli (2010), they found that the Islamic banking sectors were developing rapidly and the total asset had shown the increasing trend since the year 2000. Although there was no results showing the Islamic banks were took over the commercial banks, however they do put a threat to the commercial banks via their well-capitalized advantage. In short, the commercial bank efficiency will affected ultimately.

Adding by the emerging of foreign banks in Malaysia resulting by the major structural and regulations changes in the banking sectors as most of the countries around the

world moving toward internationalization. This is driven by the forces of global economic integration, new technologies and increased financial sector liberalisation (Claessens & Van Horen, 2011). The entry of the foreign bank is just like a "double-edged knife". It either jeopardize the survivability of domestic banks or enhance the domestic banks' competitive ability. Gormley (2002) said that the smaller firms and banks with greater external financing needs will have significant debility in performance following with the foreign banks' entry. According to Gelos & Roldos (2002), the entry of foreign forces into the domestic market also will further increased the degree of competition and it may lead to the unity of the domestic banks to stand bigger to face the impact of the entry and hence survive to compete with them especially those from the mature market countries.

From Chortareas, Girardone, & Ventouri (2013), financial freedom indicated that the market is less restricted and the liberality allowed free competition will greatly improve the bank efficiency. When the banking sector is deregulated, bankers will have more freedom to exercise their daily business operation, investments, and financial provision. Thus, the better cost control can be applied and lead to higher cost efficiency. However, deregulation will expose consumers and the entire industry toward a riskier environment, increase the probability of the industry going to burst and collapse especially when attack by those speculators. Thus, the concern regarding implementation of regulations into banking industry are getting more focus compared with the previous time.

Hence, it is important for most of the people especially the policy maker to identify the determinants and have depth understanding on the bank's efficiency as the performance and the growth of the banking sector serves as the pillar for the financial system of a country.

1.3 Research objective

This research's aim is to determine the banking efficiency in Malaysia Banking Industry by using Data Envelopment Analysis (DEA) approach. There eight independent variables which comprise of five **(5)** input variables (number of branches, number of employees, number of ATMs, total asset, and capital & reserves) and three **(3)** output variables (total deposit, loans& advances, and profit before tax) to be applied in this research to derive the only dependent variable which is known as bank efficiency score.

1.3.1 General objective

The purposes of this research are to compare the bank efficiency between local banks and foreign banks in Malaysia.

1.3.2 Specific objectives

1. To determine the bank efficiency of Malaysia local banks and foreign banks.
2. To examine whether bank size contributed to the bank efficiency of local banks in competing with the foreign banks in Malaysia.
3. To inspect whether government intervention contributed to the bank efficiency of local banks to compete with foreign banks in Malaysia.
4. To study the impact of banks mergers and acquisitions toward the bank efficiency of local banks to compete with foreign banks in Malaysia.

1.4 Research questions

To attain the primary purpose of the research, this paper has addressed the following questions:

a) Local banks or foreign banks operated at more efficiently in Malaysia banking industry?
b) Larger or smaller local banks more efficient to compete with the foreign banks?
c) Does the government intervention affect the bank efficiency of local banks to compete with foreign banks?
d) Does the banks post-mergers and acquisitions affect the bank efficiency of local banks to compete with foreign banks?

1.5 Hypothesis of the study

There are several hypotheses included in this paper in order to conduct the empirical research of the bank efficiency between the local and foreign banks in Malaysia.

H1: Foreign banks operate more efficient as compared with the local banks in Malaysia banking industry.

H2: Larger banks are more efficient than smaller banks in competing with foreign banks.

H3: Local banks without government intervention is more efficient than government

-link banks in competing with foreign banks.

H4: Post-merger bank operate more efficient than pre-merger bank in competing with foreign banks.

1.6 Significance of the Study

Importance of our research toward banking industry aims to help either local banks or foreign banks in Malaysia to reveal factors that can contribute to their efficient banking operations. So, bankers can refer to this study for their cost control decision making process. Thus, this result in cut out wasted steps or speed up service response by eliminating unnecessary or timely-consuming work.

Besides, this study can help bankers to identify and analyze their potential mistakes as a step to maximize profitability level. Thus, bankers can avoid the chances that spoil their reputation if discover their potential mistakes before it affect the bank operations. Moreover, this can help banks tackling too-big-to-fail problems as this is the most serious problem faced in 21st centuries banking industry.

Not only that, this study aim to identify the banks operate in an efficient and effective manners will be the paramount important that can lead banks to achieve its expected profit level. This contributes to help bankers in maintained activities with right manners that can results higher productive and efficiency, and also assist them to make decision in carry activities or restructure plans with do the right things in the right manners. In the end, this leads to ensure bank staffs have enough work with eliminate layoffs or trimming of hours.

Furthermore, our study contributes to bankers in increase their competitiveness against their competitors. This can be done by assist banks to identify their competitive potential that resource competitiveness, assure their competitive position that results competitiveness, and as an alternative tools in planning competitive strategy that operating competitiveness.

1.7 Chapter Layout

The content in each chapter will be explain in this section. This paper has been categorized into total five main chapters as follow:

1.7.1 Chapter 1: Research Overview

This chapter is will provides an overview of study. In this chapter, research background, description of problem statement, research objective such as general objective and specific objective that have to be achieved, research question to be solved and hypothesis to be tested in the study. Besides, this chapter also describe the significance of study.

1.7.2 Chapter 2: Literature Review

The review on this chapter is on the relevant literature and theoretical models done by previous researchers. Basically, this chapter will provided foundation of theoretical framework to explain the relationship between the 8 selected variables namely customer quality, sales, location, investment, product development, technology innovation, management and brand recognition. Besides, proposed framework and hypotheses development on the comparison of profitability between Foreign Bank and Local Bank placed in Malaysia will be discussed in this chapter too.

1.7.3 Chapter 3: Methodology

Chapter 3 is focus on describing how this study is carry out in term of data collection methods, research design and the method in analysing collected data. This chapter gives a whole picture on the performing of the study start from the collecting data stage to the final stage which is transforming the data into useful information to determine bank efficiency scoring.

1.7.4 Chapter 4: Data Analysis

Chapter 4 can be refer as the climax of this study which provides the results on comparison of profitability between Foreign Bank and Local Bank placed in Malaysia as well as interpretation of the finding and empirical results regarding the relationship between the dependent and independent variable.

1.7.5 Chapter 5: Discussion, Conclusion and Implication

Chapter 5 will be the last chapter of this study. In this chapter, it will summarize and conclude the research findings and discuss relating the hypotheses developed. Through this result, policy implication will be discussed for future researcher who study on bank efficiency. In addition, the recommendation will be discussed as well such as the limitation of this study are revealed and the directions and scopes for the research in future.

1.8 Conclusion

In conclusion, this chapter covers the introduction, background of the topic, problem statement, research objectives, research question, hypotheses and the significance of the study. The aim on this paper is to determine a research towards local bank and foreign bank. The importance of internal and external variables that will affect the Banking Efficiency in Malaysia. Moreover, the detailed review from the prior studies will be presented in the following chapter.

Chapter 2: Literature Review

2.0 Introduction

For this particular chapter, the literature review, relevant theoretical models review, proposed framework and hypotheses development will be included. There are a total of five input variables, namely number of branches, number of staffs, number of ATMs, total assets and also capital and reserves. Meanwhile, the three output variables are namely loans and advances, total deposits and profit before tax.

2.1 Review of the Literature

2.1.1 Input variables

Input variable 1: Number of branches

LaPlante and Paradi (2015) said that the bank growth capabilities and marketability are heavily relied on the branching system. Bank branch plays an important role in delivering a large portion of value adding banking products and services to customers as well as reduce the operational expenses to the minimum level at the same time.

From the research of Paradi, Rouatt & Zhu (2011), the result showed that branching system can cut down operational expenses and non-performing loans. Theoretically, banks can potentially save up to millions of dollar annually with the existence of branching system. Yang and Paradi (2006) also determined that the branching system can be a profitable trend in the study.

Therefore, the optimal number of branch to be put in operation with the lowest cost efficiency and highest profit efficiency had always been the concern for bankers as the cost to maintain a branch always be a burden toward bank financial performance. Berger, Leusner & Mingo (1996) found that about twice as many branches as would minimize cost and raise revenue. The presence of additional branch can provides extra improved convenience to their customers and hence reduce the social costs of banking.

However, there are also some drawbacks in the expansion of branches. The number of branch may mislead the bank cost efficiency as the new branch may attract new customers as well as drawing existing customers from the other branches. Thus, the higher number of branch does increase the cost efficiency. Berger and DeYoung (2001) said that the organizational diseconomy issue arise from the far distant monitoring and lead to difficulty in providing relationship based products to local customers. Hence, it failed to present and distribute the proposed products and services to the local customers, eventually failed in the geographical expansion.

From the study of Ray (2016), one would need to consider production and distribution costs together in an overall optimization problem. Comparison of the actual total cost (over all branches) with the sum of the minimum cost for each branch provides a measure of the total cost efficiency of the network as it is. For example, producing the output within a specific geographical area to meet the local demand is an additional constraint in the cost minimization problem of the multi-unit decision making unit.

In short, the bank efficiency in term of bank branch still rely on how well the banks maintain and control each individual branch especially in term of cost management.

Input variable 2: Number of employee

Bank employees especially those serve in the retail frontline usually represent the bank and deliver the products and services on behalf of the name of bank to the customers.

They are classified as the core assets of a bank and essential for the business (Gümüş, Apak, Gümüş, Gümüş, & Gümüş, 2015). Having extra bank employees in the frontline will result in better profitability (Demos, 2016). Besides, employees represent the key to management efficiency of the banks.

With the rapid innovation of the technology, the retail banking automation is able to spur a great decline in banking jobs. The number of employee is a minor issue in term of efficiency, however the qualification of employee in specified area such as personal financial planning is being emphasized over the decades. Analysts forecasting that the future branches will concentrate on advisory and consultation rather than transaction activities.

Havrylchyk (2005) included employees as one of the input variables in his research and found that the higher level of the particular input into the banking operation will generate a greater output. However, the price of labour will also be significantly higher and affect the cost structure of the bank.

The performance of the employees are usually correlated with the quality of services provided to the customers, and this may contribute to the customers' satisfaction level. If the service quality is impressive, it will retain existing customers as well as attract new customers (Hossain, 2014). In order to increase the service quality, employees' satisfaction towards the job should be taken into the account. For instance, correct or corresponding salary towards the job will incline the employees' satisfaction level. Medical benefit, bonus and high pay wages will surge employees' job happiness and loyalty. However, it will also increase the banks' financial burden to cover such expenses. The higher the number of employee, the greater the expense that will be incurred. Subsequently, this will lead to cost inefficiency at certain level.

One of the reasons which affect profit earning variability for bank lies with employees. Human error during operation can cause additional expenses to the bank which tends to lower down the bank efficiency. Such operational risk will drive the banking industry

to take widespread employee layoff into consideration in order to cut expenses (Koch & MacDonald, 2009).

Input variable 3: Number of automated teller machine (ATM)

An automated teller machine (ATM) can be defined as an electronic banking outlet as banks allows their customers to conduct the basic transaction independent without any assistance required from the branch representative. Chahal, Chahal, Chowdhary, & Chahal (2013), stated that in order for banks to keep their position within the industry, banks are compelled to introduce diverse services and one of them is the ATM which generated from the innovation of technology which create extra convenience to the existing customers as well as new customers.

Floros and Giordani (2008) also found that banks with greater ATM network (large number of ATM) are more technical and cost efficiency. Banks able to achieve more revenue by increase the efficiency when offering e-services such as ATMs, result from fewer branches needed and consequently fewer labour input required. The greater number of ATM implemented will further enhance the availability to the customers since the customers are required to be physically present at the site of an ATM in order to conduct the transaction (Bjørndal, Hamers & Koster, 2004).

From the research paper of Valverde, Humprhrey & Del Pasol (2004), the expanded use of ATM had greatly reduced bank operational expenses by replace and reduce the expensive branch in delivering services to customers. This is because ATMs are considerably cheaper as compared to the paper based transaction.

From the study of Bolt and Humphrey (2010), it showed that the ATM is more likely to replace the physical branch in delivering products and services to the customers from the result that showed the branch capital cost falling rate is greater than the raise of ATM capital cost result from the substitution. Hence, lead to higher cost efficiency of the bank. Strategies of non-price competition also can be enhanced through the

increasing coverage of area served and decline of unit cost which resulted from the expansion of the ATM network. Ultimately, it aid in holding and brings in more and new depositors to the banks and increase the spread revenue as a percent of operating costs.

Input variable 4: Total Asset

The composition of bank's assets and liabilities structure is being concern as time flies due to the possibility for it to make optimal trade-offs among risk (uncertainty of cash flow) and seek to realize the greatest efficiency in the asset and liabilities management (Kusy & Ziemba, 1986). The bank assets are including deposit at the central bank and the provision of finance that lend to both commercial and local customers. At this point, the bank assets can further defined as input asset which used to generate profit through provision of finance or investment, while the other are earning assets which can consider as efficiency output if financial return is greater than the opportunity cost based on the "user cost" framework by Fixler & Zieschang (as cited in Wheelock and Wilson, 2014).

Rangan, Grabowski, Aly, & Pasurka (1988) stated that a bank that operate at a larger scale can improve its pure technical efficiency, however, if the banks going too large, it might drawback the efficiency. Such empirical analysis results were aligned with the findings in study of Miller and Noulas (1996), which agree that when the banks' asset grow larger, bank efficiency will show a positive correlation relationship.

From the study of Nikiel and Opiela (2002), the results showed that on average, large asset size is tend to be more efficient in term of productivity. This can be result from the asset diversification, economies of scale and benefit by offering larger and better quality provision of finance. With a larger size in terms of assets, banks are more capable to reach out towards customers to introduce their products and services.

Alternatively, according to Ferrier, Grosskopf, Hayes & Yaisawarng. (1993), by using a nonparametric approach, these authors revealed that banks with a wider product diversity tends to lower cost efficient regardless of the asset size. Hasan and Marton (2003), also conducted another study which take consideration for the examination of retail deposit to asset ratio and retail loan to asset ratio as proxies for traditional versus non-traditional banking operations. The result showed that only the retail loan to asset ratio as well as revenue and profit efficiency have a significant positive correlation.

Input variable 5: Capital and Reserve

In order to promote a sound banking system, banks had adopted international regulation based on recommendations from Basel Committee by maintaining minimum capital requirement (Mili, Sahut, Trimeche & Teulon, 2016). Capital adequacy ratio is one of the principal regulatory tools to control and monitor a bank's health, which had received concentrated attention nowadays. From the study of Shrieves and Dahl (1992), the capital regulation in banking is effective in increasing capital ratio without shifting the portfolio toward riskier asset holding.

Chiaramonte and Casu (2016), stated that in theoretically a more liquid and better-capitalized bank should be a safer bank. However, during practice, these requirements might trigger changes in risk management, which in turns decrease the bank profitability and ultimately surge bank risk taking propensity.

Capital raise from shareholders are commonly consider as the cheapest fundraising method. With the better cost efficiency in capital inflow, hence banks could generate a higher figure of profit. Nevertheless, higher capitalization often contribute to agency problems between shareholders and managers. Subsequently, this may lead to poor decision making which resulting poor quality management during conducting banking business (Mester, 1996).

Furthermore, government capital injection will affect bank efficiency in various ways. With the increasing of the default rate of provision of finance, government may plans to conduct credit risk transfer transaction in order to protect the stability and soundness of banking system. On the other hands, it also creates financial liberation issue which may constraint the banks in capital utilization in terms of profit generating ability (Chang & Chen, 2016). Reserve which is deposited with the central bank is deemed to absorb the loss arising from the financial shock. Banks required to deposit as much as the regulators required. When such amount of capital deposited, banks will be unable to fully utilize their assets and hence lower down the profit efficiency (Cummings & Durrani, 2016).

2.1.2 Output variables

Output variable 1: Total Deposit

Money or cash placed into bank for safekeeping is part of bank deposits. In general, banks accept deposits through credit accounts such as savings accounts and current accounts. Account holder has the right to withdraw any deposited money at wish. Deposits are known as the liability of the bank to the depositor (Rose & Hudgins, 2013).

Despite being a liability for bank, deposits serve as source of funds for banks. Normally, total deposit will be widely used by bank as investment funds, supply of loans, and capital reserve of bank. When total deposit shrunk, supply of loans lessen, thus credit is less accessible in the market and resulting some corporations will be force to slow down or shut down on investment projects and production line, which decrease total output in the economy (Kassim & Majid, 2009).

To ensure safety and soundness of deposits towards banks, those accounts are normally insured by Perbadanan Insurance Deposit Malaysia (PIDM). Account holders can claim

separate protection up to RM 250, 000 for each accounts in the event of bank solvency. Conventional and Islamic deposit accounts, trust accounts, joint accounts and accounts belong to sole proprietorships, partnerships, expert practices and enterprises which are entitled to enjoy this protection. However, there are certain accounts that are not eligible to enjoy this protection. For instance, designed products, negotiable instruments of deposit and other holder deposits (Bank Negara Malaysia).

Deposit plays several roles in the bank production process. Some researchers characterized deposits as an input, while others view them as an output in measuring bank efficiency (Puri & Yadav, 2015). In the study of Holod and Lewis (2011), they treat deposits as intermediate products in bank production process as deposits can considered as either output or input. Izah and Sudin (2008) treated total deposits as input in their research of technical efficiency within Malaysia commercial banks.

According to Fries and Taci (2005), one of deposits' characters is it able reimbursed in fragment by the liquidity provision, transactions and payment services to depositors. According to Vandenbrink and Denis (2005), if banks were using too much of their short term deposits to finance long term investments may contributed to the economic crisis. According to Abdul Karim, Hassan, Hassan, & Mohamad (2014), most commercial banks cannot adjust their investments quickly because of financing in long-term investment which are at fixed rate due to negative impact of loan growth.

Output variable 2: Loans and Advances

Loans are funds borrowed by banks to borrowers with repayments for specific period carrying interest rate; while, advances are funds provides by banks to borrowers for a specific purpose with repayment after short period (Surbhi, 2015). Loans are kind of debt, usually longer term, and needed more legal formality; while advances are kind of credit facility, short term, and less legal formality is needed. Both loans and advances

are assets of banks and banks use these tools to earn profit from interest collected. Referring to International Monetary Fund (IMF), non-performing loans (NPLs) is type of loan which unpaid more than 90 days interest and principal repayments; or more than 90 days interest has been refinanced, capitalized or overdue by agreement; or outstanding payment less than 90 days but had been default.

According to Espinoza and Prasad (2010) stated that lagged credit growth will affect NPLs. This research also in line with results of Vithessonthi (2016), which bank credit growth, had a positive relationship with NPLs before global financial crisis in 2007; but, it shown negative correlated with non-performing loans after 2007. His research also suggested that credit growth and NPLs have no effect to bank profitability as increases of supply of loans increase NPLs level, but do not show higher profitability. Moreover, the research also stated that Japanese banks would have more opportunities to lower standards of borrowing to balance corporate lending demand as market discipline of Japan weaken after financial crisis 2007. Besides, lending interest rate is one of the determinants which lead to increase NPLs (Beck, Jakubik, & Piloiu, 2013).

Moral hazard is also core element that leads to NPLs. So, bank managers may take more risk lending if moral hazard problems exist. Jensen and Meckling (1976) advise that these problems can be categorize to 2 types: first is managerial rent-seeking that may conduct when managers monitor their corporate wealth optimization by investing in ‘pet projects’ or through inadequate monitoring of loans; second is a conflict of interest between shareholders and creditors because shareholders aim to earn extraordinary return with invest in risky investment. According Zhang, Cai, Dickson & Kutan (2015), their research’s hypothesis test on China banks’ lending decisions exhibit moral hazard while result suggest that riskier lending arise as NPLs ratio increase, thus potentially loans quality may cause loans quality deteriorate and instability financial system.

Ghosh (2015) stated that lower NPLs greater bank profitability, while higher capitalization, higher liquidity risks, worse credit quality, higher cost inefficiency and

banking industry size may leads NPLs to increase. Furthermore, greater government real GDP, real individual income growth rates, and fluctuations in national housing price index tends to decrease NPLs. On the other hand, inflation, unemployment rates, and public debt may leads to increase NPLs.

Output variable 3: Profit before Tax

Tahir, Bakar, & Haron (2010) carry out research about the efficiency levels of local commercial banks and foreign commercial banks in Malaysia using accounting based ratio, stochastic cost and profit frontier approach from year 2000 to 2006. The study result shown that cost of operating and interest margin of foreign banks is slightly lower compare to local banks; while profit ratio are slightly higher than local banks using accounting based ratio. Result suggested that local commercial banks have greater cost efficiency but less profit efficiency as compare to foreign banks using stochastic cost and profit frontier approach.

Bank efficiency might be impact by regulatory and supervision framework (Pasiouras, Tanna, and Zopounidis, 2009). The researches stated that banking regulations boost market discipline and permit authorities' supervisory power had raised both banks cost efficiency and profit efficiency.

According to Chiorazzo and Milani (2011), their study suggests that the more taxes paid by banks likely affect price of banking services increases. The good idea is government implements zero capital income tax. However, this is difficult to apply this rule to actual world and hard to guarantee government keeps its promise if this idea implemented.

Gaganis, Pasiouras, & Tsaklanganos (2013) examine the connection between real tax rate on bank profit efficiency and bank income. It suggests that greater tax rate results in greater profit before tax efficiency. This is because tax on interest income reduces

the amount of deposits. A higher tax rate increases deposits' opportunity cost which is difference between the deposits' rate of return and direct investment and also shrinks investors' disposable income. Hence, these reduce the supply of deposits and raise the cost of loans.

De Nicoló, Gamba, & Lucchetta (2012) stated increases taxes in corporate income and bank liabilities may able to reduce efficiency and welfare. This effect increases of value of tax receipts together with corporate income taxes due to substitution effects. In contrast, bank default risk rises with liability taxation.

2.1.3 Dependent variable

Banking efficiency

Bank efficiency is the evaluation of the performance of the bank (Paradi & Zhu, 2013). Bank efficiency can be determined through accounting profitability ratios, cost ratios, cost efficiency and profit efficiency (Halkos & Tzeremes, 2013). According to Ray (2016), bank efficiency is generalized from the measurement of technical, scale, cost, or profit efficiencies through the nonparametric Data Envelopment Analysis (DEA) approach.

Technical efficiency indicates production of given outputs with minimum inputs or with certain amount of inputs to obtain maximum outputs (Fethi & Pasiouras, 2010). Technical efficiency and allocative efficiency is known as the product of cost efficiency. Allocative efficiency refers to the ability of a bank which managed to achieve an optimum mix of inputs with consideration on their respective prices. Consequently, cost efficiency revealed the ability of a bank to operate with no resources wasted which is be due to technical or allocative inefficiency (Fethi & Pasiouras, 2010). According to Fethi et al. (2010), pure technical efficiency change and scale

efficiency change under the variable returns is the disaggregated technical efficiency change.

2.1.4 Literature on Comparison between Foreign Banks and Local Banks

How does the efficiency of the local banks be affected with the entry of foreign banks? By using 7900 bank observations from 80 countries for the period 1988-1995, Claessens et al. (2001) investigated the extent and the effect of present of foreign banks in local banking markets. These authors suggest that with the entry of foreign banks, it can render the local banks markets more competitive, associated with a reduction in profitability and margins. Thus, the authors suggest that the entry of foreign banks will enhance the efficiency of local banks. Furthermore, by using data from year 1996 to 2000 and with an unbalanced panel consisting of 225 banks and 856 observations, Bonin, Hasan & Wachtel (2005) researched on the effects of ownership, especially by a strategic foreign owner, on bank efficiency for eleven transition countries. These authors suggest that compare with local banks, foreign-owned banks are more cost-efficient with better services provided, if they have a strategic foreign owner. The local banks will be compelled to be more efficient, a better focus on operations due to incline risk, as well as less reliant on relationship-based banking practices when foreign banks exist (Unite & Sullivan, 2003).

According to Lensink and Hermes (2004), local banks tends to reduce costs, increase efficiency and provide a variety of financial services through competition with foreign banks. The quality of local banks' services will be improved in order to retain their market shares. In addition, these authors also suggest that foreign banks entry may introduce new financial services, modern banking techniques which force the local banks to keep up with the pace and resulting in the enhancement in the bank efficiency.

2.2 Review of Relevant Theoretical Models

2.2.1 Data Envelopment Analysis (DEA)

Data envelopment analysis (DEA) is a methodology to evaluate performance and benchmarking which included multiple performance measures (Liu, Lu, & Lu, 2016). The relative efficiency of a number of Decision Making Units (DMUs) is commonly test by the Data Envelopment Analysis (DEA) (Edirisinghe & Zhang, 2007). Cooper, Charnes & Rhodes (2007) developed an efficient frontier moulded by the best performing DMUs and dispense an efficiency index for each non-frontier units according to their differences with efficient frontier (Liu et al., 2016). With a fixed set of input and output parameters, the DEA model is able to compute an efficiency score. In the financial applications of DEA methodology, one particularly appealing idea is to measure managerial efficiency of a company by using its financial statements (Edirisinghe & Zhang, 2007). Furthermore, according to Dong, Hamilton, & Tippett, (2014), DEA is known as a non-parametric approach when it comes to measure the frontier efficiency. As it does not require cost function or a prior assumptions about the analytical form of the production or an assumed probability distribution for efficiency, DEA avoids the model specification error. Fethi and Pasiouras (2010) also stated that DEA does not require any assumptions to be made about the distribution of inefficiency and it does not require a particular functional form on the data in determining the most efficient banks. However, there are drawbacks for DEA which it does not allow random errors as it will exaggerate the inefficiency if any random error is present (Dong et al., 2014). DEA is sensitive to outliers as it assumes the data is free from measurement error (Fethi & Pasiouras, 2010). DEA deemed to have an edge over other analytical tools due to the capability of dealing with multi-input or multi-output settings with no requirement on the unambiguous specifications of the relationships between the inputs and outputs included (Paradi, Rouatt, & Zhu, 2011).

2.2.2 Stochastic Frontier Approach (SFA)

SFA is a parametric approach where the form of the production function is assumed to be known and estimated statistically (Charoenrat & Harvie, 2013). In other words, explicit specification of functional form assumptions about the relationship between inputs and outputs is required (Hailu & Tanaka, 2015). The quality of SFA is dependent on the parameterization. Comparing with Data Envelopment Analysis (DEA), SFA have several advantages. For instance, by specifying parameters in the error term, statistical noise and random variation of the frontier across firms can be removed from inefficiency (Hailu & Tanaka, 2015). SFA allows hypotheses to be tested with relationships between inputs and outputs follow known functional forms as well as statistical rigour (Charoenrat & Harvie, 2013). Furthermore, the unique feature of the stochastic frontier model is that the error term is the sum of a one-sided technical inefficiency term and a two-sided noise term (Bhaumik, Das, & Kumbhakar, 2012). In principle, the stochastic frontier tool can be used in a variety of cases where the one-sided technical efficiency can be viewed as deviation of the outcome variable from its maximum or minimum value (Bhaumik et al., 2012). According to Fenn et al. (2008), potential to discriminate between measurement error and systematic inefficiencies in the estimation process is the principal advantage of SFA in the estimation of cost frontiers. However, these authors also stated that the means by which this is achieved is inevitably subtle to distributional assumptions, in terms of relation to the frontier itself and the stochastic nature of the error terms.

2.3 Proposed Theoretical / Conceptual Framework

In this part will discuss about how to use DEA method to investigate the hypothesis. DEA method will aid to evaluate the level of efficiency. There are five input variables and three output variables take into account to examine the efficiency score. The figure below shows framework of inputs and the outputs to examine the banking efficiency in Malaysia Banking Industry.

Malaysia Banking Efficiency: A research towards local bank and foreign bank

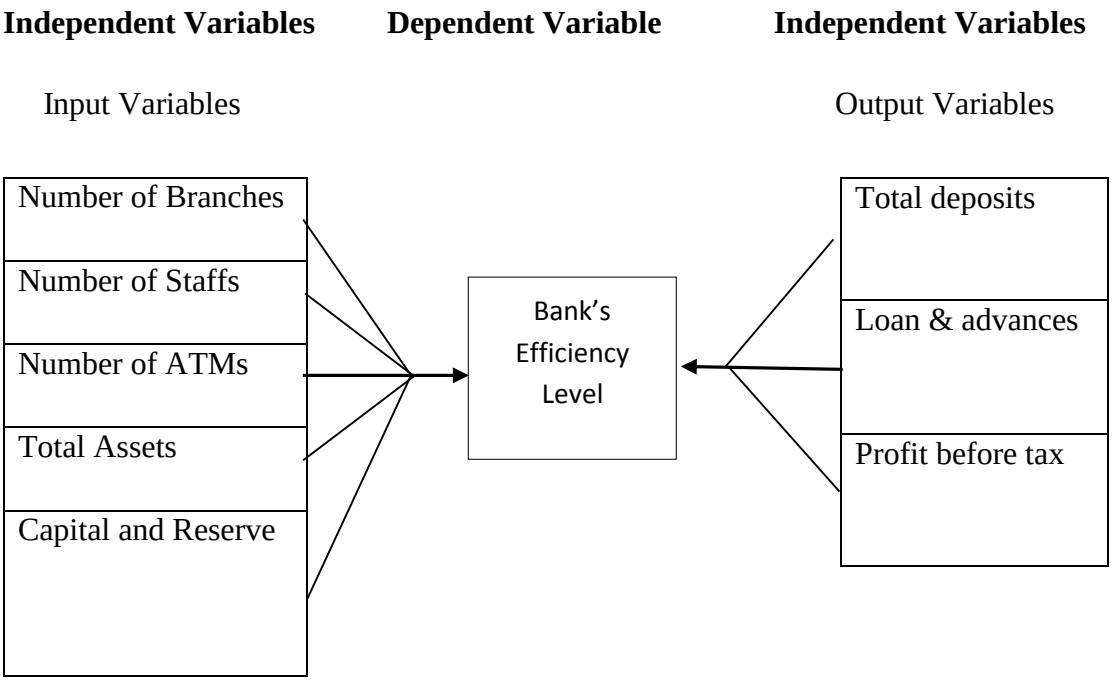

Figure 2.3.1: Relationship between independent variables and dependent variables in efficiency score

This section illustrates the network of relationship among the important variables as shown in figure 2.3.1. In this study, the main purpose is to gain deep intuitive understanding regarding to the efficiency of local and foreign bank. The figure shows

all of the variables included in our study. The inputs are number of branches, number of staffs, number of ATMs, total assets and capital and reserve that are used to examine the efficiency level. The outputs are total deposit, loan and advances and profit before tax. To conduct this research, the variables in inputs and outputs of the banks are both independent variables to examine the bank efficiency level which is the dependent variable.

The result of efficiency score that done by DEA will be use in chapter 4 to compare the efficiency level for foreign banks and local banks. According to Shabri abd. Majid & Rahim (2013), they have found out the conventional banks are more concern on the cost efficiency while the Islamic banks are more concern in allocation efficiency.

2.4 Hypothesis Development

H1: Foreign banks operate more efficient as compared with the local banks in Malaysia banking industry.

According to Havrylchyk (2006), foreign banks have high efficiency compare to local banks and utilize their comparative advantages. In loans and technology, foreign banks have better output quality than local banks as foreign banks have good performing loans and are able to provide advance technology. In managerial efficient, foreign banks show higher efficiency than local banks. In addition, foreign banks have high level of efficiency scores compare to all categories of local banks in Croatia (Kraft, Hofler & Payne, 2006).

H2: Larger banks are more efficient than smaller banks in competing with foreign banks.

According to Fuentes and Vergara (2003), banks with higher property ownerships tend to have higher level of cost and profit efficiency. This is because larger bank can easily mitigate the principal agent problem compared to smaller banks. Larger banks tend to benefit from economic of scale and have greater expertise in risk management. Besides that, Arora (2010) found that the bank size has significant effect towards the bank's efficiency.

H3: Local banks without government intervention is more efficient than government-link banks in competing with foreign banks.

According to Sturm and William (2004), deregulation has increased local bank efficiency in Australia. The entry of foreign bank enhanced technological exchange and improvement to the local banks. The technological changes in local banks had produced a higher productivity in post-regulation. However, Chen (2013) stated that commercial banks have higher productivity growth when there is a better national governance due to effective and timely information disclosure and adequate supervision. It can said that deregulation effects impact bank's efficiency varies across the nation.

H4: Post-merger bank operate more efficient than pre-merger bank in competing with foreign banks.

According to Du and Sim (2016), bank mergers and acquisitions (M&A) can lead to bank efficiency. However, it depends on whether on the target bank or acquiring bank's viewpoint. Target bank tends to have positive impact on its efficiency while acquiring bank have no signal of improvement on its efficiency after the M&A. Researchers also found that over the short run period, M&A could improves operating efficiency but not

during financial crisis hits in Greek. They believe that the bank mergers does not ensure bank efficiency in all event (Halkos & Tzeremes, 2013). Moreover, Peng and Wang (2004) stated that cost efficiency on M&A can be varies for different organizational types. Those banks owned by the government or govern by the government tends to benefit maximum cost efficiencies while private bank have lowest cost efficiencies in Taiwan.

2.5 Conclusion

In order to determine Malaysia banking efficiency of local bank and foreign bank, this research use the selected inputs and outputs for further investigation. The input variables included number of branches, number of staff, number of ATMs, total asset and capital reserve. The output variables included total deposit, profit before tax and loan and advances. The rationale for using those input and output variables are due to most of the past researches had chosen the same variables for their researches. However, limitation of focusing narrow perspective by many past researcher which only look into the comparison of banking efficiency between local banks while overlook several aspects which are able to provide greater vision on overall banking efficiency. The vital aspects in determine bank efficiency will disclose and develop in the hypothesis statement.

The relevant theoretical models or methods to scale the scoring in bank efficiency conduct in this research are Data Envelopment Analysis (DEA) and Cobb Douglas stochastic frontier production model (SFA) which been used by many past researchers in the past few decades (Edirisinghe & Zhang, 2007; Paradi et al, 2011; Hailu & Tanaka, 2015; Charoenrat & Harvie, 2013; Unite & Sullivan, 2003). These two models are among those which are widely use in interpreting the bank efficiency's scores as the model's results are more relevant.

For hypothesis development, this research has been stressed on several aspects such as determine the level of bank efficiency between local bank and foreign bank in order to provide better view on banking efficiency. Comparison on bank size, financial freedom, mergers and acquisitions and foreign bank versus local bank have taken into account. Hence, the finding of the research ought to provide more precise result on the level of bank efficiency and performance in selected banks. Thus, in conducting the next chapter, the research will provide an overview of the research methodology and explains how it is conducted during the research carry out.

Chapter 3: Methodology

3.0 Introduction

This chapter will introduce about the data collection and methodology of analyzing the efficiency of the bank. The highlights in this particular chapter included research design, data collection methods, sampling design, research instrument, construct measurement, data processing and data analysis which is required before proceed to next chapter. General speaking, this study is based on secondary data which able to retrieve from the annual reports of each banks selected as well as Association of Banks Malaysia. The obtained data will be analyzed by using Data Envelopment Analysis (DEA) to evaluate the efficiency of the local and foreign banks in Malaysia.

3.1 Research Design

To investigate the efficiency of local and foreign banks in Malaysia, this study apply Data Envelopment Analysis (DEA) approach to undergone the particular purpose. The main concern of this study is to examine and compare the bank efficiency of local banks and foreign banks in Malaysia. In addition, this study aims to determine the aftermath of the existence of foreign banks on the efficiency of the local banks in Malaysia. Furthermore, this study will examine the relationship between size of bank and bank efficiency of local banks. The consequence of government intervention upon local banks' efficiency and their ability to compete with foreign banks are being inspect in this particular study as well. Besides that, this study also evaluate the effect of bank mergers and acquisitions upon bank efficiency of local banks and how does it affect the position in terms of competition with foreign banks. The data required for the research will be retrieved from the sample banks' annual reports and from Association of Banks

Malaysia. In general, a total number of eight independent variables and one dependent variables will be included in this study.

3.2 Data Collection Methods

3.2.1 Secondary Data

This study obtained and analyze secondary data for the usage of the measurement of efficiency of the banks. There are seven local banks and five foreign banks in Malaysia designated to be analyze. The data for these banks are obtained from the respective annual reports of each banks as well as the Association of Banks Malaysia. The data for input variables of each banks are retrieved from the balance sheets, income statements which are available from the annual reports of the respective banks. Additionally, besides annual reports of the banks and Association of Banks Malaysia, the alternative data sources included journals, Data Bank, government website, etc.

3.3 Sampling Design

3.3.1 Target Population

In conducting the result, secondary data will be use. This research will focus on the performance of banking efficiency for the local banks and foreign banks in commercial bank sector in Malaysia. The research will examine the result for a long-run period of 8 years to develop a consistent result. Following will be the historical background of the selected local banks and foreign banks in commercial bank sector in Malaysia (Table 3.3.1 & 3.3.2).

Bank name	Background
AmBank (M) Berhad	Ambank (M) Berhad, as the fifth largest anchor bank in Malaysia was established in August 1975, consists of AMMB Holdings Berhad and its subsidiaries from sectors of investment, Islamic finance, Insurance and so on. Ambank (M) Berhad stands as a premier financial service provider by offering business and consumer a variety of both commercial and Islamic banking products and services. These includes investment banking, commercial banking, retail financing, leasing, stock trading, general insurance, Islamic insurance (Takaful), wealth management, derivatives trading and offshore banking. Throughout its development history, it receives great support and assistance from the oversea banking group especially in the aspect of management, risk control and advance of fresh business. Ambank (M) Berhad was well known as the very first pioneer in private sector institution in raising capital by issuing public bond in Kuala Lumpur Stock Exchange (KLSE, now called as Bursa Malaysia). It was Malaysia's first merchant bank that public listed in the KLSE since year 1988 and had the first property trust to be listed in the KLSE in the following year.
CIMB Bank Berhad	CIMB Group roots can be traced back nearly 90 years. CIMB Group is a leading universal bank in ASEAN, which is one of the largest Asian investment banks and also is one of the world's largest Islamic banks. CIMB group offers consumer banking, Islamic banking, commercial banking,

	wholesale banking, and asset management goods and services to the customers. CIMB was on the main market listed in Bursa Malaysia since 1987. Besides, CIMB operate in 17 markets around the globe with over 40,000 staff serving and connecting our 13 million customers.
EON Capital Berhad	EON Capital Berhad was a bank that listed on Main Board of Bursa Malysia and it is one of the oldest banks in Malaysia where EON Capital Berhad's presence in Malaysia dates back to 1984. EON bank was the first local bank to be awarded license to operate a Takaful business in Malaysia in 2006. There are total 61 branches nationwide of EON in Malaysia. In 2012, Hong Leong and EON Capital Berhad merged and now EON Capital Berhad is part of Hong Leong Bank Berhad. The number of branches increased from 2007 to 2010 as they have 141 branches in 2010. The number of employee in 2010 is 5846.
Hong Leong Bank	Hong Leong Bank Berhad is a member of Hong Leong Group Malaysia and it is a public listed company on Bursa Malaysia. The headquarters of Hong Leong Group is in Malaysia since 1968. It operated in 35 branches and renamed MUI Bank in 1989. MUI Bank was aquired by the Hong Leong Group Malaysia through Hong Leong Credit Berhad which known as Hong Leong Financial Group Berhadin 1994. Hong Leong Bank Berhad is very stable in banking industry as it have more than 100 years of banking knowledge and experience.

	In 2011, Hong Leong Bank Berhad have completed doing merger exercise with EON Bank group. The merging exercise effectively transform the bank into banking group more than RM145 billion assets and expanded 329 branches nationwide. Hong Leong Bank Berhad was stated as Malaysia's 5th largest banking group.
Malayan Banking Berhad (Maybank)	Malayan Bank Berhad is also known as Maybank. Maybank is the largest financial institution in Malaysia with over 2,100 offices in 17 countries worldwide such as Singapore, Philippines, London, Hong Kong and etc. Maybank was incorporated in 31 May 1960 and started operate in 12 September 1960. Maybank operates business, consumer banking and corporate banking and private banking as well. It is one of the largest listed companies on Bursa Malaysia to provide the best banking practices experiences. In 2010, Maybank is the largest Malaysian bank.
Public Bank Berhad	Public Bank Berhad is the largest shareholder funding bank in Malaysia, second largest in the market capital value and third largest in term of total asset. Public Bank was founded by Teh Hong Piow in the year 1966 and successfully put in on the main board of KLSE in the following year. Nowadays, Public Bank Berhad owns a vast network of banking operations throughout the Malaysia region. Besides local market, Public Bank Berhad also expand its banking business to other Asia-Pacific countries.

	The range of banking services and products offer is deep and wide to all segment of customers in the sectors of personal banking, commercial banking, Islamic banking, investment banking, stock broking services, trustee services, nominee services, wealth management, insurance. The core strategy of Public bank is concentration in retail banking business segment especially in the small and medium enterprises (SMEs).
RHB Bank	RHB Capital Bhd (RHB Banking Group) was incorporated in Malaysia as a public limited company on 24 August 1994 under the name of DCB Holdings Berhad. Now, the fourth largest fully integrated financial services group in Malaysia, The RHB Banking Group provides financial products and services through its main subsidiaries – RHB Bank Berhad, RHB Investment Bank Berhad, OSK Investment Bank Berhad, RHB Insurance Berhad and RHB Islamic Bank Berhad, while its asset management and unit trust businesses are undertaken by RHB Asset Management Sdn. Bhd. and RHB Islamic International Asset Management Berhad. With the recent merger of OSKIB and RHBIB, the investment banking business is now in seven ASEAN countries and Hong Kong. The Group has a staff strength of 10,000 and as of 31 December 2009, Total Assets were RM115.0 Billion with Total Shareholders' Funds at RM8.7 Billion

Table 3.3.1: Background of Local Banks

Bank Name	Background
Citibank Berhad	Citibank Berhad is a licensed banking institutions founded since July 1959 in Malaysia, and incorporated in 1994. It operates as Citigroup Holding (Singapore) Private Limited subsidiary. It has around 6,400 employees in Malaysia and 11 branches through Penang, Kuala Lumpur, Selangor, Malacca, Kuantan, and Johor. Citibank Berhad is an universal bank which offering financial products includes retail banking, investment products, credit cards, insurance, and offshore financial services at Labuan. Not only that, it is the only foreign bank to be rated AAA by Rating Agency Malaysia for 15 consecutive years. It also offers its customers access to its transaction services and cash withdrawal through 11,000 MEPS (Malaysian Electronic Payment System) ATMs throughout 2,000 locations nationwide. Citibank Berhad is a front-runner in credit cards, top foreign bank for Corporate Foreign Exchange, cross-country Cash Management, e-payments and institutional investor transactions.
HSBC Bank Malaysia Berhad	HSBC Bank Malaysia Berhad's existence dates back to 1884 which 1st office established in Penang and go through acquisition of Mercantile Bank, branches expansion in more states until become largest foreign-owned bank in Malaysia today. It is a HSBC Holdings plc subsidiary which headquartered in London, while the group had nearest 8,000 offices across 87 countries including Europe, Americas, Middle East, Asia-Pacific region and Africa. It had around 5,000

	employees and 60 branches in Malaysia nationwide including HSBC Amanah Malaysia Berhad branches. It offers many varieties of personal financial services, Global Banking and Markets, Commercial banking, and also offering Islamic financial services include Takaful since 1994 in Malaysia. Moreover, it recognised its Islamic banking subsidiary which is HSBC Amanah Malaysia Berhad in 2007. It got many awards including rated as AAA in Asset Servicing Awards in 2015 for 8th consecutive year, and Best Foreign Commercial Bank in Malaysia for 5th consecutive year.
OCBC Bank (Malaysia) Berhad	OCBC Bank (Malaysia) Berhad has operated in Malaysia more than eight decade long and incorporated in 1994. OCBC Bank is a public listed financial service organisation originate from Singapore and formed in 1932. It was the longest established bank in Singapore with the mergers of three bank known as Chinese Commercial Bank (1912), Ho Hong Bank (1917), and Oversea- Chinese Bank (1919). Today, OCBC Bank has become second largest financial services group in Southeast Asia with the asset more than 224 billion SGD. Due to its financial stability and strength, OCBC Bank get Aa1 rating recognition from Moody's, credit rating corporation and also achieved rank number one in World's 10 strongest $ 100 billion assets banks by the Bloomberg in 2011. Wide range of services for the customers, business, corporate, as well as the government in financial services, wealth management services, investment, insurance, asset management, and stock broking services provided by the OCBC

	Bank and its subsidiaries. Targeted market of OCBC Bank are Singapore, Malaysia, Indonesia and Greater China. It has placed over 620 branches and representative offices all over 18 countries and regions. As at 2014, OCBC Bank (Malaysia) Berhad has 41 branches in total comprising 31 conventional and 10 Islamic banking.
Standard Chartered Bank Malaysia Berhad	Standard Chartered Bank's existence should be dates back to 1875 when it opened 1st branch in Penang, Malaysia, and united as Standard Chartered Bank Malaysia Berhad on 29th February 1984 equally Malaysia 1st and oldest bank with over 140 years history. It had around 7,000 employees for Malaysian operations. It recognized Standard Chartered Saadiq Berhad as Standard Chartered Bank Malaysia Berhad subsidiary in 2008 which offering Islamic banking services and Shariah-compliant solutions. Standard Chartered Bank Malaysia Berhad runs a full range of financial products and services to people and corporates. Standard Chartered Bank won Islamic Deal of the Year by IFR Asia Awards 2015 for Malaysia's USD1.5billion dual tranche sovereign sukuk.
United Overseas Bank Malaysia (UOB Malaysia)	UOB was united as United Chinese Bank in 1935 and set up by Datuk Wee Kheng Chiang, thus name amendment was effected in 1965. UOB had more than 500 offices in 19 countries including Western Europe, Asia Pacific, and North America.

	UOB Malaysia was UOB Limited subsidiary and united in 1993. It go through a series of acquisition from took over Lee Wah Bank Malaysian operations in 1994, Chung Khiaw Bank Berhad was merged with UOB in 1997 and Overseas Union Bank Berhad in 2002. UOB Malaysia runs 45 branches through Malaysia nationwide. It provides wide range of commercial financial services and personal financial services including commercial lending, treasury services, investment banking, trade services, home loans, cash management and bank assurance.

Table 3.3.2: Background of Foreign Banks

3.3.2 Sampling Frame and Sampling Location

In this research, a total number of seven local banks and five foreign banks in Malaysia are chosen to undergone the evaluation of the performance of banking efficiency. The performance of efficiencies will be measure only within the Malaysia boundaries for foreign banks although the parent companies of the foreign banks are allocated overseas.

3.3.3 Sampling element

Banking efficiency can be measured by several tools and approaches, such as Data Envelopment Analysis (DEA) approach, Stochastic Frontier Analysis (SFA) approach, bank profitability, bank rating, and etc. The main purpose of the research is to study and make a comparison about the banking efficiency between the local banks and foreign banks in commercial bank sectors in Malaysia. Due to specific respondent is address to, banks with increasing popularity and well known banks are selected as sampling units. The bank efficiency of sample banks which are seven local banks and five foreign banks in total will be determined and comparison will be make.

3.3.4 Sampling Technique

There are seven local banks and five foreign banks selected for the research purpose. The local banks that had been selected included Ambank (M) Berhad, CIMB Bank Berhad, Hong Leong Bank Berhad, Malayan Banking Berhad, Public Bank Berhad, and RHB Bank Berhad. For the selected foreign banks, it consist of Citibank Berhad, HSBC Bank Malaysia Berhad, OCBC Bank (Malaysia) Berhad, Standard Chartered Bank Malaysia Berhad, and United Overseas Bank (Malaysia)

Bhd. Data Envelopment Analysis (DEA) approach will be used to analyze the bank efficiency of the chosen commercial banks in Malaysia.

3.3.5 Sampling Size

In Malaysia, financial institution can be categorize into three categories namely Investment Bank, Islamic Bank, and Commercial Bank. In this particular research, Commercial Bank is selected as sample. Based on the information provided by Bank Negara Malaysia (BNM), there are twenty-seven established commercial banks in Malaysia which comprising of 8 local banks and 19 foreign banks. A full list of commercial bank in Malaysia is listed out in the table below (Table 3.3.3).

Commercial Bank in Malaysia		
No.	Bank Name	Ownership
1.	Affin Bank BErhad	L
2.	Alliance Bank Malaysia Berhad	L
3.	Ambank (M) Berhad	L
4.	BNP Paribas Malaysia Berhad	F
5.	Bangkok Bank Berhad	F
6.	Bank of America Malaysia Berhad	F
7.	Bank of China (Malaysia) Berhad	F
8.	Bank of Tokyo- Mitsubishi UFJ (Malaysia) BErhad	F
9.	CIMB Bank Berhad	L
10.	Citibank Berhad	F
11.	Deutsche Bank (Malaysia) Berhad	F
12.	HSBC Bank Malaysia Berhad	F

13.	Hong Leong Bank Berhad	L
14.	India International Bank (Malaysia) Berhad	F
15.	Industrial and Commercial Bank of China (Malaysia) Berhad	F
16.	J. P. Morgan Chase Bank Berhad	F
17.	Malayan Banking Berhad	L
18.	Mizuho Bank (Malaysia) Berhad	F
19.	National Bank of Abu Dhabi Malaysia Berhad	F
20.	OCBC Bank (Malaysia) Berhad	F
21.	Public Bank Berhad	L
22.	RHB Bank Berhad	L
23.	Standard Chartered Bank Malaysia Berhad	F
24.	Sumitomo Mitsui Banking Corporation Malaysia Berhad	F
25.	The Bank of Nova Scotia Berhad	F
26.	The Royal Bank of Scotland Berhad	F
27.	United Overseas Bank (Malaysia) Bhd.	F

Source: Bank Negara Malaysia (Central Bank of Malaysia); Last Updated Date: 12 November 2013

Table 3.3.3 Classification of commercial bank in Malaysia

However, due to specific reasons and circumstances, only 12 commercial banks comprising of 7 local banks and 5 foreign banks will be selected in conducting the whole research. The selected banks are as following (Table 3.3.4).

Local Bank	Foreign Bank
Ambank (M) Berhad	Citibank Berhad
CIMB Bank Berhad	HSBC Bank Malaysia Berhad
EON Capital Berhad	OCBC Bank (Malaysia) Berhad
Hong Leong Bank Berhad	Standard Chartered Bank Malaysia Berhad
Malayan Bank Berhad	United Overseas Bank (Malaysia) Bhd.
Public Bank Berhad	
RHB Bank Berhad	

Table 3.3.4 List of Selected Local Banks and Foreign Banks in Malaysia

3.4 Research Instrument

This research will analyze secondary data obtained by using the Data Envelopment Analysis (DEA) approach to compute the banking efficiency of the selected banks. Therefore, questionnaires are excluded for this research. DEA linear programming methodology meant for the measurement the efficiency of multiple decision-making units when the production process shows a structure of multiple inputs and outputs. To obtain the accurate result for this research, the data will be retrieved from the reliable sources such as the annual reports of each banks and Association of Bank Malaysia. There are total 8 years period data assembled for the research to be carry out. The range start from year 2007 to year 2014. The purpose for using DEA approach is due to this method is able to compute and evaluate the operation efficiency of each of the banks, hence it will provide more precise and transparent result for all the individual banks. There are total 7 local banks and 5 foreign banks to be studied in the research.

3.5 Constructs Measurement (Scale and Operational Definitions)

Research data will be collected from secondary sources for analyze and evaluate purpose. The data will be retrieved from the annual reports of the targeted banks and Association Banks of Malaysia which will be classified before analyze by using the Data Envelopment Analysis (DEA). The complied data will be us to confirm the validity to the hypothesis in the study.

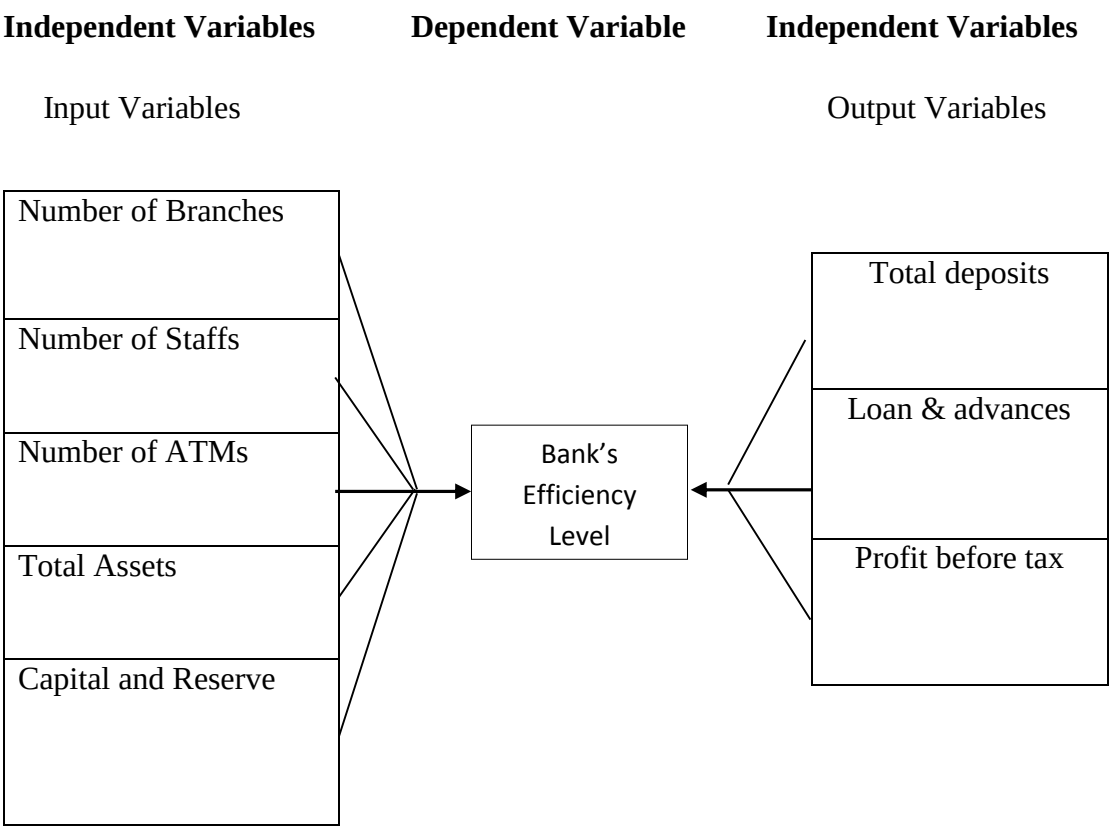

Figure 3.5.1: Relationship between independent variables and dependent variables in efficiency score

According to figure3.5.1, the data collected is differentiate into two kinds of variables which are independent variables and dependent variables. Basically, this study analyze the independent variables which can be either input or output variables to generate the value of the dependent variables. For example, number of branches, number of staffs, number of ATMs, total assets and capital & reserves are known as input variables; while total deposits, loan & advances and profit before tax are known as output. After confirmation of the inputs and outputs, DEA is able to analyze the result in terms of banking efficiency scoring.

3.6 Data Processing

In the first place, data of this research will be obtained from the secondary sources. Secondary sources of this research refers to the annual reports of the targeted banks and Association Banks of Malaysia. Afterwards, data will be compiled and classified before being analyzed. Data Envelopment Analysis (DEA) approach will apply to evaluate the efficiency score in next phase. As for the final stage, this research will use the analysis result from DEA to evidence research's hypothesis in this study. The below figure 3.6.1 will assist to explain the process for better understanding.

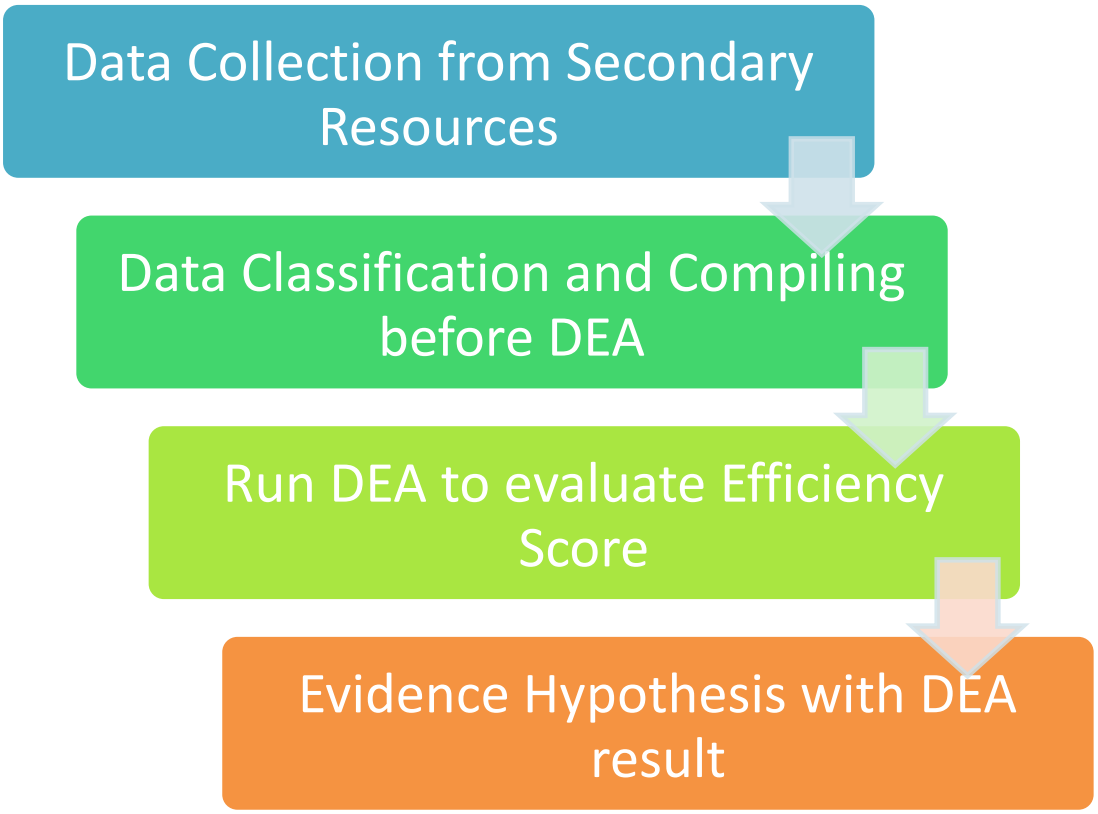

Figure 3.6.1: Data Processing

3.7 Data Analysis

From the Data Envelopment Analysis (DEA) handbook by Cooper, Seiford, & Zhu (2011), it stated that DEA is used to performance of sets of peer entities that referred as Decision-Making Units (DMUs) by using a non-parameter "data-oriented" approach. It mainly used to estimate productivity and efficiency level of the research targets in various forms of output variables. DEA approach recently had been widely applied in variety range of research field such as US Air Force wings, hospitals, universities, banks, etc.

Since it was first introduced to the world since year 1978, DEA had granted new insight into activities that had previously evaluated by other research methods. By study from the benchmarking practices, researchers can easily to identify the efficiency of the research targets and thus spot out the inefficiency variables (weakness).

With the less assumption required, DEA opened up possibilities and posts advantages against other research methods which require lots of assumptions to compensate problem such as heterogeneous data, model misspecification, etc. Besides, it supports various inputs and various outputs from the DMUs and stands as an alternative solution if there are problems regarding to the resistant to the other approaches.

Based on the Farrell (1957) work, to estimate the efficiency, certain assumptions were made. There are *n* unit of DMUs and each unit of DMUs consumes *m* unit of distinct inputs to generate *s* unit of outputs. To be specify, DMU_jconsumes amount x_{ij} of input *i* and produces amount $y_{rj}$of output, *r*. Then, set $x_{ij} \geq 0$ and $y_{rj} \geq 0$ and each unit of DMU should has at least one positive input and one positive output value to estimate the relative efficiency of the DMU_j = DMU_0 to be evaluated relative to the ratios of all of the j = 1, 2, ..., *n* DMU_jafter transformed into ratio form.

The derived model is shown as below.

Efficiency,

$$\max h_0 \ (u, v) = \frac{\sum_r u_r y_{ro}}{\sum_i v_i x_{io}}$$

subject to

$$\frac{\sum_r u_r y_{rj}}{\sum_i v_i x_{ij}} \leq 1 \text{ for } j = 1, \ldots, n,$$

$u_r, v_i \geq 0$ for all i and r.

3.8 Conclusion

In this study, research simply discussed the targeted populations which are local banks and foreign banks in Malaysia with long-run period of 8 years. Besides, research also explained the frame which is performance in terms of banking efficiency and this research is conducted within Malaysia only. The sampling elements and techniques are banks with uprising popularity or good ratings as well as well-known banks. For instance, local banks including Ambank (M) Berhad, CIMB Bank Berhad, Hong Leong Bank Berhad, Malayan Banking Berhad, Public Bank Berhad, EON Capital Berhad and RHB Bank Berhad; while for the foreign banks including Citibank Berhad, HSBC Bank Malaysia Berhad, OCBC Bank (Malaysia) Berhad, Standard Chartered Bank Malaysia Berhad, and United Overseas Bank (Malaysia) Bhd. As for sampling size, commercial banks are selected to conduct the research. The bank efficiency can be measured through several tools such as DEA and SFA. Assembled data will be classify into independent variables which can be further classified into input variables and output variables. Input variables include numbers of branches, numbers of staffs, numbers of ATMs, total assets, and capital and reserves; and output variables includes total deposits, loan and advances, and profit before tax. There is only one dependent variable which is the bank's efficiency level.

A simplify formulae for better understanding in DEA process as below.

$$Efficiency = \frac{Output}{Input}$$

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

In chapter 4, the efficiency score of 7 local banks and 5 foreign banks in Malaysia will be determined by using the DEA approach. This research will examine the efficiency level of local banks and foreign banks in Malaysia start from year 2007 to year 2014.

4.1 Descriptive Analysis

Table 4.0 shows below had go through several statistics to analysis the input and output variables within the sample period from 2007 to 2014 before discussing the result of DEA approach. Statistic data will help to provide better information on population in banking industry.

4.1.1 Respondent Demographic Profile

Based on table 4.0, it shows the range of data. The data collection for each bank is different as in the same input or output, the value is different. The value of input and output for each bank is raising from year to year. Due to different bank have different culture, their operation and management will different too. Therefore, some of the bank prefer using high input to produce high output while some of the bank prefer using high output to produce low output or vice versa.

4.1.2 Trend Analysis

Based on table 4.1.1 to 4.1.8, the mean value, maximum value, minimum value and range from year 2007 to year 2014 showed the input and output from each of the banks in banking industry is increasing. The mean (average) can conclude the improvement in banking industry. The value of range is increasing in the first 4 years and drop for 1 year yet it slowly rose back for 2 years. However, the value of standard deviation is not stable and fluctuate over the whole period of 8 years. The input variable included total assets, capital reserve, branches, ATM and employee, while the output variable included loan and advances, total deposit and profit before tax.

Year	Statistic	Input Variable					Output Variable		
		Branches	Employee	ATM	Total asset (RM'000)	Capital & Reserves (RM'000)	Total deposit (RM '000)	Loan & Advances (RM'000)	Profit before tax (RM'000)
2007	Mean	150.7	7,506.3	488.2	84,266,608.2	5,699,320.2	64,633,445	45,305,136	1,200,212.7
	Max	371	22,465	2,498	227,447,240	17,453,838	165,026,349	118,557,035	3,892,704
	Min	7	2,012	38	41,119,882	1,752,295	29,150,762	717,525	-84,612
	Range	364	20,453	2,460	186,327,358	15,701,543	135,875,587	117,839,510	3,977,316
	Standard Deviation	127.2	6,182.0	714.8	60,313,499.2	4,771,487.3	43,016,593	39,241,791.3	1,126,789.5

Table 4.1.1: Descriptive statistic for year 2007

Year	Statistic	Input Variable					Output Variable		
		Branches	Employee	ATM	Total asset (RM'000)	Capital & Reserves (RM'000)	Total deposit (RM '000)	Loan & Advances (RM'000)	Profit before tax (RM'000)
2008	Mean	137.7	7,556.2	551.3	86,318,360.9	6,387,354.4	71,094,398.7	50,285,986.8	1,367,862.7
	Max	378	14,564	2,765	219,172,485	17,200,315	180,752,634	138,855,474	3,118,575
	Min	7	2,012	33	40,317,701	2,081,944	31,832,502	19,211,240	207,611
	Range	371	12,552	2,732	178,854,784	15,118,371	148,920,132	119,644,234	2,910,964
	Standard Deviation	131.4	6,168.8	819.9	59,361,297.5	4,604,424.8	48,975,875.3	37,140,029.9	901,201.2

Table 4.1.2: Descriptive statistic for year 2008

Year	Statistic	Input Variable					Output Variable		
		Branches	Employee	ATM	Total asset (RM'000)	Capital & Reserves (RM'000)	Total deposit (RM '000)	Loan & Advances (RM'000)	Profit before tax (RM'000)
2009	Mean	150.3	7,600.5	631.4	91,790,229.7	7,399,049.8	76,814,148.8	53,210,930.7	1,046,836.9
	Max	387	23,168	2,828	238,277,142	22,510,444	193,574,846	144,431,798	2,789,170
	Min	7	2,044	33	39,397,787	2,283,114	33,523,993	18,497,072	383,079
	Range	380	21,124	2,795	198,879,355	20,227,330	160,050,853	125,934,726	2,406,091
	Standard Deviation	125	6,296	881	65,286,717	6,013,533	54,101,340	39,872,755	708,483

Table 4.1.3: Descriptive statistic for year 2009

Year	Statistic	Input Variable					Output Variable		
		Branches	Employee	ATM	Total asset (RM'000)	Capital & Reserves (RM'000)	Total deposit (RM '000)	Loan & Advances (RM'000)	Profit before tax (RM'000)
2010	Mean	151.3	8,491.8	689.92	98,531,868.7	8,353,146.9	81,584,770.2	59,587,470.3	1,629,433.8
	Max	385	23,870	2,847	248,392,266	25,256,824	198,309,563	151,469,585	4,786,544
	Min	11	2,064	38	37,621,647	2,554,697	31,111,788	19,480,745	507,670
	Range	374	21,806	2,809	210,770,619	22,702,127	167,197,775	131,988,840	4,278,874
	Standard Deviation	124	6,501	899	67,799,098	6,672,244	55,147,042	42,720,754	1,340,331

Table 4.1.4: Descriptive statistic for year 2010

Year	Statistic	Input Variable					Output Variable		
		Branches	Employee	ATM	Total asset (RM'000)	Capital & Reserves (RM'000)	Total deposit (RM '000)	Loan & Advances (RM'000)	Profit before tax (RM'000)
2011	Mean	167.2	10,674.5	798.4	124,771,958.5	9,944,146.1	101,310,504.5	74,847,861.6	1,829,229
	Max	396	42,693	2,866	323,999,608	29,634,456	258,450,885	194,174,085	4,327,840
	Min	11	2,084	38	44,449,559	3,178,245	37,847,802	20,357,327	765,036
	Range	385	40,609	2,828	279,550,049	26,456,211	220,603,083	173,816,758	3,562,804
	Standard Deviation	142.0	11,510.0	957.8	85,450,569.2	7,991,145.7	68,488,547.2	53,599,957.9	1,146,054.9

Table 4.1.5: Descriptive statistic for year 2011

Year	Statistic	Input Variable					Output Variable		
		Branches	Employee	ATM	Total asset (RM'000)	Capital & Reserves (RM'000)	Total deposit (RM '000)	Loan & Advances (RM'000)	Profit before tax (RM'000)
2012	Mean	165	11,126.8	816.8	134,224,262.4	11,565,102.3	109,511,477.5	82,355,486.7	2,230,648.2
	Max	399	47,233	2862	342,556,673	36,895,307	266,600,855	214,852,046	5,498,158
	Min	11	2,062	38	38,453,019	3,665,843	31,844,219	19,276,194	789,577
	Range	388	45,171	2824	304,103,654	33,229,464	234,756,636	195,575,852	4,708,581
	Standard Deviation	138.7	12,812.7	974.4	93,079,874.8	9,647,739.3	73,378,511.9	60,278,022.1	1,580,174.8

Table 4.1.6: Descriptive statistic for year 2012

Year	Statistic	Input Variable					Output Variable		
		Branches	Employee	ATM	Total asset (RM'000)	Capital & Reserves (RM'000)	Total deposit (RM '000)	Loan & Advances (RM'000)	Profit before tax (RM'000)
2013	Mean	161.7	11,759.4	808.5	147,705,564.1	12,790,851	120,119,525.4	91,722,272.3	2250798.6
	Max	399	47,523	2777	397,605,477	40,499,772	311,252,957	237,971,279	6,126,940
	Min	11	2,002	37	38,372,211	4,327,584	31,669,786	20,498,282	647,748
	Range	388	45,521	2740	359,233,266	36,172,188	279,583,171	217,472,997	5479192
	Standard Deviation	128.1	12,361.8	904.1	103,548,900.2	10,274,055.7	82,209,040.4	64,943,444.7	1626466

Table 4.1.7: Descriptive statistic for year 2013

Year	Statistic	Input Variable					Output Variable		
		Branches	Employee	ATM	Total asset (RM'000)	Capital & Reserves (RM'000)	Total deposit (RM '000)	Loan & Advances (RM'000)	Profit before tax (RM'000)
2014	Mean	161.7	11,223.5	793.5	162,917,449	14,832,335.7	130,072,917.5	101,779,433.5	2,458,611.5
	Max	402	47,058	2615	452,559,458	46,172,805	354,439,156	264,524,441	7,344,427
	Min	11	2,245	35	37,634,078	4,048,705	26,706,380	21,641,546	500,423
	Range	391	44,813	2580	414,925,380	42,124,100	327,732,776	242,882,895	6,844,004
	Standard Deviation	135.2	12,704.8	926.6	126,126,582.6	40,558,984.2	101,034,102.1	75,919,185.2	2,054,631.1

Table 4.1.8: Descriptive statistic for year 2014

4.2 Outcomes of Relative Efficiency Score (Scale Measurement)

This research apply the DEA approach to analyze the efficiency of the local and foreign banks in Malaysia. The research studied and make comparison between the banking efficiency of the selected local and foreign banks in Malaysia from year 2007 till year 2014. Additionally, the study also able to determine and make a comparison between the banking efficiency of large banks and small banks. Furthermore, this study also deems to be interested to determine whether the bank will operate efficiently with or without the government intervention. In addition, a comparison in terms of banking efficiency between pre-merger and post-merger banks are available in this study. The efficiency score determines whether the bank operate efficiently or not regarding to the various input and output variables. The bank is considered to be efficient if and only if the bank have a 100% score.

According to table 4.2.1, five banks are able to maintain and operate efficiently throughout the period, namely Citibank Berhad, OCBC (Malaysia) Bank Berhad, Standard Chartered Bank Malaysia Berhad, United Overseas Bank (Malaysia) Berhad and Public Bank Berhad. Malayan Bank Berhad and CIMB Bank Berhad are having the similar trend in terms of banking efficiency. Both of the banks are inefficient over the period except for the year 2011. Meanwhile, Ambank (M) Berhad managed to run the business efficiently in year 2014 after 7 years of being operating inefficiently. HSBC Bank Malaysia Berhad had been running the business efficiently except for year 2009. The banking efficiency for Hong Leong Bank Berhad and RHB Bank Berhad fluctuate throughout the period. As for Eon Capital Berhad, before it was acquired by Hong Leong Bank Berhad, it was running the business efficiently until year 2010. In a conclusion, foreign banks deemed to be more efficient in running the business than the local banks.

As for table 4.2.2, it displays the banking efficiency of Eon Capital Berhad and Hong Leong Bank Berhad. Before being acquired by Hong Leong Bank Berhad, Eon Capital Berhad had been operating efficiently all the time while Hong Leong Bank Berhad does not. The

efficiency of Hong Leong Bank Berhad fluctuate before it acquired Eon Capital Berhad. After it acquired Eon Capital Berhad, Hong Leong Bank Berhad managed to operate efficiency for two years which are year 2011 and year 2012. Generally speaking, merger and acquisition will affect the banking efficiency for a period.

From table 4.2.3, Public Bank Berhad, Malayan Bank Berhad and CIMB Bank Berhad are recognized as the large banks while Ambank (M) Berhad, RHB Bank Berhad, Hong Leong Bank Berhad and EON Capital Berhad are known as small banks. Public Bank Berhad is the only large bank in Malaysia which is able to maintain its business running efficiently throughout the period. The other two large banks, Malayan Bank Berhad and CIMB Bank Berhad banking efficieny fluctuate over the years and operate efficiently during year 2011 only. As for the small banks, the banking efficiency for RHB Bank Berhad and Hong Leong Bank Berhad are inconsistent and vacillate. Eon Capital Berhad is the only small bank which can operate efficiently before it was acquired by Hong Leong Bank Berhad in year 2010. Ambank (M) Berhad is excluded during year 2007 due to negative value detected. It is considered to be inefficient from year 2007 till year 2013 according to the efficiency scoring approach. However, it managed to become an efficient bank during year 2014. In other words, large bank does not necessarily have a better banking efficiency than small banks. It depends on the quality of management of the bank on resources distribution and other variables.

According to table 4.2.4, government-link banks included Malayan Bank Berhad, CIMB Bank Berhad and Ambank (M) Berhad. Public Bank Berhad, RHB Bank Berhad, Hong Leong Bank Berhad and EON Capital Berhad are known as private banks. The government-link banks are the banks which government sector hold 50% or above of shares for the particular banks. Private bank are the banks which its share is mainly hold by individuals or companies which are not government-link. From table 4.4, it shows that the government-link banks are inconsistent in terms of banking efficiency. The banking efficiency of the government-link banks fluctuate over the period and most of the time, the banks are considered as inefficient. As for the private banks, Public Bank Berhad and Eon

Capital Berhad are the banks which are able to maintain and running the banking business efficiently throughout the period. RHB Bank Berhad and Hong Leong Bank Berhad banking efficiency varies over the period. Generally, this study shows that government-link banks might not necessarily being superior in terms of banking efficiency.

In a nutshell, the banking efficiency of foreign banks are generally better than the local banks. For instance, the banking efficiency of Standard Chartered Bank Malaysia Berhad, United Overseas Bank (Malaysia) Berhad and OCBC Bank (Malaysia) Berhad are the concrete evidences for this statement. The size of banks does not directly affect the banking efficiency of a bank as small banks can be more efficient than large banks. Besides that, banking efficiency is dependent towards the case of merger and acquisitions of banks. For example, Hong Leong Bank Berhad which become efficient for two years after acquired Eon Capital Berhad. Last but not least, government intervention might not be necessary as it might not cause the banks to operate efficiently. For example, private bank such as Public Bank Berhad shows a better result in terms of banking efficiency than government-link banks such as Malayan Bank Berhad, Ambank (M) Berhad and CIMB Bank Berhad.

No	Bank	2007	2008	2009	2010	2011	2012	2013	2014
1	Malayan Bank Berhad	86.79	98.02	94.59	95.3	100	98.66	89.89	91.3
2	CIMB Bank Berhad	94.05	94.38	93.21	94.4	100	97.86	90.13	88.09
3	Public Bank Berhad	100	100	100	100	100	100	100	100
4	Ambank (M) Berhad	*	96.6	95.3	97.58	88.68	91.93	90.96	100
5	RHB Bank Berhad	100	96.77	97.72	99.48	100	100	95.49	94.9
6	Hong Leong Bank Berhad	98.45	100	99.36	99.28	100	100	93	91.59
7	EON Capital Berhad	100	100	100	100	**	**	**	**
8	Citibank Berhad	100	100	100	100	100	100	100	100
9	HSBC Bank Malaysia Berhad	100	100	98.82	100	100	100	100	100
10	OCBC Bank (Malaysia) Berhad	100	100	100	100	100	100	100	100
11	Standard Chartered Bank Malaysia Berhad	100	100	100	100	100	100	100	100
12	United Overseas Bank (Malaysia) Bhd.	100	100	100	100	100	100	100	100

Table 4.2.1: Comparative Bank Efficiency Score in Malaysia (%)

** = The bank merged with other banks

* = The bank has negative value

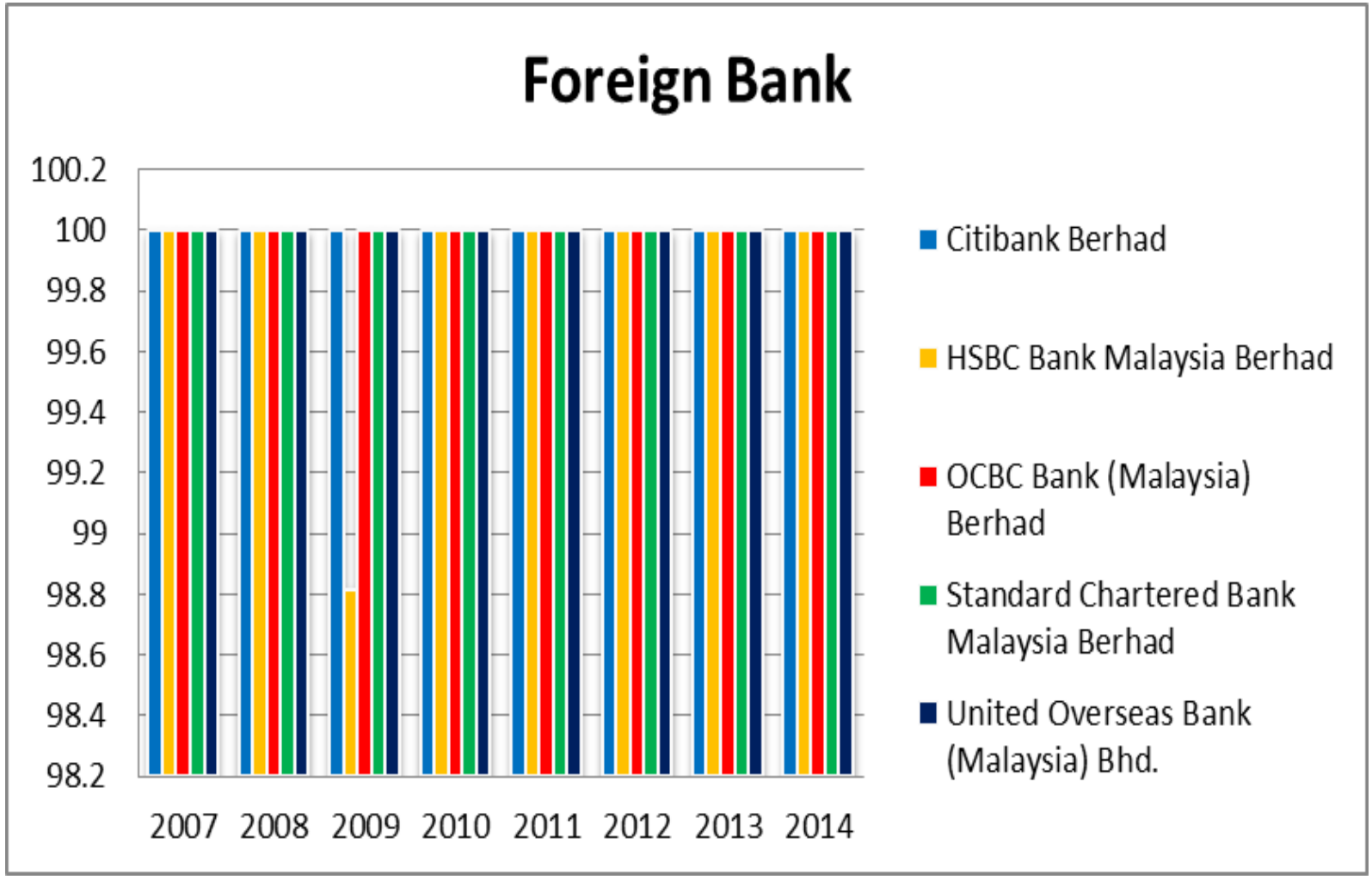

Figure 4.2.1: Efficiency score of foreign bank

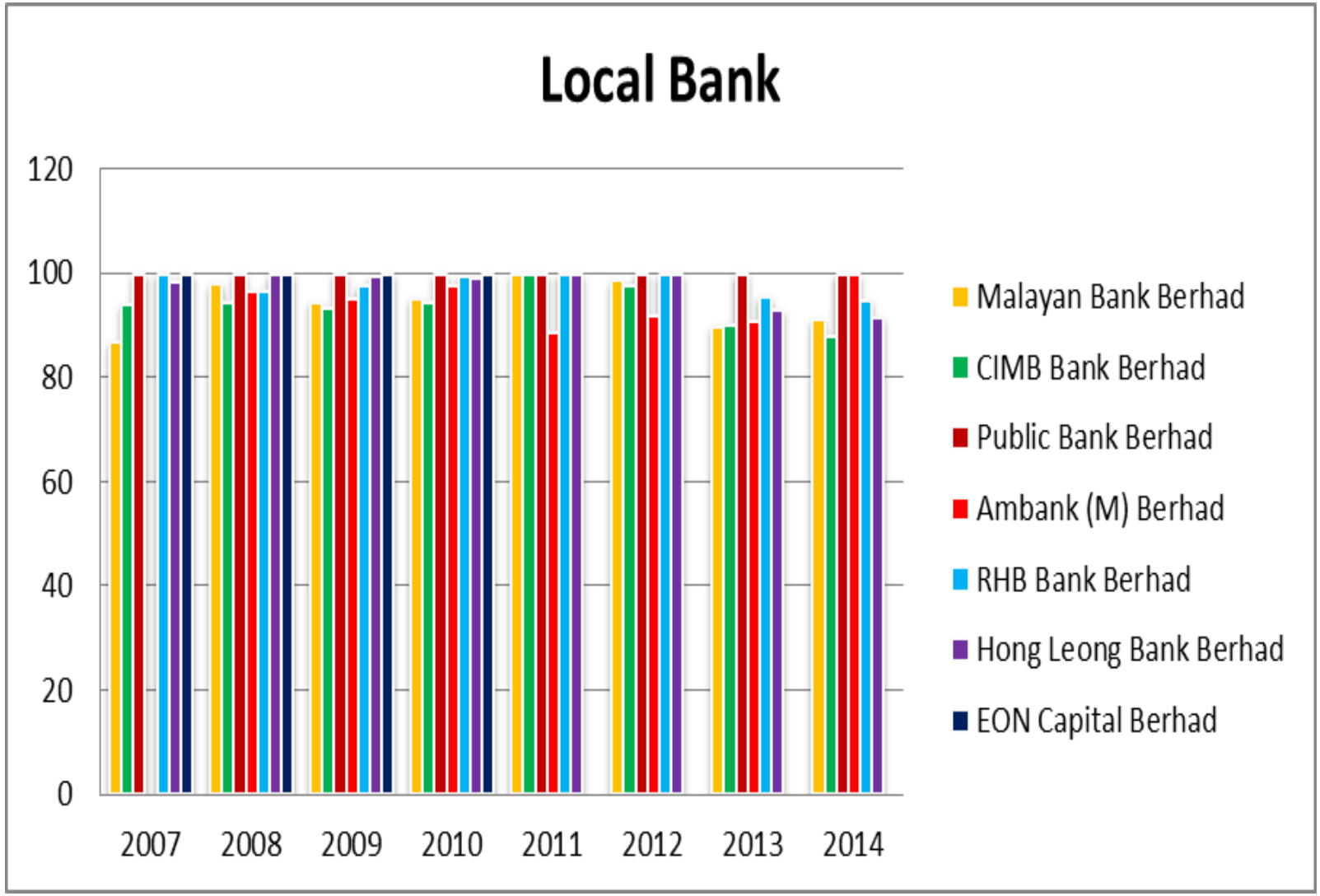

Figure 4.2.2: Efficiency score of local bank

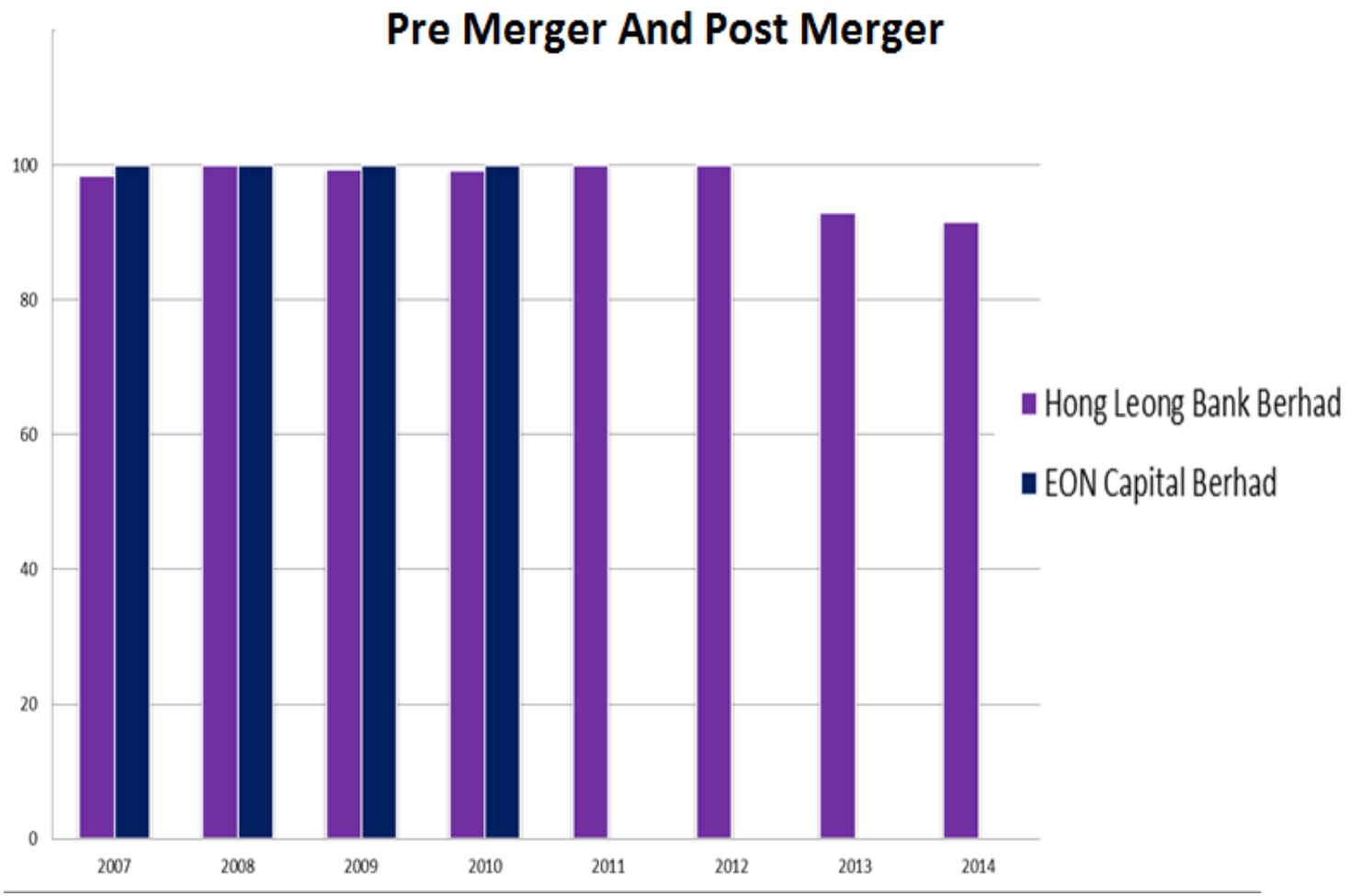

Figure 4.2.3: Efficiency score of pre-merger and post-merger bank

Hong Leong Bank Berhad	98.45	100	99.36	99.28	100	100	93	91.59
EON Capital Berhad	100	100	100	100	**	**	**	**

Table 4.2.2: Pre-merger versus Post-merger Bank

** = The bank merged with other banks

* = The bank has negative value

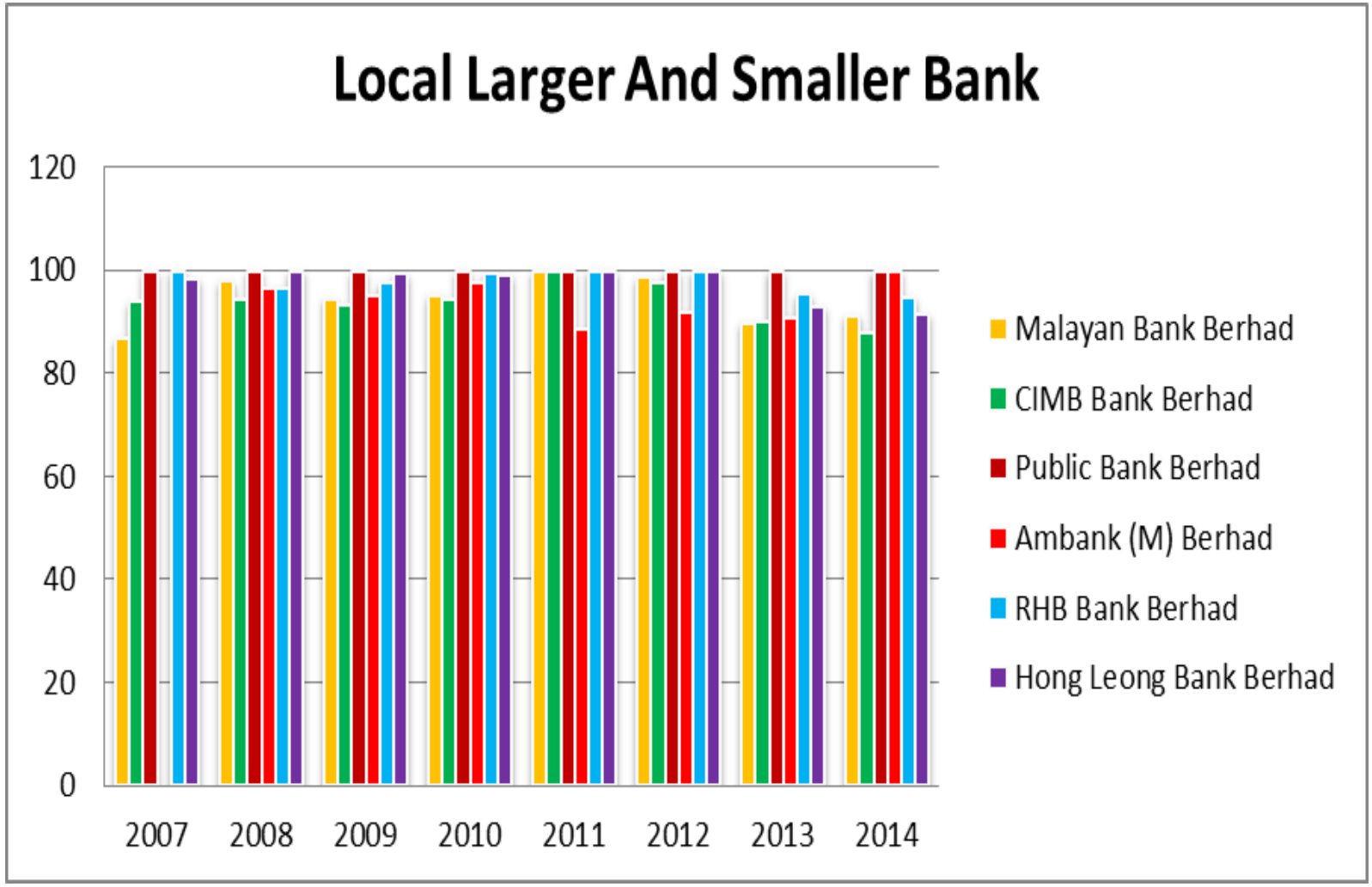

Figure 4.2.4: Efficiency score of larger and smaller local bank

No	Bank	2007	2008	2009	2010	2011	2012	2013	2014
Large Bank									
1	Malayan Bank Berhad	86.79	98.02	94.59	95.3	100	98.66	89.89	91.3
2	CIMB Bank Berhad	94.05	94.38	93.21	94.4	100	97.86	90.13	88.09
3	Public Bank Berhad	100	100	100	100	100	100	100	100
Small Bank									
4	Ambank (M) Berhad	*	96.6	95.3	97.58	88.68	91.93	90.96	100
5	RHB Bank Berhad	100	96.77	97.72	99.48	100	100	95.49	94.9
6	Hong Leong Bank Berhad	98.45	100	99.36	99.28	100	100	93	91.59
7	EON Capital Berhad	100	100	100	100	**	**	**	**

Table 4.2.3: Local Large Bank versus Small Bank

** = The bank merged with other banks

* = The bank has negative value

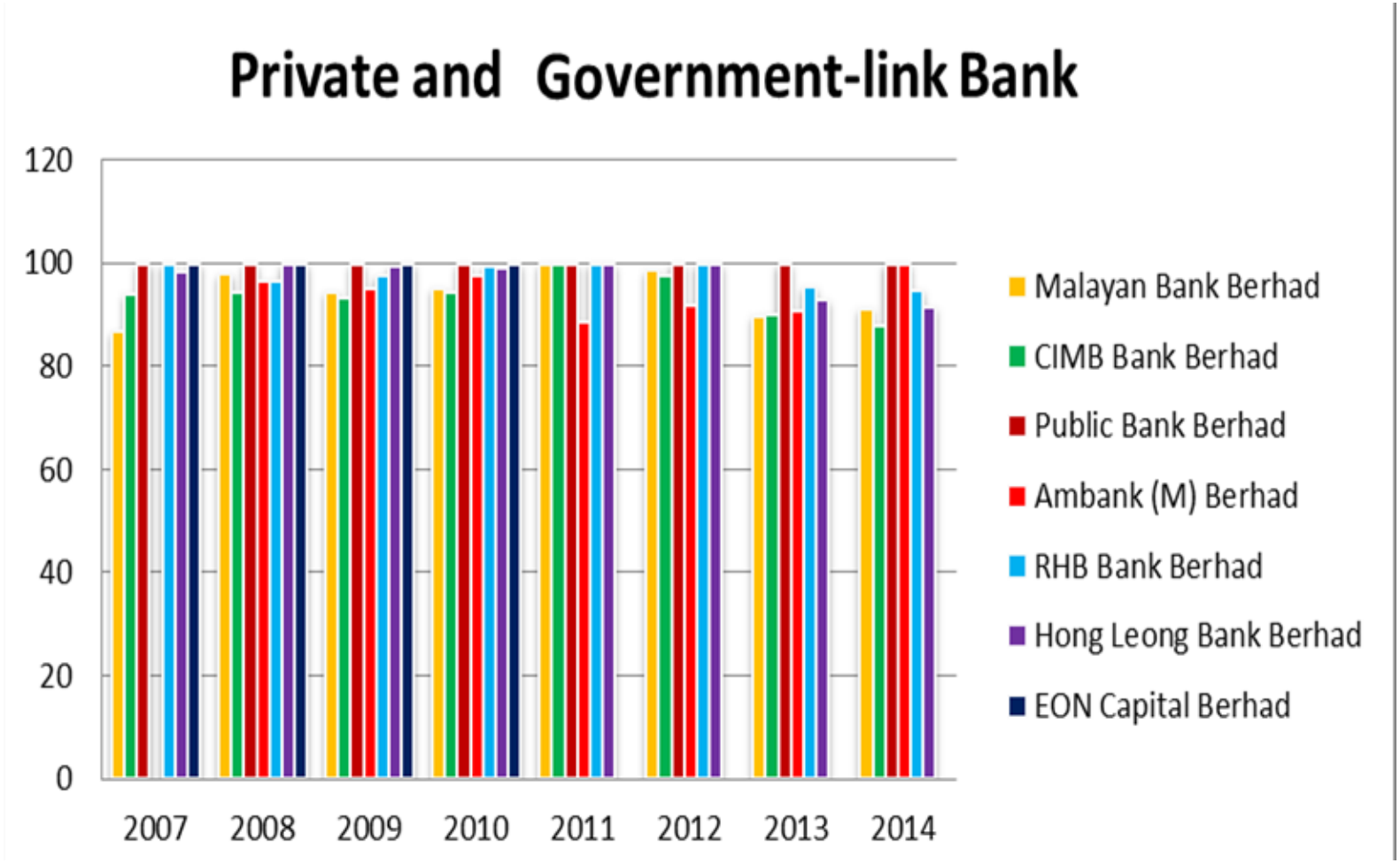

Figure 4.2.5: Efficiency score of local private and government-link bank

No	Bank	2007	2008	2009	2010	2011	2012	2013	2014
Government- link Bank									
1	Malayan Bank Berhad	86.79	98.02	94.59	95.3	100	98.66	89.89	91.3
2	CIMB Bank Berhad	94.05	94.38	93.21	94.4	100	97.86	90.13	88.09
3	EON Capital Berhad	100	100	100	100	**	**	**	**
4	RHB Bank Berhad	100	96.77	97.72	99.48	100	100	95.49	94.9
Private Bank									
5	Public Bank Berhad	100	100	100	100	100	100	100	100
6	Hong Leong Bank Berhad	98.45	100	99.36	99.28	100	100	93	91.59
7	Ambank (M) Berhad	*	96.6	95.3	97.58	88.68	91.93	90.96	100

Table 4.2.4: Local Government-link Bank versus Private Bank

** = The bank merged with other banks

* = The bank has negative value

4.3 Inferential Analysis

Assessment of DEA Outcome on Inefficient Bank (Year 2007)

Efficiency target score for Malayan Bank Berhad (86.79%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	371	174.58	52.94	47.06
Employees (persons)	22,465	17,010.72	24.28	75.72
ATMs (units)	2,498	452.81	81.87	18.13
Total Asset (RM in thousands)	227,447,240	197,395,350.21	13.21	86.79
Capital and Reserves (RM in thousands)	17,453,838	12,558,041.09	28.05	71.95
Loans and Advances (RM in thousands)	118,557,035	118,557,035	0	100
Total Deposits (RM in thousands)	165,026,349	165,026,349	0	100
Profit Before Tax (RM in thousands)	3,892,704	3,892,704	0	100

Table 4.3.1

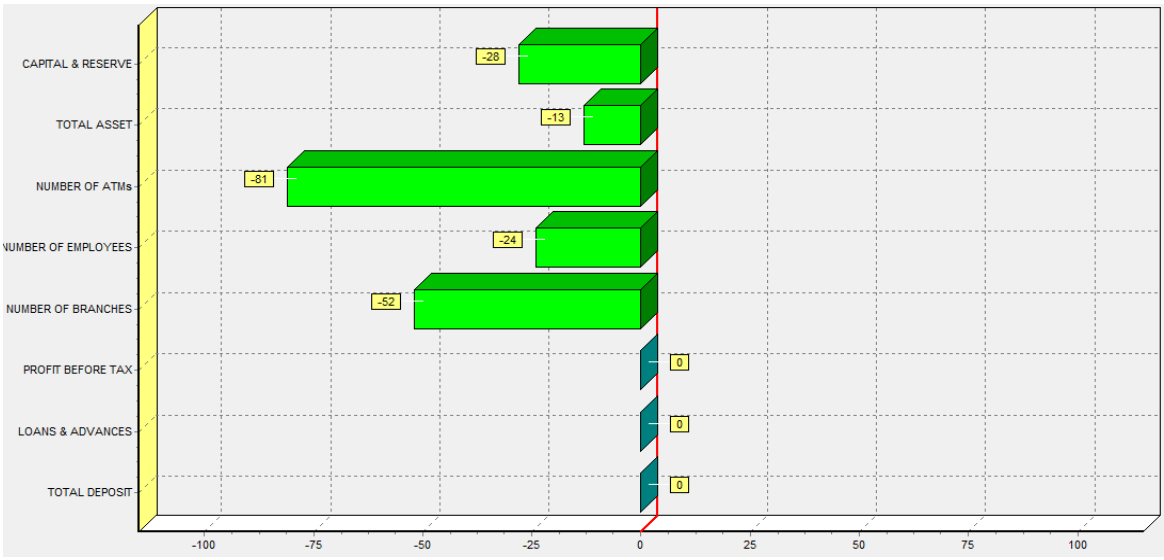

Figure 4.3.1

Efficiency target score for CIMB Bank Berhad (94.05%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	364	199.05	45.32	54.68
Employees (persons)	14,408	11,033.97	23.42	76.58
ATMs (units)	1,245	330.42	73.46	26.54
Total Asset (RM in thousands)	139,987,541	131,663,291.01	5.95	94.05
Capital and Reserves (RM in thousands)	10,697,054	8,529,613.65	20.26	79.74
Loans and Advances (RM in thousands)	73,011,777	73,011,777	0	100
Total Deposits (RM in thousands)	113,092,527	113,092,527	0	100
Profit Before Tax (RM in thousands)	1,767,939	1,767,939	0	100

Table 4.3.2

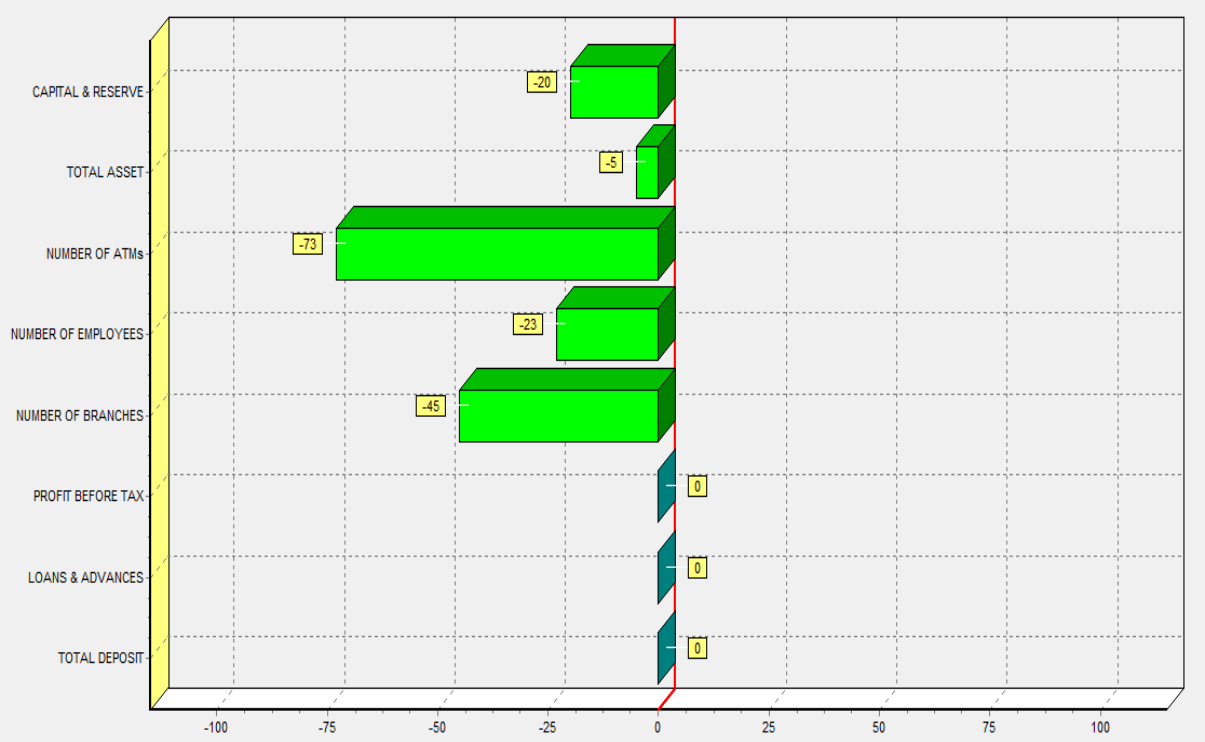

Figure 4.3.2

Efficiency target score for Hong Leong Bank Berhad (98.45%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	185	9.97	94.61	5.39
Employees (persons)	5,764	3,259.22	43.46	56.54
ATMs (units)	291	54.11	81.41	18.59
Total Asset (RM in thousands)	66,161,398	65,137,722.39	1.55	98.45
Capital and Reserves (RM in thousands)	5,188,794	3,583,036.90	30.95	69.05
Loans and Advances (RM in thousands)	27,965,985	29,195,140.34	4.40	95.60
Total Deposits (RM in thousands)	56,911,919	56,911,919	0	100
Profit Before Tax (RM in thousands)	759,444	1,065,785.26	40.34	59.66

Table 4.3.3

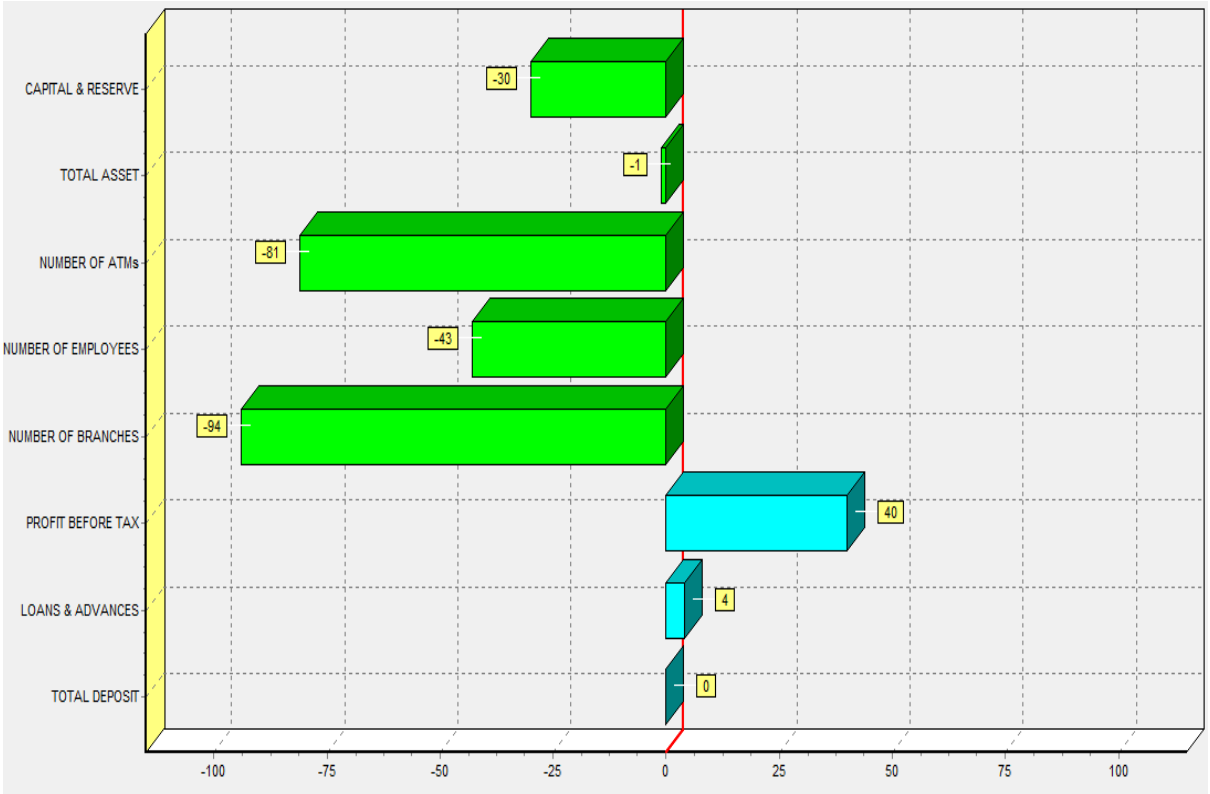

Figure 4.3.3

In 2007, there are three commercial banks performed inefficiently which include CIMB Bank Berhad, Malayan bank Berhad, and Hong Leong Bank Berhad while Ambank (M) Berhad being excluded in the consideration due to its negative profit before tax.

Based on the efficiency score in table above, Malayan Bank Berhad need to work on its input variables to become efficient. The bank had exceeded the target number of branches and ATMs machine by 52.94% and 81.87% respectively. The holding amount for the capital & reserves and total asset need to cut down by RM 4,895.80 million (28.05%) and RM 30,051.89 million (13.21%) respectively to operate efficiently.

CIMB Bank Berhad had the same issues faced by Malayan Bank Berhad. Excessive ATMs machines located all over the Malaysia's region is the major problem for the particular bank. In order to become efficient, the bank needs to cut down almost 73.46% of the existing ATMs machines in year 2007. Besides that, the number of branches need to decrease by 45.32% to fit the target which only required 200 branches.

Hong Leong Bank Berhad had room to improve with all the input variables. Meanwhile, the bank also facing issue in output variables such as loans & advances and profit before tax. The bank need to diminish the number of branches and ATMs machines by 94.61% and 81.41% respectively. The bank also need to increase the amount of loans & advances and profit before tax by RM 1,229.16 million (4.40%) and RM306.34 million (40.34%) respectively.

Assessment of DEA Outcome on Inefficient Bank (Year 2008)

Efficiency target score for CIMB Bank Berhad (94.38%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	350	189.81	45.77	54.23
Employees (persons)	14,564	11,383.27	21.84	78.16
ATMs (units)	1,618	336.16	79.22	20.78
Total Asset (RM in thousands)	147,069,901	13,8806,422.26	5.62	94.38
Capital and Reserves (RM in thousands)	11,623,484	9,983,415.78	14.11	85.89
Loans and Advances (RM in thousands)	84,922,177	84,922,177	0	100
Total Deposits (RM in thousands)	117,674,539	117,674,539	0	100
Profit Before Tax (RM in thousands)	2,184,696	2,184,696	0	100

Table 4.3.4

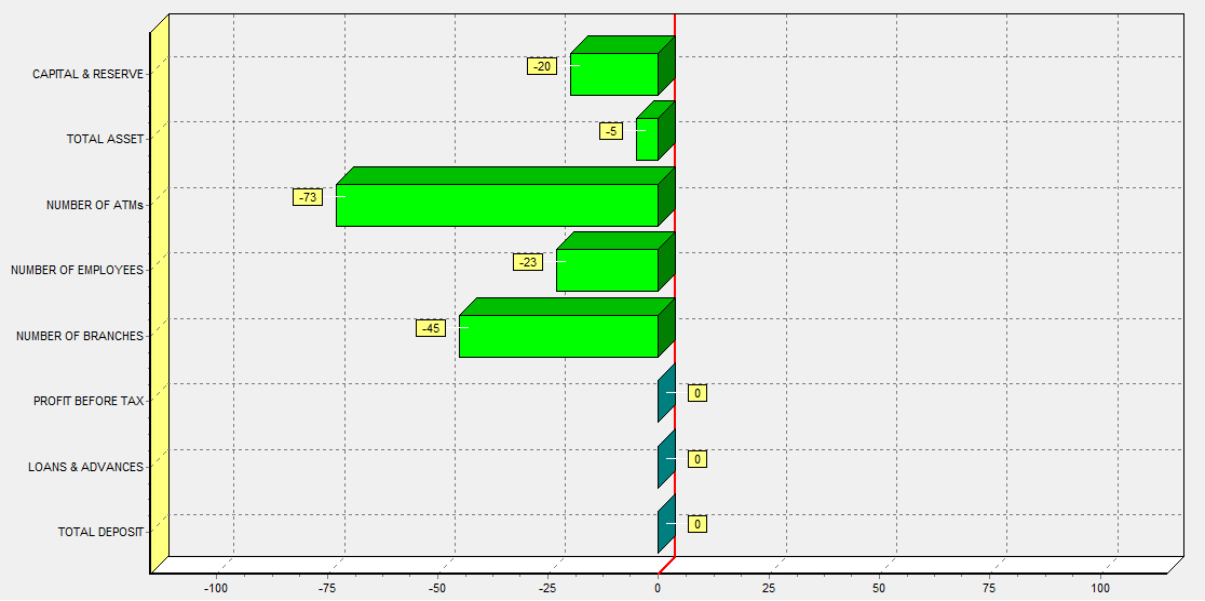

Figure 4.3.4

Efficiency target score for AmBank (M) Berhad (94.38%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	184	69.57	62.19	37.81
Employees (persons)	7,180	4,569.75	36.35	63.65
ATMs (units)	532	150.58	71.70	28.30
Total Asset (RM in thousands)	83,191,707	80,364,923.83	3.40	96.60
Capital and Reserves (RM in thousands)	7,169,593	5,675,605.33	20.84	79.16
Loans and Advances (RM in thousands)	52,453,593	52,453,593	0	100
Total Deposits (RM in thousands)	62,886,140	66,968,265.77	6.49	93.51
Profit Before Tax (RM in thousands)	1,194,437	1,194,437	0	100

Table 4.3.5

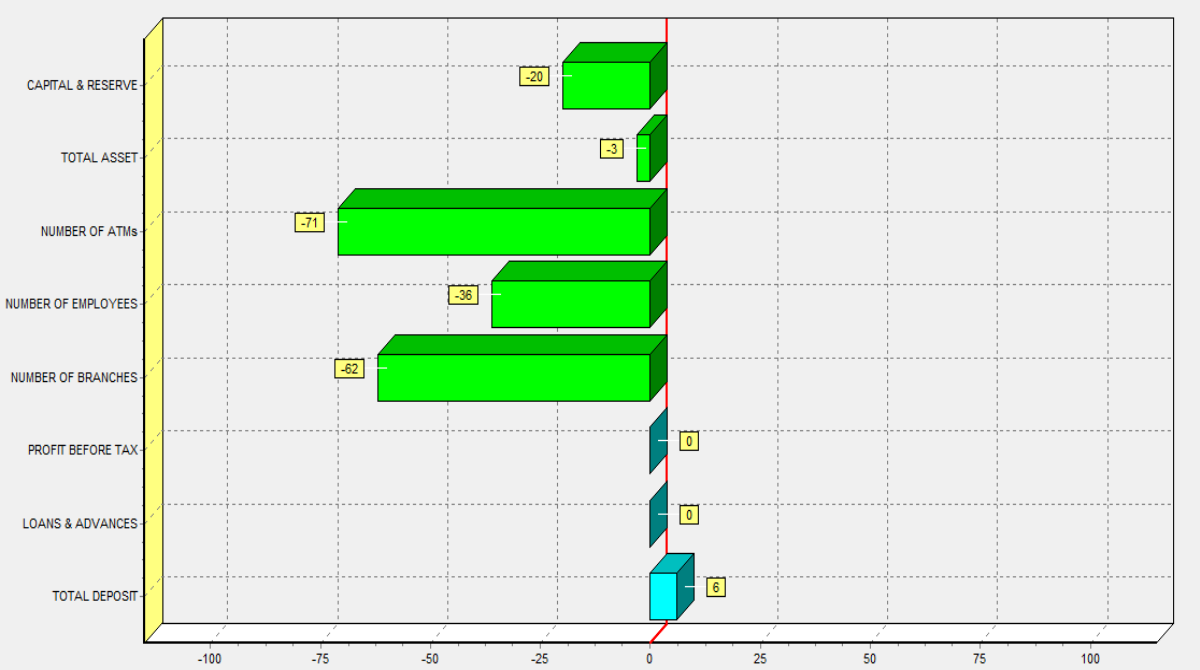

Figure 4.3.5

Efficiency target score for RHB Bank Berhad (94.38%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	186	65.1	65	35
Employees (persons)	7,881	4,996.03	36.61	63.39
ATMs (units)	356	142.74	59.90	40.10
Total Asset (RM in thousands)	84,238,533	81,520,469.27	3.23	96.77
Capital and Reserves (RM in thousands)	6,266,099	5,735,676.88	8.46	91.54
Loans and Advances (RM in thousands)	52,600,047	52,600,047	0	100
Total Deposits (RM in thousands)	67,848,155	68,127,611.90	0.41	99.59
Profit Before Tax (RM in thousands)	1,317,150	1,317,150	0	100

Table 4.3.6

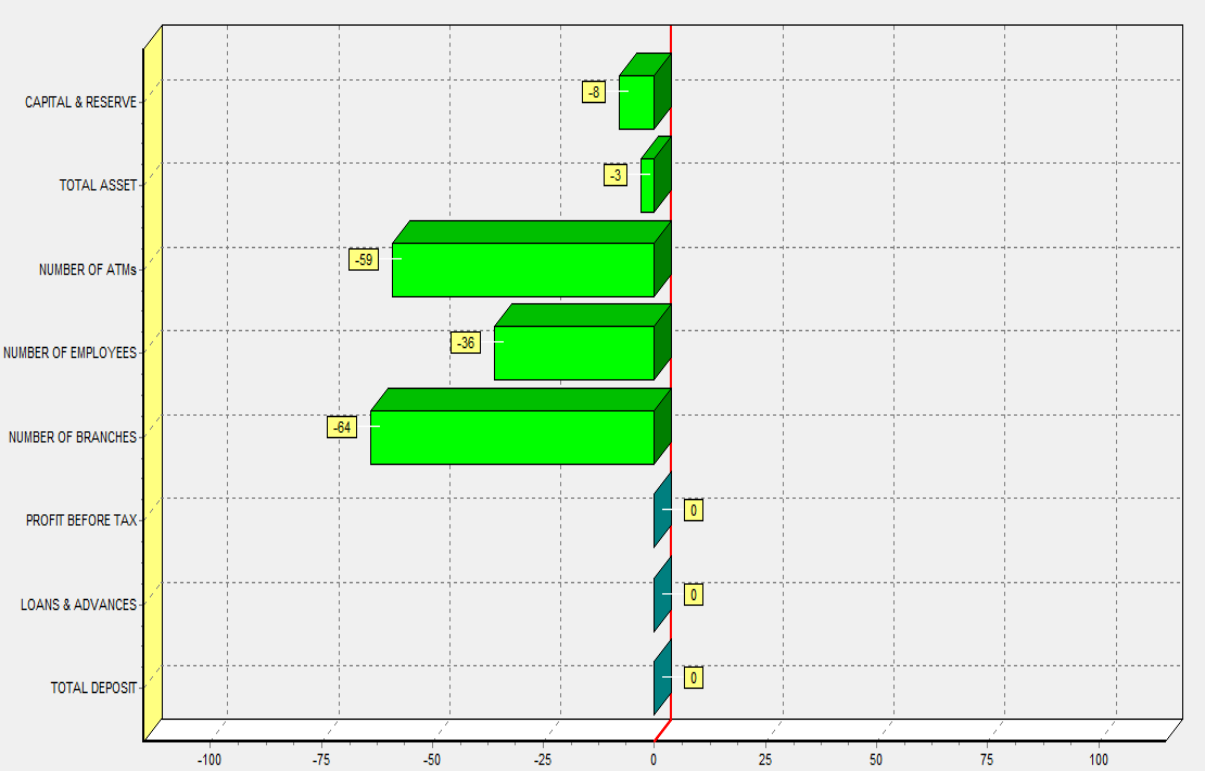

Figure 4.3.6

Efficiency target score for Malayan Bank Berhad (94.38%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	350	189.81	45.77	54.23
Employees (persons)	14564	11383.27	21.84	78.16
ATMs (units)	1618	336.16	79.22	20.78
Total Asset (RM in thousands)	219,172,485	214,830,903.97	1.98	98.02
Capital and Reserves (RM in thousands)	17,200,315	15,258,254.86	11.29	88.71
Loans and Advances (RM in thousands)	138,855,474	138,855,474	0	100
Total Deposits (RM in thousands)	180,752,634	180,752,634	0	100
Profit Before Tax (RM in thousands)	3,118,575	3,118,575	0	100

Table 4.3.7

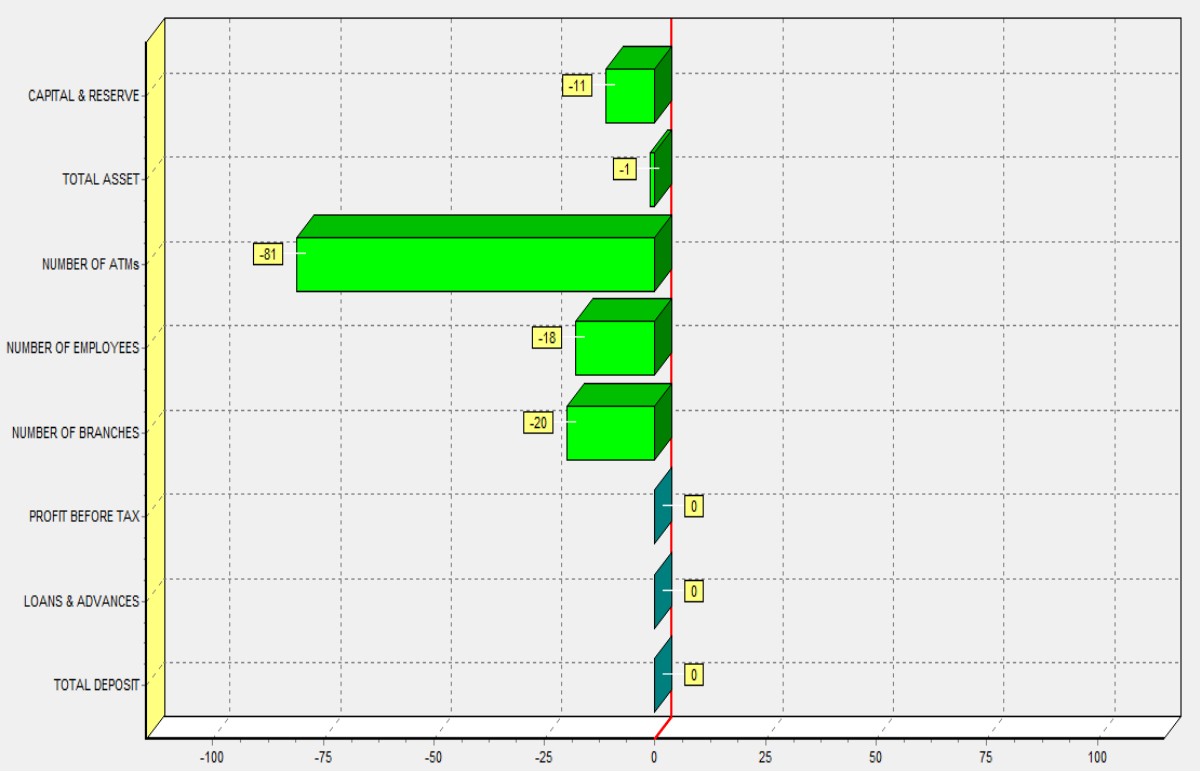

Figure 4.3.7

During 2008, all 12 Malaysia's commercial banks selected had been operating efficiently except several banks which are CIMB Bank Berhad, Ambank (M) Berhad, RHB Bank Berhad and Malayan Bank Berhad with the scoring of 94.38%, 96.60%, 96.77%, and 98.02% respectively.

Based on the efficiency score in table above, inefficiency in CIMB Bank Berhad are caused by the input variables or management inefficiency. The score showed that the bank is having too much number of employees, number of branches, number of ATMs for the year. In order to operate effectively, the bank should employ only 11,384 employees instead of 14,564 employees which had exceeded the target by 21.84%. The number of branches had exceeded by 160 branches or 45.77% while the number of ATMs exceeded by 1,281units ATMs machine or 79.22%. Hence, the bank should cut down the number of branches and number of ATMs to 190 branches and 337 units ATMs machine respectively to avoid unnecessary expenses. The bank also being over conservative by holding too much capital & reserves and the total assets. The bank should condense the holding amount of capital & reserves from RM 11,623,484 to RM 9,983.42 million or 14.11% of the total capital & reserves. For the total assets, the bank should reduce by 5.62% or approximately to RM 138,806.42 million.

The Ambank (M) Berhad are inefficient in both input output variables. The bank faced serious issue on excessive number of employees, branches, and ATMS. Therefore, the bank should cut down 2,610 (36.35%) employees, 114 (62.19%) branches, and 381 (71.70%) units ATMs machine respectively. In terms of capital & reserves and total asset, the bank should lessening the holding by 20.84% and 3.40% respectively. The bank should increase the amount of deposit by 6.49% to reach the amount of RM 66,968.27 million.

The RHB Bank Berhad also facing the same issues as Ambank (M) Berhad. The number of employees, branches, and ATMs of the bank are in a surplus state. Hence, the bank should diminish the number of employees, branches, and ATMs by 2,844 (36.61%) employees, 120 (65.00%) branches, and 213 (59.90%) units ATMs machine respectively to avoid resources wastage. As for capital & reserves and total asset, the bank is suggested

to decrease the holding by 8.46% and 3.23% respectively. The bank should increase the amount of deposit by 0.41% to reach the amount of RM 68,127.61 million.

The Malayan Bank Berhad operate inefficiently regarding to the input variables. The supply of ATMs exceed the demand which approximately 2,244 units extra ATMs machine or 81.16% are being spotted. The number of employee and branches should be reduced by 4,067 (18.10%) employees and 75 (20.10%) branches respectively. On the other hand, the bank should shrink the holding amount of capital & reserves and total deposit approximately by RM 1,942.10 million (11.29%), and RM 4,341.60 million (1.98%) respectively.

Assessment of DEA Outcome on Inefficient Bank (Year 2009)

Efficiency target score for Hong Leong Bank Berhad (99.36%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	184	98.60	46.41	53.59
Staffs (persons)	5813	5207.73	10.41	89.59
ATMs (units)	314	182.50	41.88	58.12
Total Asset (RM in thousand)	70659886	70206345.28	0.64	99.36
Capital and Reserves (RM in thousand)	5945713	4383050.84	26.28	73.72
Loans and Advances (RM in thousand)	30938086	42925699.46	38.75	61.25
Deposits (RM in thousand)	62093304	62093304	0	100.00
Profit Before Tax (RM in thousand)	886395	1108965.92	25.11	74.89

Table 4.3.8

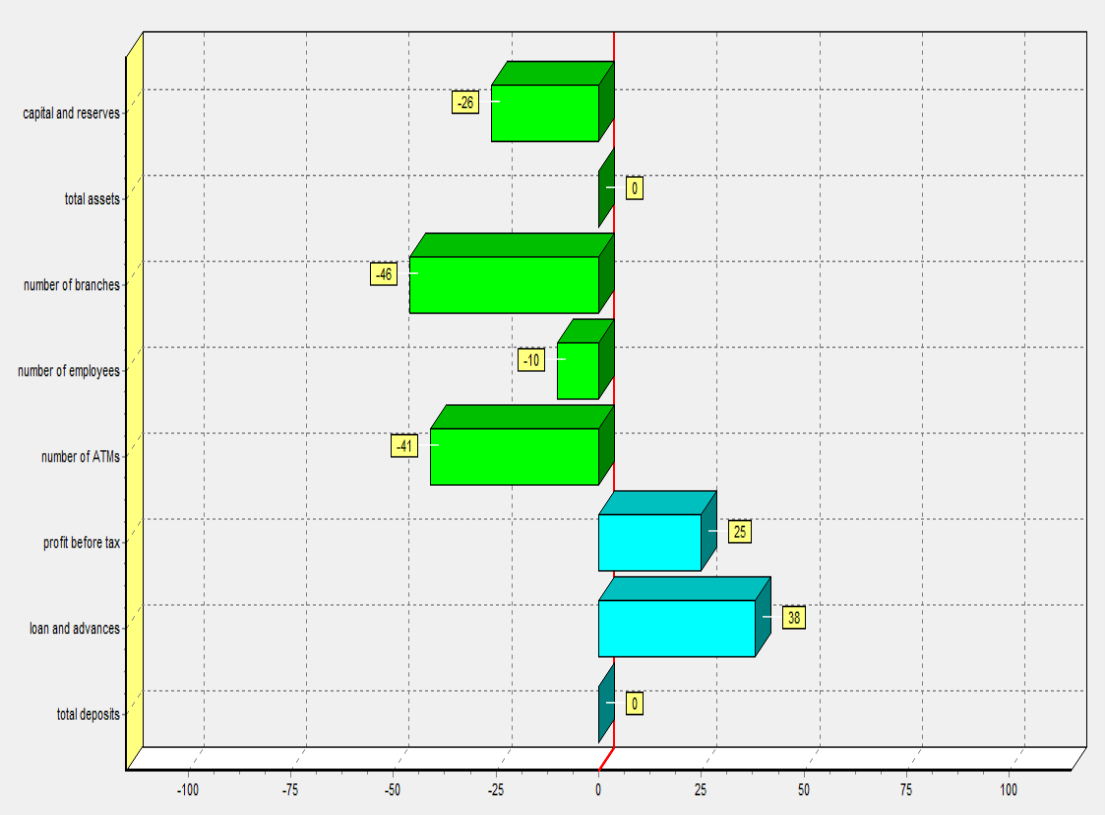

Figure 4.3.8

Efficiency target score for HSBC Bank Malaysia Berhad (98.82%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	40	39.53	1.18	98.82
Staffs (persons)	5094	3302.27	35.17	64.83
ATMs (units)	123	81.06	34.10	65.90
Total Asset (RM in thousand)	52764279	52140008.70	1.18	98.82
Capital and Reserves (RM in thousand)	3553439	3511397.18	1.18	98.82
Loans and Advances (RM in thousand)	25458819	28291427.73	11.13	88.87
Deposits (RM in thousand)	44923990	44923990	0	100
Profit Before Tax (RM in thousand)	805303	805303	0	100

Table 4.3.9

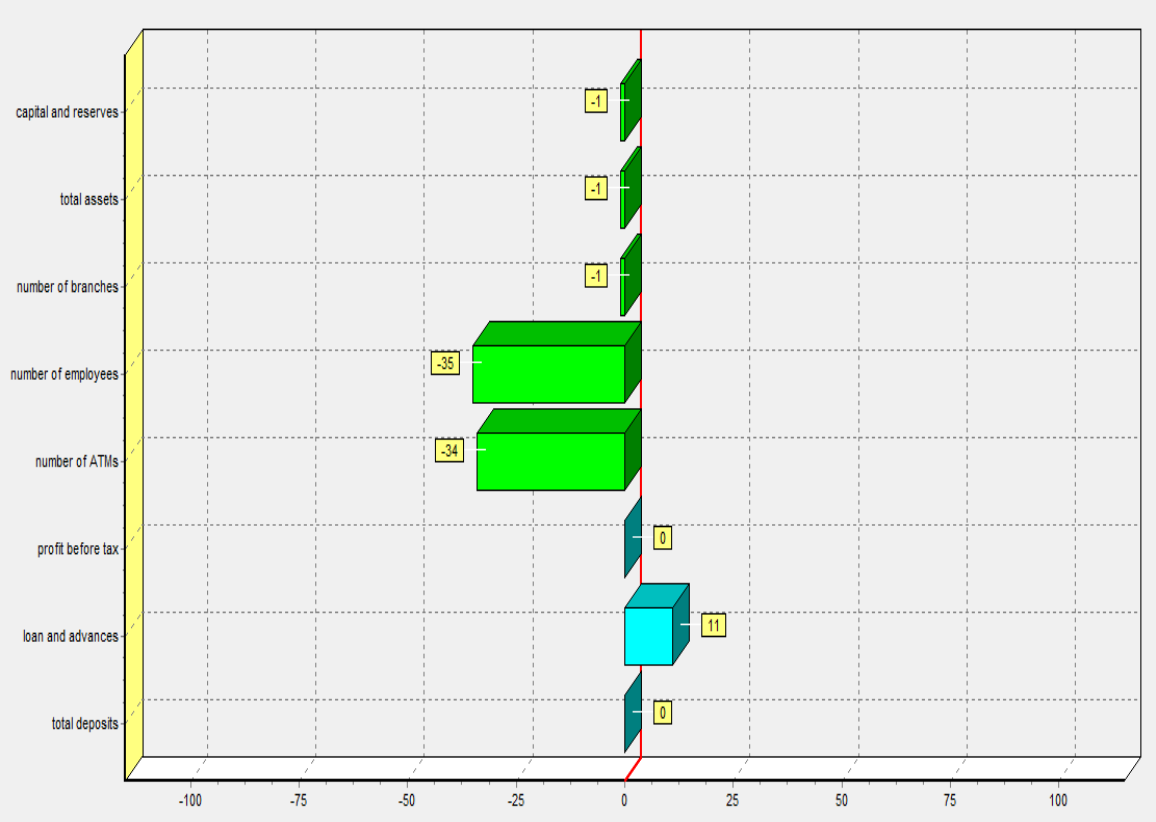

Figure 4.3.9

Efficiency target score for RHB Bank Berhad (97.72%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	189	100.34	46.91	53.09
Staffs (persons)	6343	6198.58	2.28	97.72
ATMs (units)	649	204.38	68.51	31.49
Total Asset (RM in thousand)	94045473	91904155.87	2.28	97.72
Capital and Reserves (RM in thousand)	7180044	7016561.90	2.28	97.72
Loans and Advances (RM in thousand)	59116696	59116696	0	100
Deposits (RM in thousand)	77056648	77660427.67	0.78	99.22
Profit Before Tax (RM in thousand)	1357344	1487471.83	9.59	90.41

Table 4.3.10

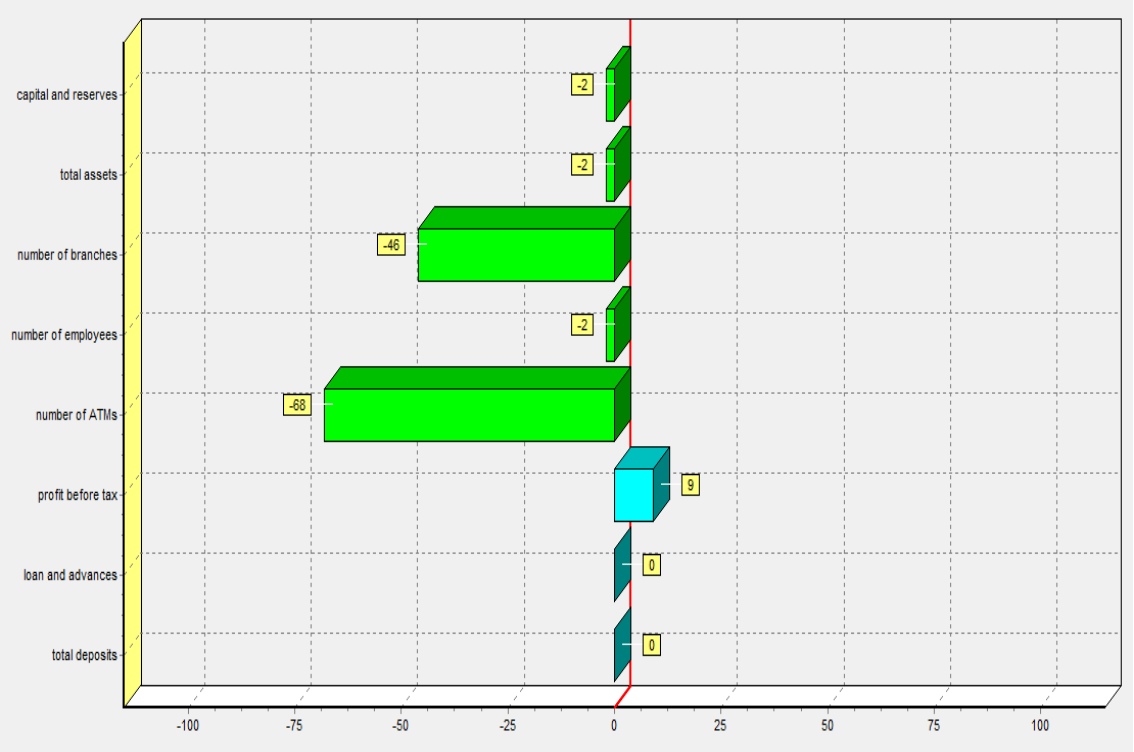

Figure 4.3.10

Efficiency target score for Ambank (M) Berhad (95.30%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	187	134.41	28.12	71.88
Staffs (persons)	7180	6842.48	4.7	95.30
ATMs (units)	737	250.18	66.05	33.95
Total Asset (RM in thousand)	89892881	85667115.60	4.7	95.30
Capital and Reserves (RM in thousand)	7736093	6834903.47	11.65	88.35
Loans and Advances (RM in thousand)	56947831	56947831	0	100
Deposits (RM in thousand)	70266915	71367743.60	1.57	98.43
Profit Before Tax (RM in thousand)	1217636	1218330.43	0.06	99.94

Table 4.3.11

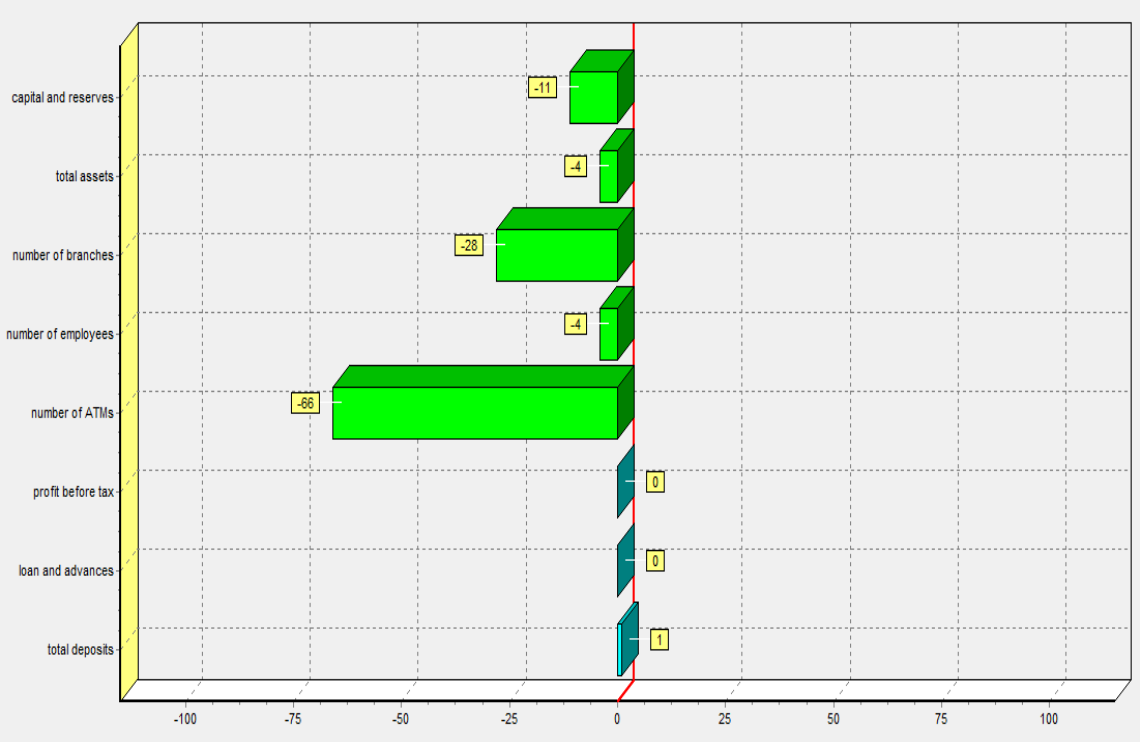

Figure 4.3.11

Efficiency target score for Malayan Bank Berhad (94.59%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	387	366.06	5.41	94.59
Staffs (persons)	23168	18142.63	21.69	78.31
ATMs (units)	2828	665.87	76.45	23.55
Total Asset (RM in thousand)	238277142	225381448.19	5.41	94.59
Capital and Reserves (RM in thousand)	2251044	15975528.05	29.03	70.97
Loans and Advances (RM in thousand)	144431798	144434798	0	100
Deposits (RM in thousand)	193574846	193574846	0	100
Profit Before Tax (RM in thousand)	383079	3270473.37	88.29	11.71

Table 4.3.12

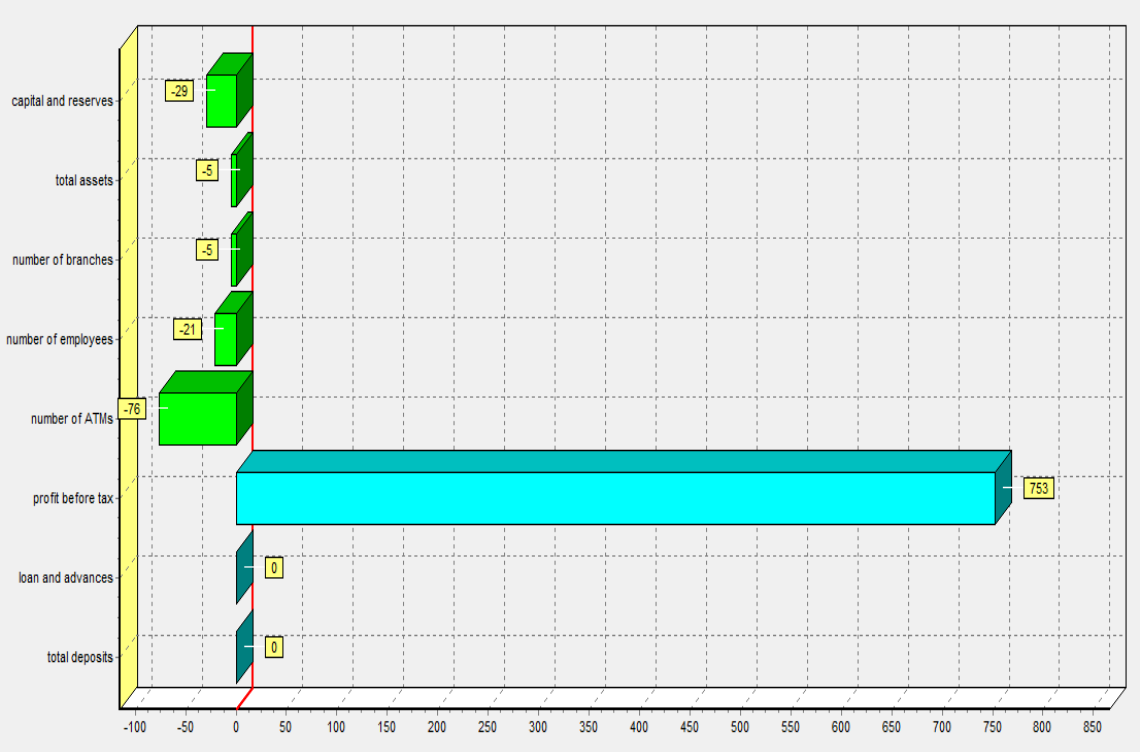

Figure 4.3.12

Efficiency target score for CIMB Bank Berhad (93.21%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	321	209.75	34.66	65.34
Staffs (persons)	14564	11077.75	23.94	76.06
ATMs (units)	1994	388.20	80.53	19.47
Total Asset (RM in thousand)	160221618	149341164.50	6.79	93.21
Capital and Reserves (RM in thousand)	14598701	9323515.05	36.13	63.87
Loans and Advances (RM in thousand)	84456367	91310463.73	8.12	91.88
Deposits (RM in thousand)	132083308	132083308	0	100
Profit Before Tax (RM in thousand)	1937069	2358964.29	21.78	78.22

Table 4.3.13

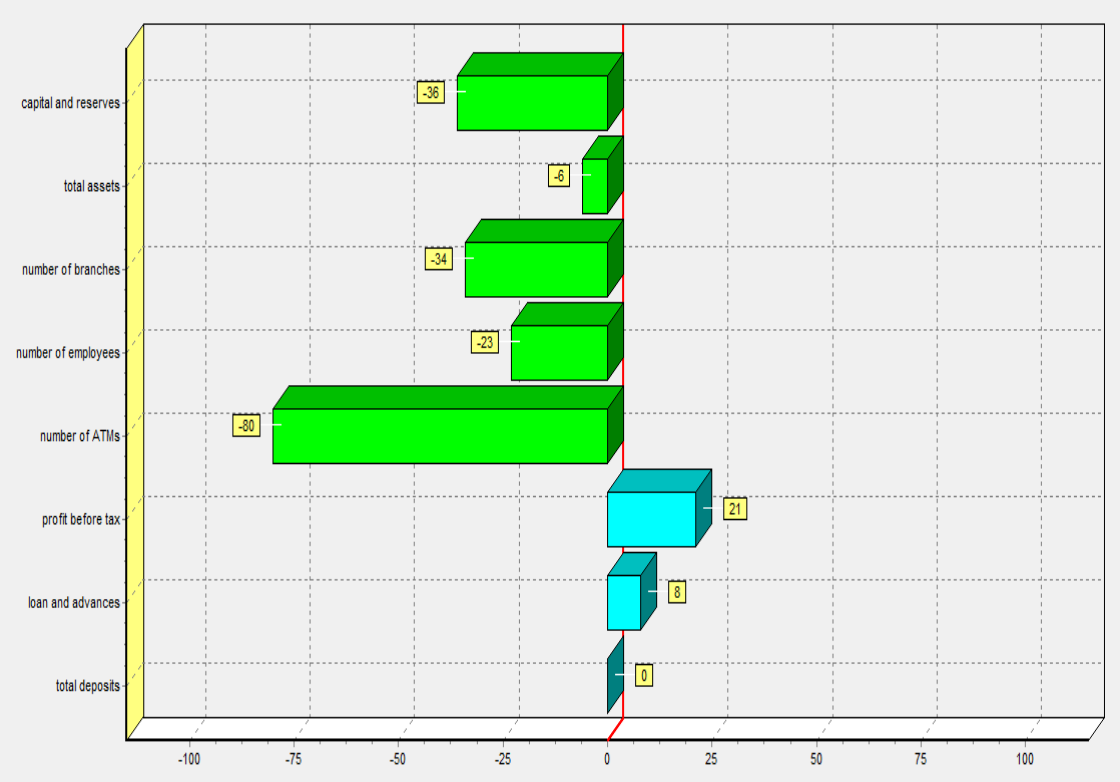

Figure 4.3.13

In the study focus on year 2009, there were 6 banks were affirmed as inefficient banks from 12 selected sample banks which are Hong Leong Bank Berhad, HSBC Bank Malaysia Berhad, RHB Bank Berhad, Ambank (M) Berhad, Malayan Bank Berhad, and CIMB Bank Berhad and their DEA efficiency score were 99.36%, 98.82%, 97.72%, 95.30%, 94.59%, and 93.21% respectively.

From the result of DEA, RHB Berhad, Hong Leong Bank Berhad, CIMB Bank, Ambank(M) Berhad, Malayan Bank Berhad, HSBC Bank Malaysia Berhad need to lessen their bank branches to become efficient. These banks are recommended to reduce their bank branches by 88.65 units, 85.40 units, 111.25 units, 52.59 units, 20.94 units, and 0.47 units respectively. These banks used too much money in purchasing assets or expenses but little profit is generated. They may shut down under-performing branches to reduce their

costs as they need to pay staffs, property and utilities expenses as internet-based banks spring up continuously and online-banking transaction is more convenience and attractive to consumers (Erin, 2014; Egan, 2015; BBC News, 2016).

From the aspect of number of staffs, in order to become efficient, HSBC Bank Malaysia Berhad need to retrench about 1792 staffs. CIMB Bank Berhad need to retrench approximately 3487 staffs. Malayan Bank Berhad is suggested to retrench approximately 5026 staffs. Hong Leong Bank Berhad is recommended to retrench 606 staffs. Ambank (M) Berhad is advised to retrench 338 staffs. RHB Berhad need to retrench 145 staffs. Compare with continue employing under-performance employees that jeopardizing the banks by lessening its profitability, banks rather utilise its money to increase competitiveness in banking industry, increase profits for shareholders, and survive from financial crisis or economic downturn (Sylvester, 2016; Rachael, 2016; Sravani, 2016).

According to the efficiency score, it is recommended that CIMB Bank should remove approximately 1606 ATMs, 2163 ATMs for Malayan Bank Berhad, 145 ATMs for RHB Bank Berhad, Ambank (M) Berhad should undergone shrinkage of approximately 338 ATMs, 606 ATMs for Hong Leong Bank Berhad, and 1792 ATMs for HSBC Bank Malaysia Berhad.

From the result of DEA, regarding to the issue of total assets, CIMB Bank should sell off RM 1,088,045,350. Malayan Bank Berhad should reduce its total asset by RM 12,895,693,900, RM 4,225,765,400 for Ambank (M) Berhad, RM 2,141,317,130 for RHB Berhad, RM 624,270,300 for HSBC Bank Malaysia Berhad, and RM 453,540,720 for Hong Leong Bank Berhad.

Based on the DEA result, for capital and reserves, CIMB Bank should utilize RM 5,275,185,950, Malayan Bank Berhad over utilize RM 13,724,484,050 capital and reserves, Hong Leong Bank Berhad should utilize RM 1,562,662,160, Ambank (M) Berhad should utilize RM 901,189,530, RHB Berhad should utilize RM 163,482,100, and HSBC Bank Malaysia Berhad should utilize RM 42,041,820.

Result of DEA from independence output variables recommends that Hong Leong Bank Berhad should increases its loans and advances by RM 11,987,613,460 and profit before tax by RM 222,570,920; while HSBC Bank Malaysia Berhad should increases its loans and advances with RM 2,832,608,730; meanwhile RHB Bank Berhad should boost its deposits to increase RM 603,779,670 and profit before tax by RM 130,127,830; moreover Ambank (M) Berhad should rises its deposits to increase RM 1,100,828,600 and profit before tax by RM 694,430; for Malayan Bank Berhad, it should increases its profit before tax by RM 2,887,394,370; and CIMB Bank Berhad should enhances its loans and advances and profit before tax by increasing RM 6,854,096,730 and RM 421,895,290.

Assessment of DEA Outcome on Inefficient Bank (Year 2010)

Efficiency target score for RHB Bank Berhad (99.48%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	185	104.07	43.75	56.25
Staffs (persons)	10397	7830.51	24.68	75.32
ATMs (units)	1068	211.30	80.22	19.78
Total Asset (RM in thousand)	105179231	104637432.45	0.52	99.48
Capital and Reserves (RM in thousand)	8397474	8022204.57	4.47	95.53
Loans and Advances (RM in thousand)	71125558	71125558	0	100
Deposits (RM in thousand)	86726030	89117443.14	2.76	97.24
Profit Before Tax (RM in thousand)	1740757	1740757	0	100

Table 4.3.14

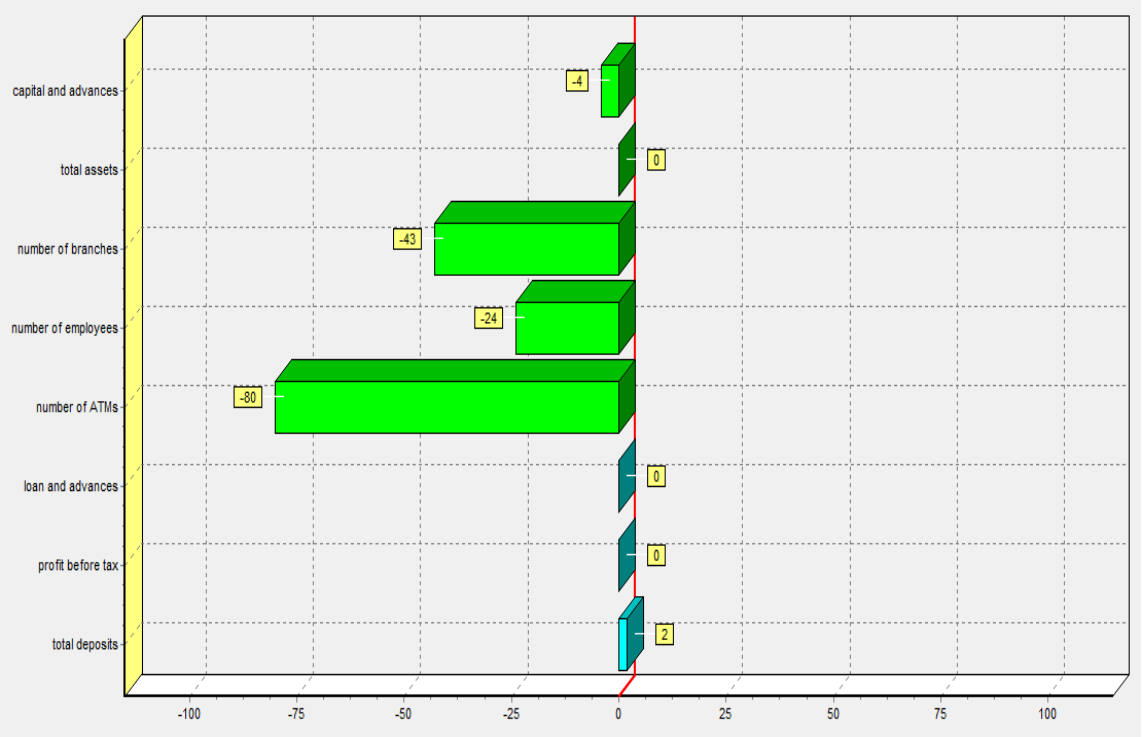

Figure 4.3.14

Efficiency target score for Hong Leong Bank Berhad (99.28%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	187	101.64	45.65	54.35
Staffs (persons)	5873	5830.95	0.72	99.28
ATMs (units)	349	198.84	43.03	56.97
Total Asset (RM in thousand)	77777858	77220945.61	0.72	99.28
Capital and Reserves (RM in thousand)	6591271	5221774.56	20.78	79.22
Loans and Advances (RM in thousand)	33589093	51689171.02	53.89	46.11
Deposits (RM in thousand)	67030179	67030179	0	100
Profit Before Tax (RM in thousand)	989155	1518142.31	53.48	46.52

Table 4.3.15

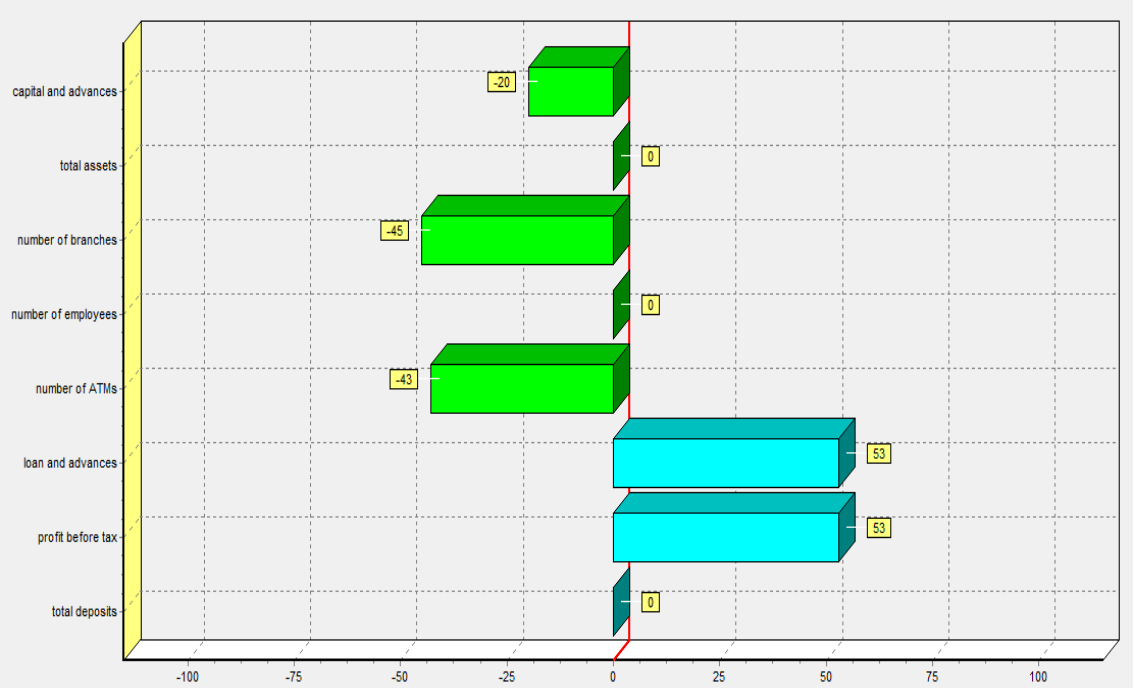

Figure 4.3.15

Efficiency target score for Ambank (M) Berhad (97.58%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	186	122.39	34.20	65.80
Staffs (persons)	10428	7791.18	25.29	74.71
ATMs (units)	803	251.12	68.73	31.27
Total Asset (RM in thousand)	96480303	94140748.84	2.42	97.58
Capital and Reserves (RM in thousand)	9637713	7382479.14	23.40	76.60
Loans and Advances (RM in thousand)	64425920	64425920	0	100
Deposits (RM in thousand)	73189388	79935261.13	9.22	90.78
Profit Before Tax (RM in thousand)	1376659	1376659	0	100

Table 4.3.16

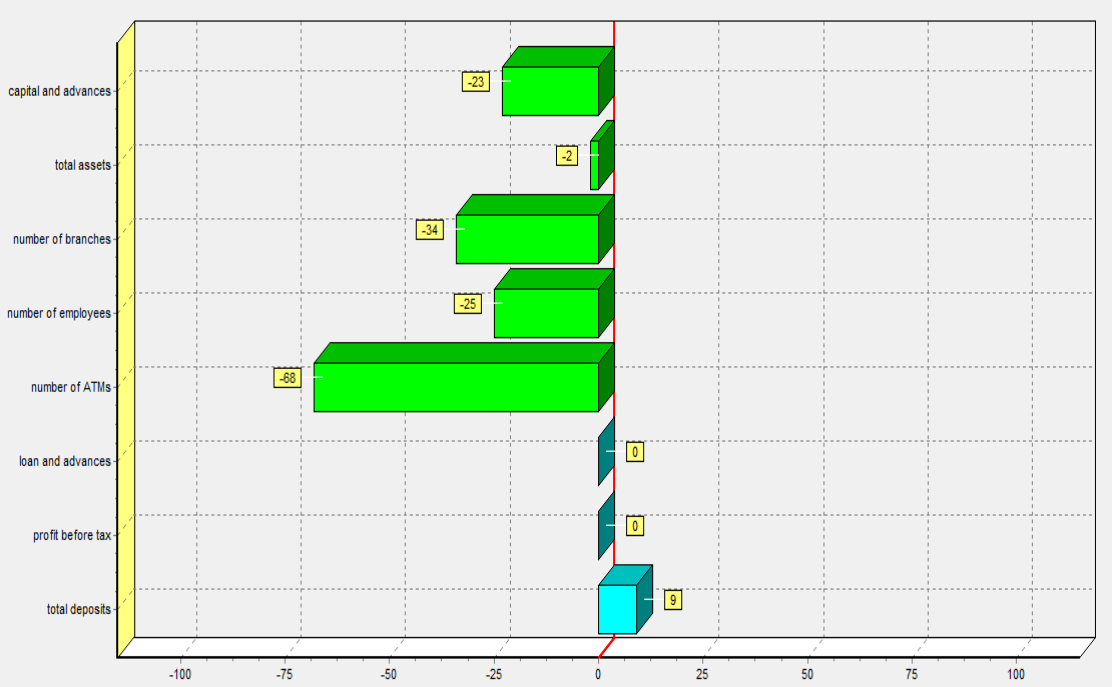

Figure 4.3.16

Efficiency target score for Malayan Bank Berhad (95.30%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	385	267.17	30.60	69.40
Staffs (persons)	23870	18423.20	22.82	77.18
ATMs (units)	2847	542.59	80.94	19.06
Total Asset (RM in thousand)	248392266	236713070.40	4.70	95.30
Capital and Reserves (RM in thousand)	25256824	17284156.91	31.57	68.43
Loans and Advances (RM in thousand)	151469585	151469585	0	100
Deposits (RM in thousand)	198309563	200594527.94	1.15	98.85
Profit Before Tax (RM in thousand)	4786544	4786544	0	100

Table 4.3.17

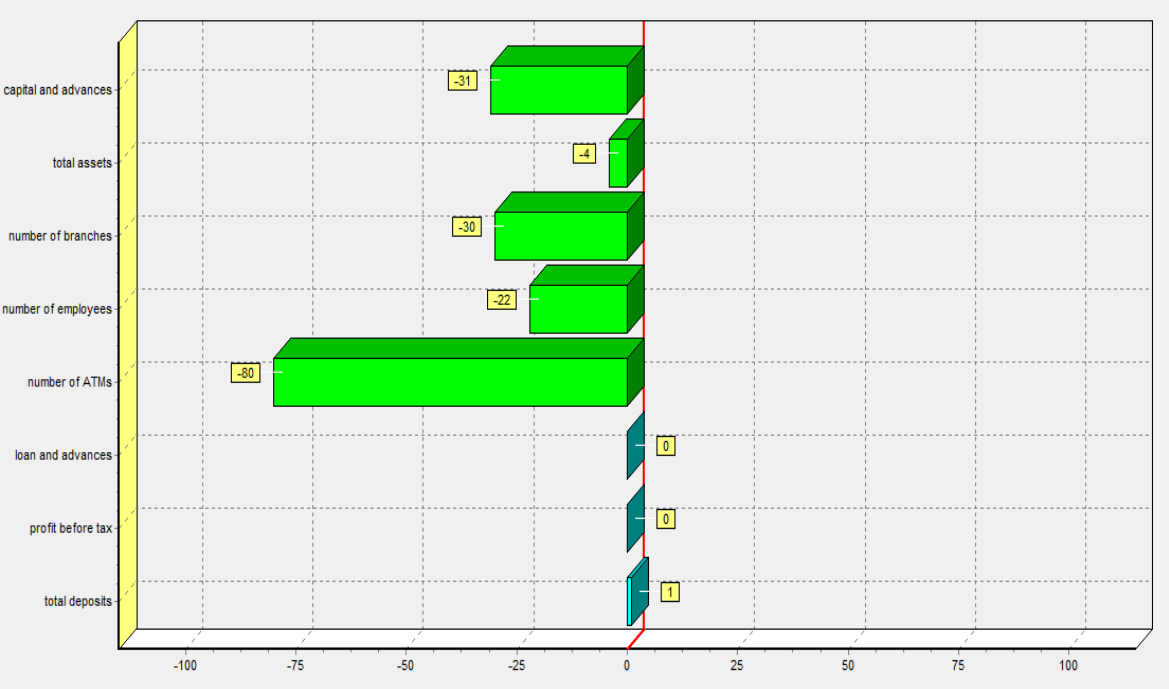

Figure 4.3.17

Efficiency target score for CIMB Bank Berhad (94.40%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	324	216.27	33.25	66.75
Staffs (persons)	14650	12272.09	16.23	83.77
ATMs (units)	2057	422.16	79.48	20.52
Total Asset (RM in thousand)	170823022	161260248.01	5.6	94.40
Capital and Reserves (RM in thousand)	15511384	10829172.19	30.19	69.81
Loans and Advances (RM in thousand)	90816549	108189333.07	19.13	80.87
Deposits (RM in thousand)	140021723	140021723	0	100
Profit Before Tax (RM in thousand)	2352728	3181483.39	35.23	64.77

Table 4.3.18

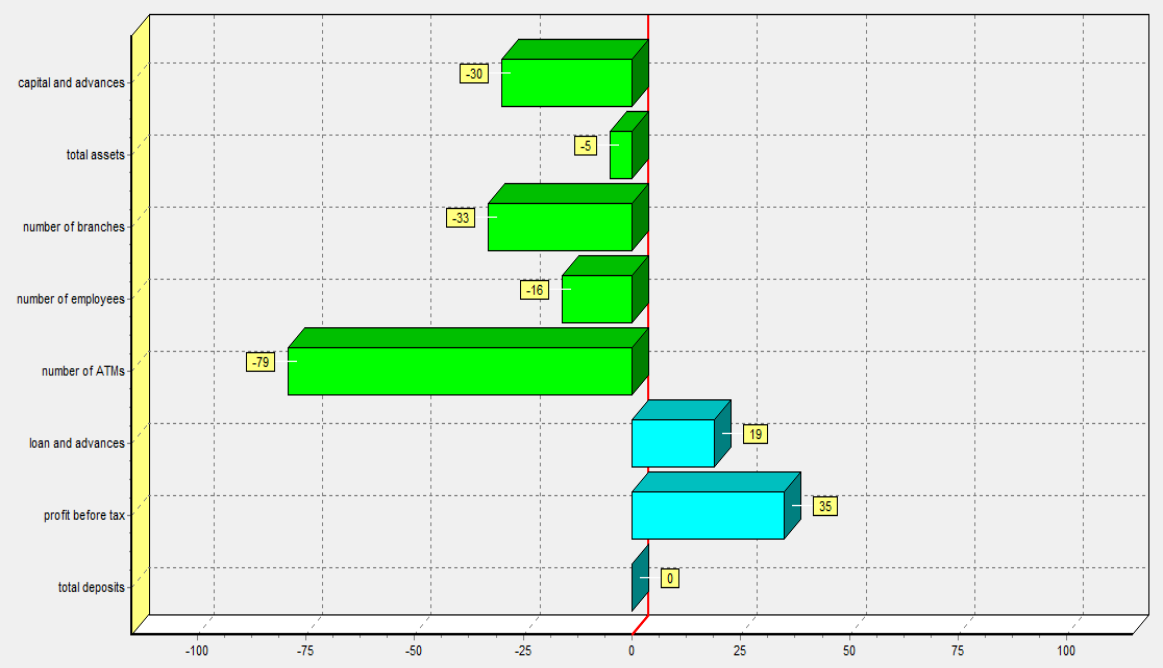

Figure 4.3.18

In the study focus on year 2010, there were 5 banks were found to consider as inefficient banks from 12 selected sample banks which are RHB Bank Berhad, Hong Leong Bank Berhad, Ambank (M) Berhad, Malayan Bank Berhad, and CIMB Bank Berhad and their DEA efficiency score were 99.48%, 99.28%, 97.58%, 95.30%, and 94.40% respectively.

From the result of DEA, Hong Leong Bank Berhad, RHB Berhad, Ambank(M) Berhad, CIMB Bank, and Malayan Bank Berhad need to reduce their bank branches units to achieve efficiency of profitability as they could done their reduction by 85.36 branches, 80.93 branches, 63.61 branches, 107.73 branches, and 117.83 branches.

From the aspect of number of staffs and in order to achieve more efficiency result, Ambank (M) Berhad need to retrench 2636.82 persons, RHB Berhad need to retrench 2566.49 persons, Malayan Bank Berhad need to retrench 5446.80 persons, CIMB Bank Berhad need to retrench 2377.91 persons, and Hong Leong Bank Berhad need to retrench 42.05 persons. Efficiency target score result from input variable, number of ATMs, give advises that Malayan Bank Berhad should reduce2304.41 ATMs, RHB Berhad should decrease 856.70

ATMs, CIMB Bank should cut down 1634.84 ATMs, Ambank (M) Berhad should shrinkage 551.88 ATMs, and Hong Leong Bank Berhad should condense 150.16 ATMs.

DEA result from the aspect of total assets owned by banks give advises that CIMB Bank should sell RM 9,562,773,990 from its total assets, Malayan Bank Berhad should sell RM 11,679,195,600 from its total assets, Ambank (M) Berhad should sell RM 2,339,554,160 from its total assets, Hong Leong Bank Berhad should sell RM 556,912,390 from its total assets, and RHB Berhad should sell RM 541,798,550 from its total assets.

DEA result from the aspect of capital and reserves owned by banks give advises that Malayan Bank Berhad should utilize RM 7,972,667,090 capital and reserves, CIMB Bank should utilize RM4,682,211,810, Ambank (M) Berhad should utilize RM2,255,233,860, Hong Leong Bank Berhad should utilize RM1, 369,496,440, and RHB Berhad should utilize RM 375,269,430.

Result of DEA from independence output variables recommends that RHB Bank Berhad should boost its deposits to increase RM 2,391,413,140; meanwhile Hong Leong Bank Berhad should increases its loans and advances by RM 18,100,078,020 and profit before tax by RM 528,987,310; moreover Ambank (M) Berhad should rises its deposits to increase RM 6,745,873,130; while Malayan Bank Berhad, it should increases its deposits by RM 2,284,964,940; and CIMB Bank Berhad should enhances its loans and advances and profit before tax by increasing RM 17,372,784,070 and RM 828,755,390.

Assessment of DEA Outcome on Inefficient Bank (Year 2011)

Efficiency target score for AmBank (M) Berhad (88.68%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	187	123.2	34.12	65.88
Staffs (persons)	8,277	6,960.08	15.91	84.09
ATMs (units)	848	394.95	53.43	46.57
Total Asset (RM in thousand)	108,236,205	95,981,795.13	11.32	88.68
Capital and Reserves (RM in thousand)	10,308,924	7,147,341.32	30.67	69.33
Loans and Advances (RM in thousand)	69,378,824	69,378,824	0	100
Deposits (RM in thousand)	78,836,618	78,836,618	0	100
Profit Before Tax (RM in thousand)	1,865,124	1,950,422	4.57	95.43

Table 4.3.19

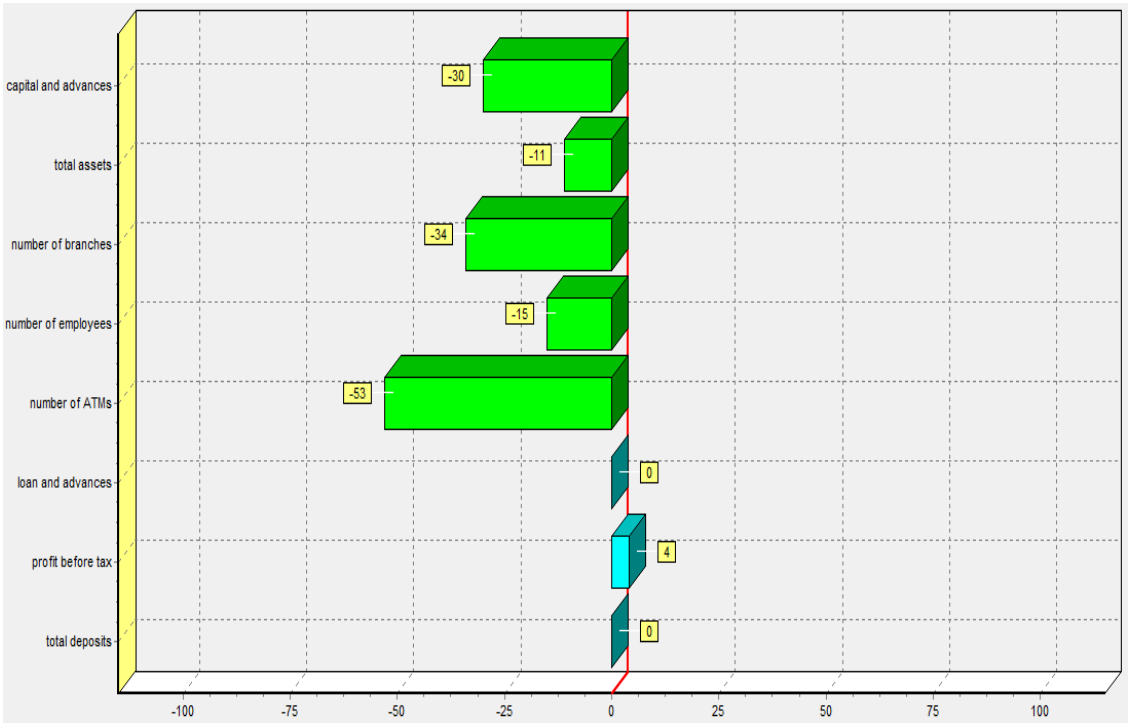

Figure 4.3.19

From the DEA analysis result in year 2011, it showed that only AmBank (M) Berhad achived lower than 100% score which is 88.7%, it can be concluded that inefficiency performance in that particular year.

From the view of input variables such as number of staff, number of ATM, number of branch, total asset, capital and reserve, AmBank (M) Berhad did showed inefficiency in all aspects. The actual amount of ATM required is only 394.95, which means that there are 53.43% of ATM is collateral liabilities which only incurred cost burden to the bank and brings no efficiency to the bank performance. The number of branches also showed the same problem, the actual amount of branches is more than target number of branches by 34.12% which means that only 123.2 branches need instead of 187 branches. Ambank (M) Berhad also had over manpower issue, there are 15.91% of employee is excess, this further reduce the bank efficiency as more resources input for nothing. In term of financial, Ambank (M) Berhad did allocate 11.32% of asset more than target amount. This also indicated that Ambank (M) Berhad need to cut down such amount of asset for efficiency. Besides, Ambank (M) Berhad also need to cut down the capital and reserve as there is 30.67% excess than target amount required.

Then, coming to the output variables, Ambank (M) Berhad only had problem with the profit before tax. There are 4.57% potential improvement to reach the target profit figure. This may due to the cost inefficiency which input resources are not fully utilized.

Assessment of DEA Outcome on Inefficient Bank (Year 2012)

Efficiency target score for Malayan Bank Berhad (98.68%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	399	393.64	1.34	98.66
Staffs (persons)	47,233	23,992.52	49.2	50.8
ATMs (units)	2,862	2,282.61	20.24	79.76
Total Asset (RM in thousand)	342,556,673	337,957,434.8	1.34	98.66
Capital and Reserves (RM in thousand)	36,895,307	24,422,538.05	33.81	66.19
Loans and Advances (RM in thousand)	266,600,855	266,600,855	0	100
Deposits (RM in thousand)	214,852,046	238,633,061.25	11.07	88.93
Profit Before Tax (RM in thousand)	5,498,158	5,498,158	0	100

Table 4.3.20

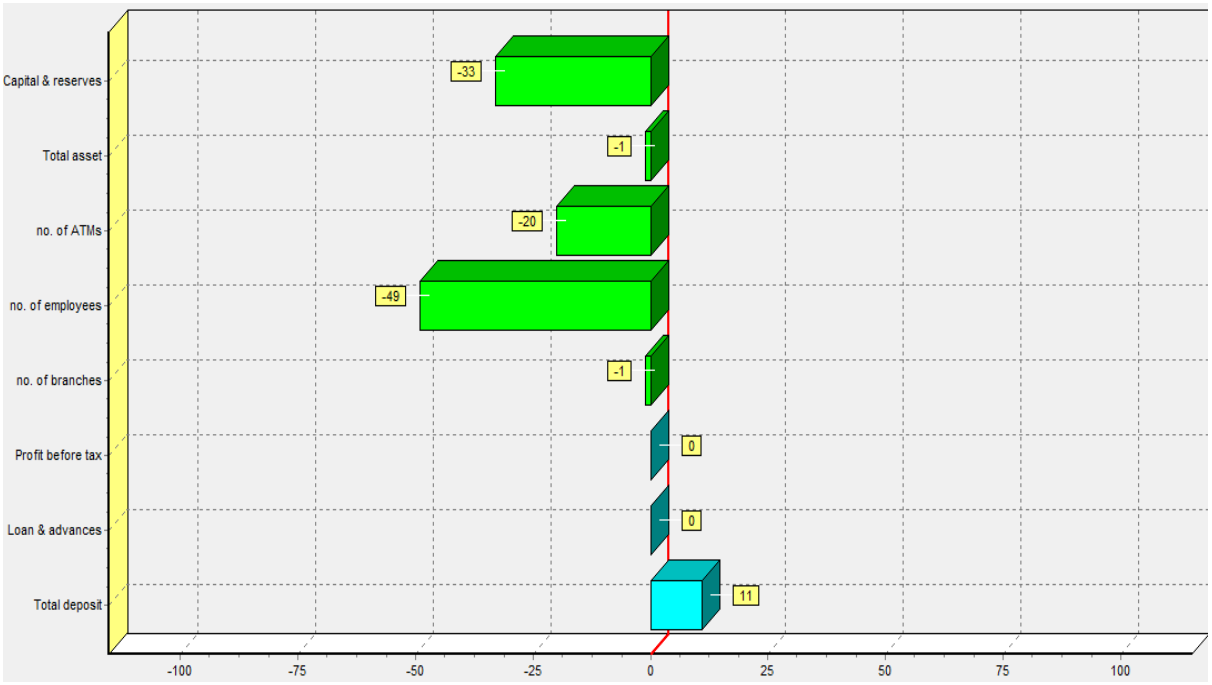

Figure 4.3.20

Efficiency target score for CIMB Bank Berhad (97.86%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	316	303.3	4.02	95.98
Staffs (persons)	14,934	14,613.87	2.14	97.86
ATMs (units)	2,284	1,400.74	38.67	61.33
Total Asset (RM in thousand)	206,795,324	202,362,371.92	2.14	97.86
Capital and Reserves (RM in thousand)	18,017,920	15,130,362.98	16.03	83.97
Loans and Advances (RM in thousand)	164,403,557	164,403,557	0	100
Deposits (RM in thousand)	108,086,083	129,739,840.65	20.03	79.97
Profit Before Tax (RM in thousand)	3,105,142	3,105,142	0	100

Table 4.3.21

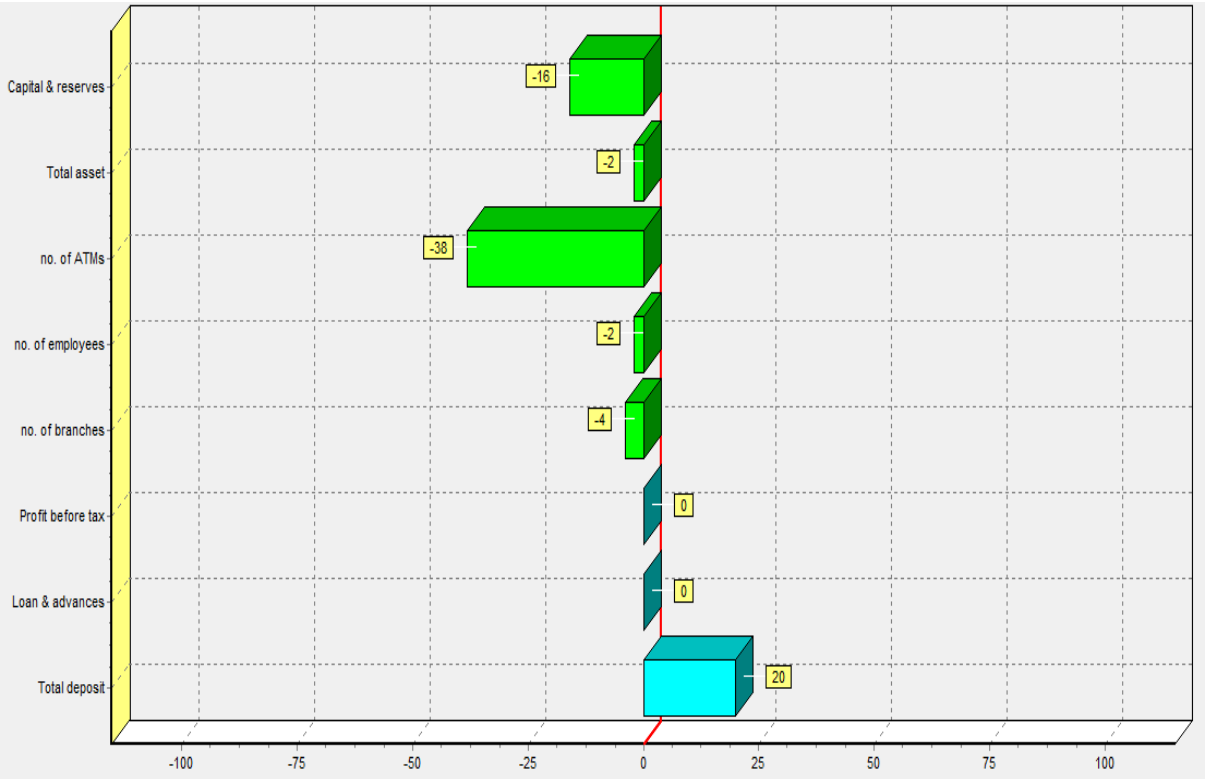

Figure 4.3.21

Efficiency target score for AmBank (M) Berhad (91.93%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	184	115.25	37.36	62.64
Staffs (persons)	8,325	6,505.4	21.86	78.14
ATMs (units)	874	269.03	69.22	30.78
Total Asset (RM in thousand)	111,855,350	102,828,812.49	8.07	91.93
Capital and Reserves (RM in thousand)	11,160,651	6,789,619.2	39.16	60.84
Loans and Advances (RM in thousand)	73,957,980	73,957,980	0	100
Deposits (RM in thousand)	81,170,996	87,149,008.96	7.36	92.64
Profit Before Tax (RM in thousand)	2,081,742	2,081,742	0	100

Table 4.3.22

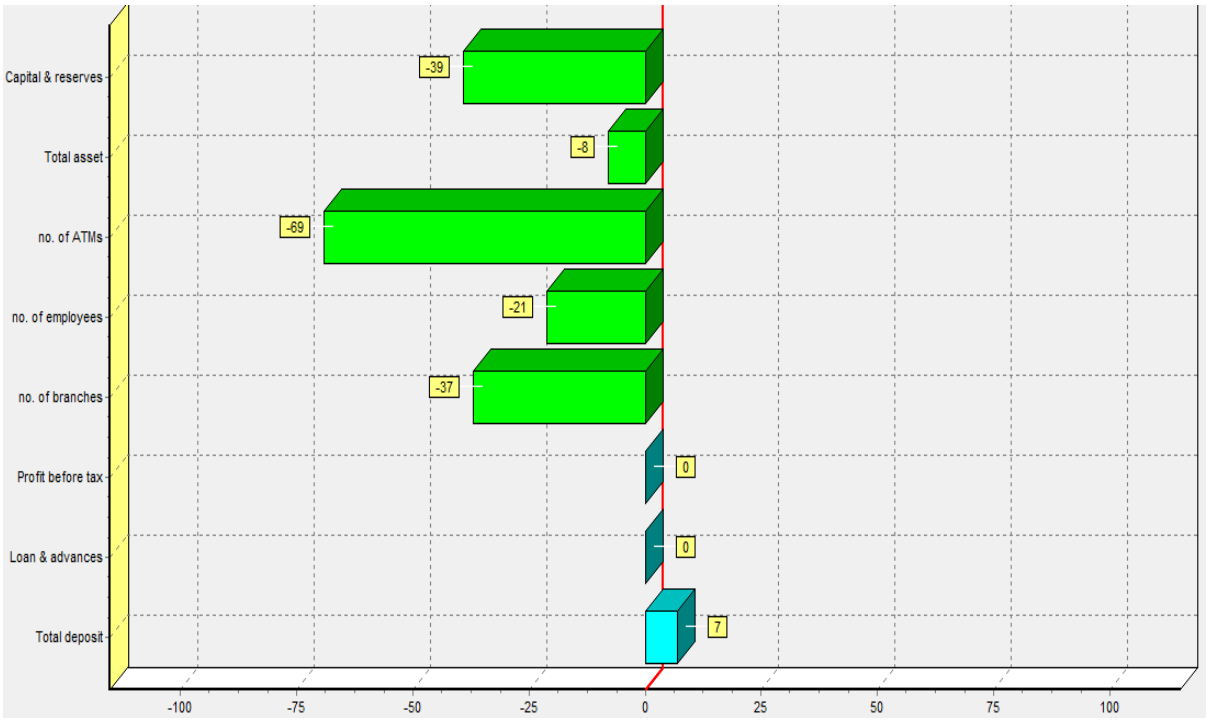

Figure 4.3.22

In the year 2012, there are 3 local banks which score under 100% and categorized as inefficiency banks, there are Malayan Bank Berhad (98.66%), CIMB Bank Berhad (97.86%) and Ambank (M) Berhad (91.93%).

In year 2012, the major inefficiency factor may due to the excess man power. There is 49.2 % excess in man power, which means those amount of employee may under-perform and become liabilities to the bank. There are 20% excess in ATM number which are needed to be reduce for cost efficiency as there is only 2282.61 ATM needed instead of 2862 ATM. Malayan Bank Berhad also need to reduce 1.34% of the number branches to cut down the operational cost. In term of financial, Malayan Bank Berhad also had 1.34% potential improvement in total asset and 33.815 in capital and reserve. With such amount of asset and capital allocated, they should be put in maximum uses instead leave in unproductive situation.

From the view of output, Malayan Bank Berhad only have problem with the total deposit acquired. There is 11.07% potential improvement in order to achieve the target amount of deposit received.

The major inefficiency factor may due to the excess number of ATM, which is 34.67% excess than the number required. Such excess amount will increase the bank operational cost greatly. CIMB Bank Berhad had to lay down 2.14% of its employee in order to gain back efficiency performance. Number of branches also required to reduce 4.02% to achieve optimal performance by cutting down unnecessary expenditure. There are 16.03% potential improvement in term of capital and reserve and 2.14% in term of total asset. These are the amount of input resource that are not fully utilized to generate profit for bank, hence advised to lay down such amount.

CIMB Bank Berhad also suffer from insufficient of deposit acquired. There is 20.03 potential improvement in term of total deposit. Somehow, the resource input failed to attract and increase the deposit amount in bank.

The main factor of bank inefficiency in Ambank (M) Berhad may due to the great excess number of ATM, there is 69.22 % ATM is categorized as excess and only act as liabilities instead of profit generate machine. There is 21.86% of man power need to be laid off in order to cut down cost as the employees are not performing efficiency. Ambank (M) berhad also need to shut down 37.36% of the branches to achieve efficiency performance and reduce the expenditures. There are 39.16% potential improvement in term of capital and reserve and 8.07% in term of asset. These are the input resource that failed to generate further profit the bank as they are not fully utilized.

In term of total deposit, there is 7.36% potential improvement in order to achieve the target deposit amount that required.

Assessment of DEA Outcome on Inefficient Bank (Year 2013)

Efficiency target score for Malayan Bank Berhad (89.89%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	399	303.08	24.04	75.96
Staffs (persons)	47523	19274.21	59.44	40.56
ATMs (units)	2777	675.8	75.66	24.34
Total Asset (RM in thousand)	397605477	357415525.11	10.11	89.091
Capital and Reserves (RM in thousand)	40499772	26616614.41	34.28	65.72
Loans and Advances (RM in thousand)	237971279	249616089.33	4.89	95.11
Deposits (RM in thousand)	311252957	311252957	0	100
Profit Before Tax (RM in thousand)	6126940	6126940	0	100

Table 4.3.23

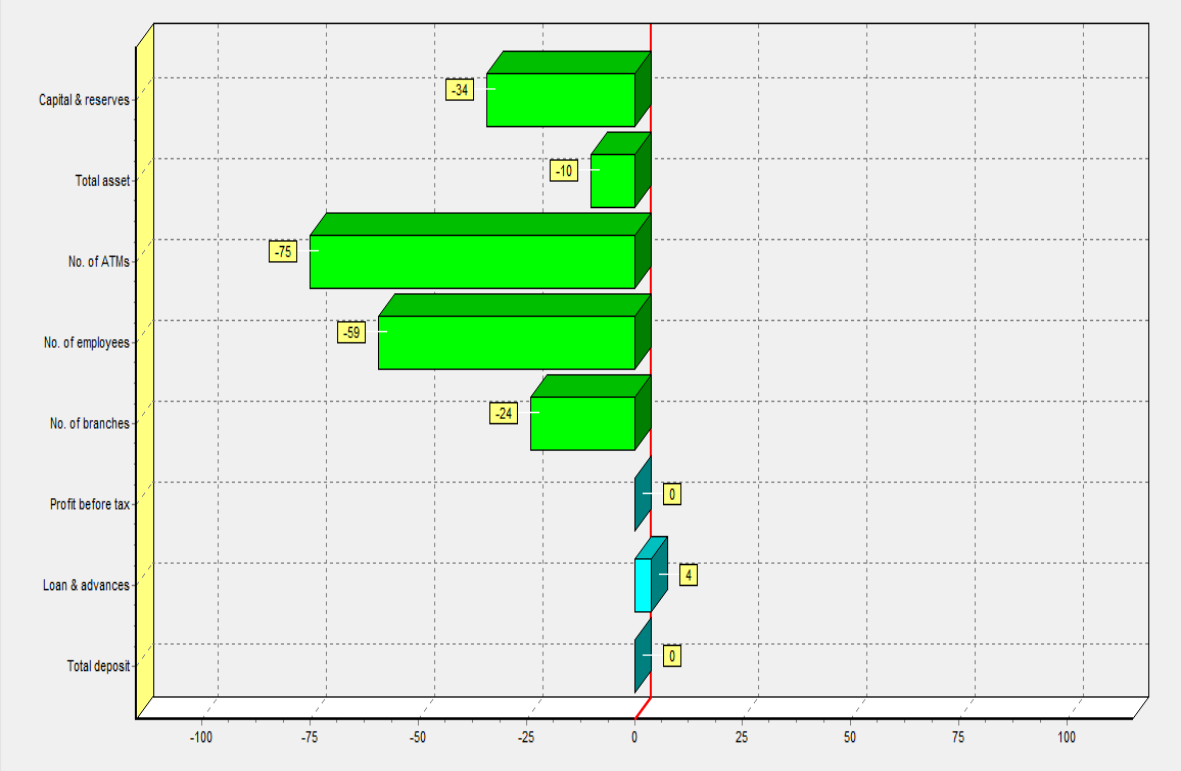

Figure 4.3.23

Efficiency target score for RHB Berhad (95.49%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	194	77.76	59.92	40.08
Staffs (persons)	17740	7340.54	58.62	41.38
ATMs (units)	1417	115.07	91.88	8.12
Total Asset (RM in thousand)	145573549	139014690.68	4.51	95.49
Capital and Reserves (RM in thousand)	12076166	9509833	21.25	78.75
Loans and Advances (RM in thousand)	95752900	95752900	0	100
Deposits (RM in thousand)	122365340	122365340	0	100
Profit Before Tax (RM in thousand)	2037172	2079170.02	2.06	97.94

Table 4.3.24

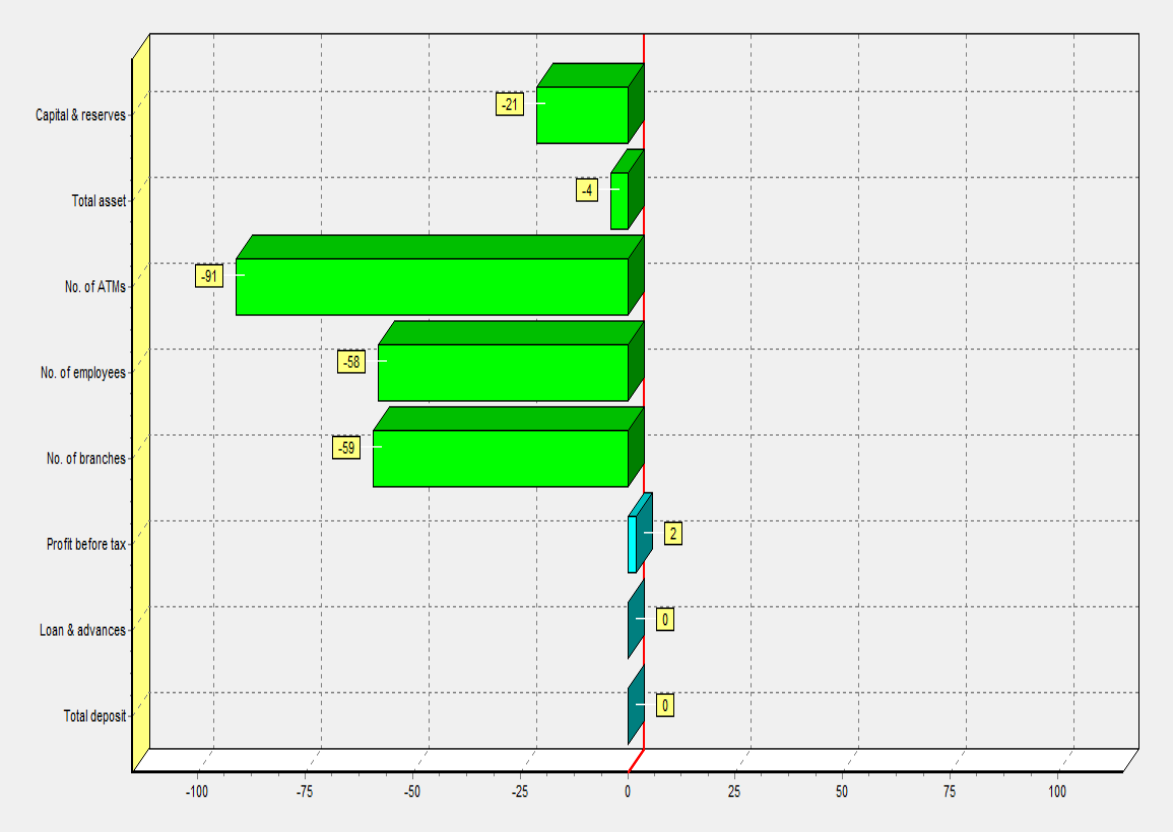

Figure 4.3.24

Efficiency target score for Hong Leong Bank Berhad (93.00%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	277	68.81	75.16	24.84
Staffs (persons)	9351	6995.08	25.19	74.81
ATMs (units)	638	99.43	84.42	15.58
Total Asset (RM in thousand)	145500383	135316402.01	7.00	93.00
Capital and Reserves (RM in thousand)	12002226	9247192.42	22.95	77.05
Loans and Advances (RM in thousand)	81835734	92108561.25	12.55	77.45
Deposits (RM in thousand)	119334745	119334745	0	100
Profit Before Tax (RM in thousand)	1973692	1973692	0	100

Table 4.3.25

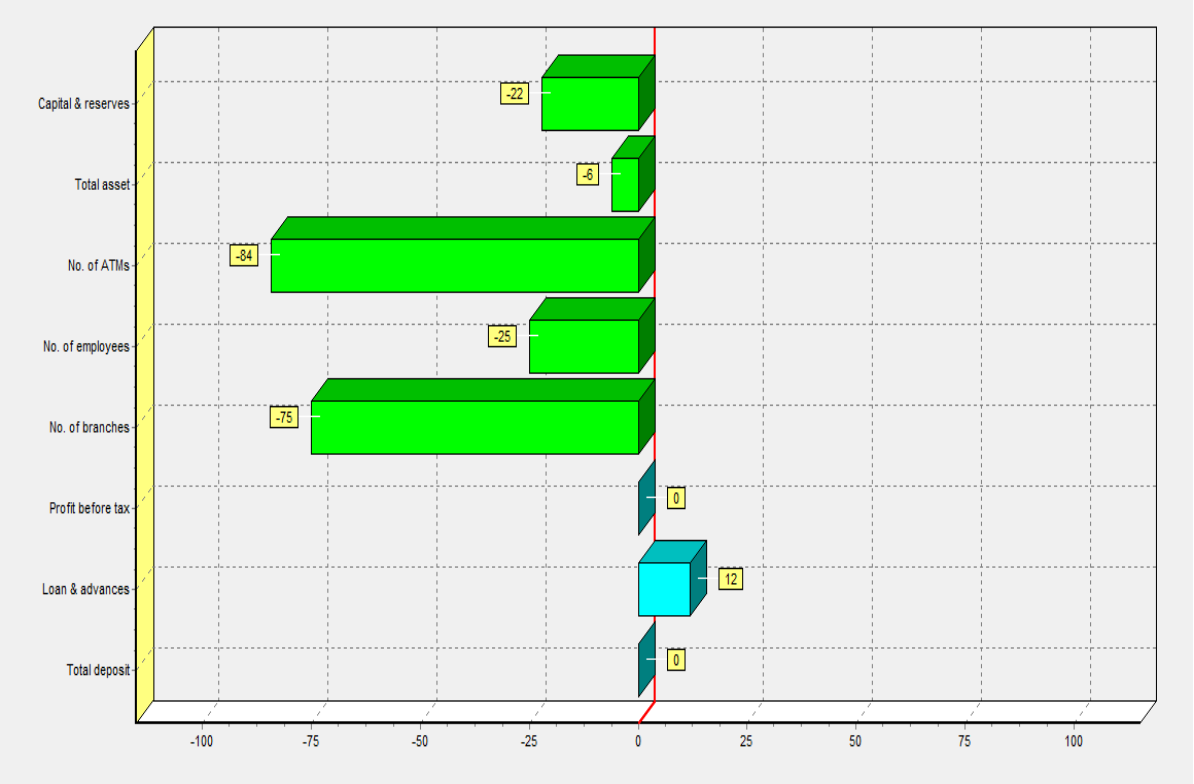

Figure 4.3.25

Efficiency target score for Ambank (M) Berhad (90.96%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	184	115.69	37.12	62.88
Staffs (persons)	9162	6651.77	27.40	72.60
ATMs (units)	882	259.51	70.58	29.42
Total Asset (RM in thousand)	127572261	116034378.03	9.04	90.96
Capital and Reserves (RM in thousand)	12067736	8779909.99	27.24	72.76
Loans and Advances (RM in thousand)	82586332	82586332	0	100
Deposits (RM in thousand)	87982933	100282140.46	13.98	86.02
Profit Before Tax (RM in thousand)	2138987	2138987	0	100

Table 4.3.26

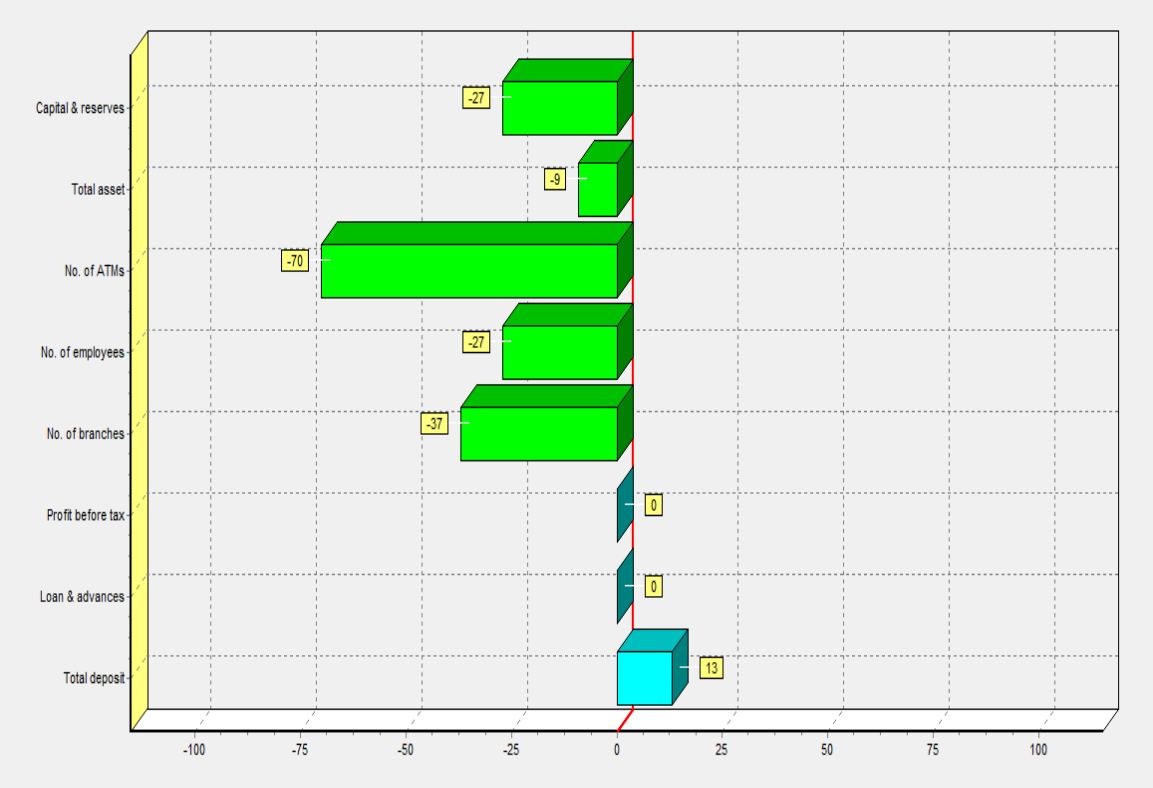

Figure 4.3.26

Efficiency target score for CIMB Bank Berhad (90.13%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	297	105.97	64.32	35.68
Staffs (persons)	13523	11051.07	18.28	81.72
ATMs (units)	2217	136.58	93.84	6.16
Total Asset (RM in thousand)	234603951	211457058.22	9.87	90.13
Capital and Reserves (RM in thousand)	19791740	14279881.16	27.85	72.15
Loans and Advances (RM in thousand)	132833310	144771392.85	8.99	91.01
Deposits (RM in thousand)	186532739	186532739	0	100
Profit Before Tax (RM in thousand)	2729015	3070418.74	12.51	87.49

Table 4.3.27

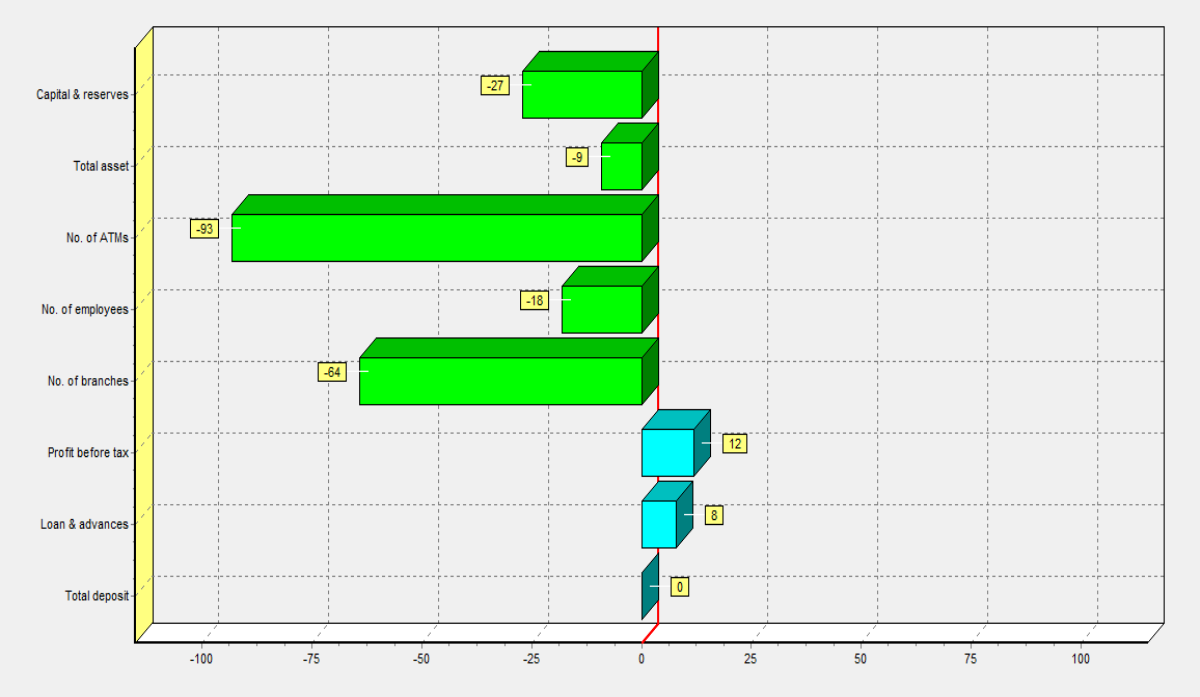

Figure 4.3.27

During year 2013, there are a total number of five banks operating inefficiently out of eleven banks selected based on the Data Envelopment Analysis (DEA) scoring approach, namely RHB Bank Berhad, Hong Leong Bank Berhad, Ambank (M) Berhad, CIMB Bank Berhad and Malayan Bank Berhad. Eon Capital Berhad is not included as it was acquired by Hong Leong Bank Berhad during year 2011.

Based on table 4.27 to table 4.31, all the five inefficient banks suffer from several similar problems, and one of the major problem is inordinate amount of ATMs. The unnecessary ATMs will further burdened the banks as a great amount of funds is needed. For instance, cost of purchasing ATMs, installation fees as well as maintenance fees. Based on the table, the potential improvement for RHB Bank Berhad regarding to the ATMs issue, the bank have to reduce the amount of ATMs by approximately 1302 units or 91.88% of current ATMs. Hong Leong Bank Berhad will have to cut down the number of ATMs by approximately 538 units or 84.42% of current ATMs. As for Ambank (M) Berhad, based on the table, it is suggested for the bank to decrease the ATMs by approximately 622 units

or 70.58% of current ATMs. For the CIMB Bank Berhad, the number of ATMs that is suggested to be removed is approximately 2,080 units or 93.84% of current ATMs. As for Malayan Bank Berhad, the bank is suggested to reduce the amount of ATMs by 2,101 units or 75.66% of current ATMs.

Furthermore, excessive number of employees will not bring any goods to a bank. Instead, it will further burdened the bank as the liability increase with the number of employees. The precise amount of employees will be sufficient to make the bank efficient. All the five inefficient banks faced this issue as well. RHB Bank Berhad, who has a number of employees of 17,740, is suggested to shrink down the size by approximately 58.62% or 10,399 person. Hong Leong Bank Berhad, with a total of 9,351 employees during year 2013, is suggested to cut down the amount by 25.19% or 2,355 person. Ambank (M) Berhad is recommended to retrench about 27.4% of employees which is approximately 2,510 person. As for CIMB Bank Berhad, it is recommended to reduce the number of employees by 18.28% which is approximately 2,471 person. Last but not least, Malayan Bank Berhad is suggested to shrink down the number of employees by 59.44% which is approximately 28,248 person.

Additionally, the five inefficient is shown to have another similarity, excessive capital and reserves as well as total assets. The overflown capital and reserves as well as assets will restraint the growth of the bank. Compare with other four banks in terms of capital and reserves as well as total assets, Malayan Bank Berhad showed an inferior condition. It is suggested to cut down approximately 34.28% of its capital and reserves or RM 13.883 million in order to be efficient. As for the total assets, Malayan Bank Berhad is recommended to reduce the amount by 10.11% or RM 40.19 million approximately.

Out of the five inefficient banks, two of the banks have the problem with their profit before taxes, namely RHB Bank Berhad and CIMB Bank Berhad. It is suggested for RHB Bank Berhad to increase its profit before tax by 2.06% which is approximately RM 41,965.74. As for CIMB Bank Berhad, it needs to increase its profit before tax by 12.51% which is approximately RM 341,399.77.

Hong Leong Bank Berhad, CIMB Bank Berhad and Malayan Bank Berhad shared one common issue, which their loan and advances are lower than expected. In order to become efficient, these three banks are suggested to increase their loan and advances by 12.55%, 8.99% and 4.89% respectively.

Last but not least, Ambank (M) Berhad is the only bank who is inefficient regarding to its total deposit. According to the table, Ambank (M) Berhad is encourage to increase the amount of its total deposit by 13.98% or approximately RM 12.299 million to be efficient.

Assessment of DEA Outcome on Inefficient Bank (Year 2014)

Efficiency target score for RHB Bank Berhad (94.90%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	199	82.34	58.62	41.38
Staffs (persons)	13,136	7,739.32	41.08	58.92
ATMs (units)	1,416	175.14	87.63	12.37
Total Asset (RM in thousand)	172,134,201	163,363,163.21	5.1	94.9
Capital and Reserves (RM in thousand)	13,686,331	11,716,727.17	14.39	85.61
Loans and Advances (RM in thousand)	109,982,719	109,982,719	0	100
Deposits (RM in thousand)	144,017,167	144,017,167	0	100
Profit Before Tax (RM in thousand)	2,016,018	2,148,729.88	6.58	93.42

Table 4.3.28

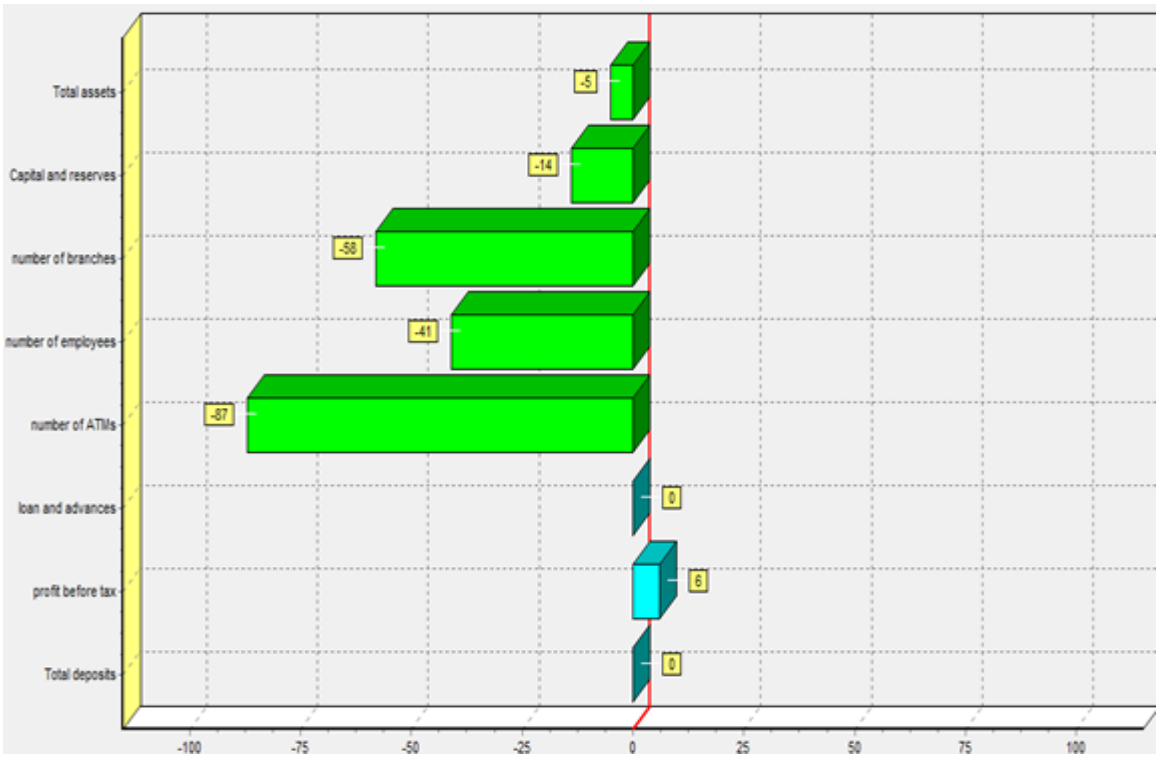

Figure 4.3.28

Efficiency target score for Hong Leong Bank Berhad (91.59%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	283	67.1	76.29	23.71
Staffs (persons)	9838	6,743.77	31.45	68.55
ATMs (units)	563	118.17	79.01	20.99
Total Asset (RM in thousand)	148,821,876	136,300,782.23	8.41	91.59
Capital and Reserves (RM in thousand)	12,976,077	9,997,094.38	22.96	77.04
Loans and Advances (RM in thousand)	87,873,449	94,313,033.19	7.33	92.67
Deposits (RM in thousand)	119,486,219	119,486,219	0	100
Profit Before Tax (RM in thousand)	2,057,725	2,057,725	0	100

Table 4.3.29

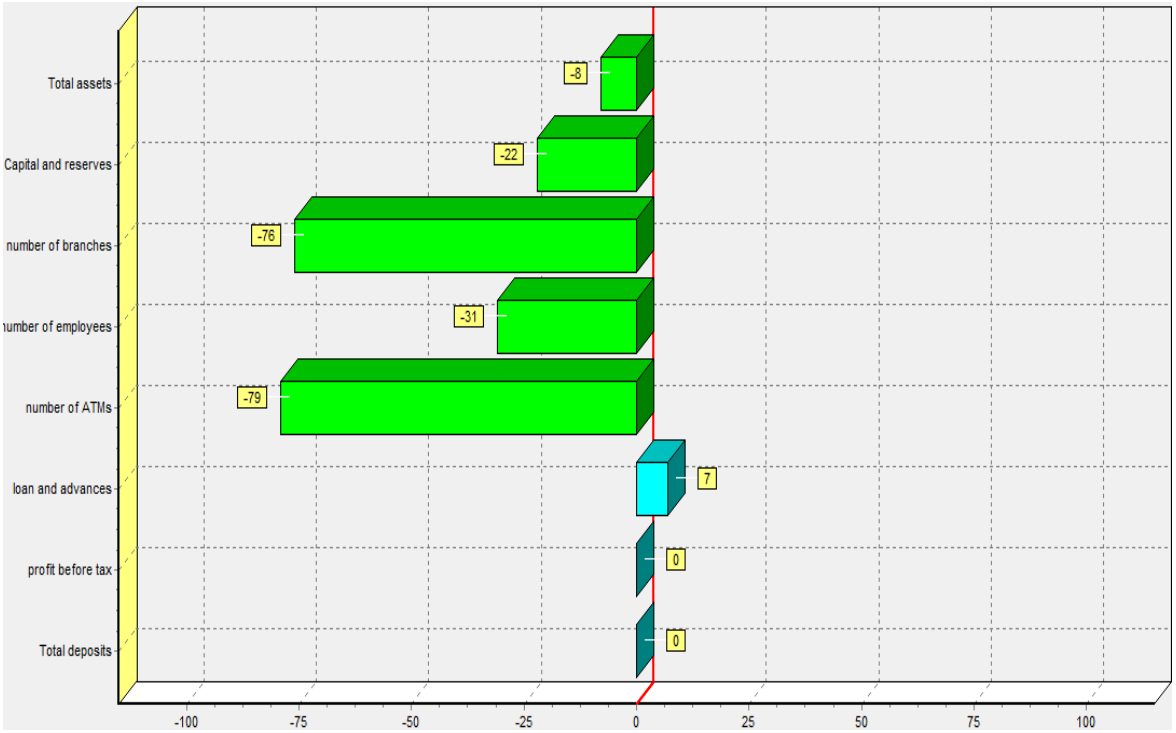

Figure 4.3.29

Efficiency target score for Malayan Bank Berhad (91.30%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	402	212.3	47.19	52.81
Staffs (persons)	47,058	22,663.2	51.84	48.16
ATMs (units)	2,615	421.19	83.89	16.11
Total Asset (RM in thousand)	452,559,458	413,193,649.79	8.7	91.3
Capital and Reserves (RM in thousand)	46,172,805	32,819,744.35	28.92	71.08
Loans and Advances (RM in thousand)	264,524,441	264,524,441	0	100
Deposits (RM in thousand)	354,439,156	354,439,156	0	100
Profit Before Tax (RM in thousand)	7,344,427	7,344,427	0	100

Table 4.3.30

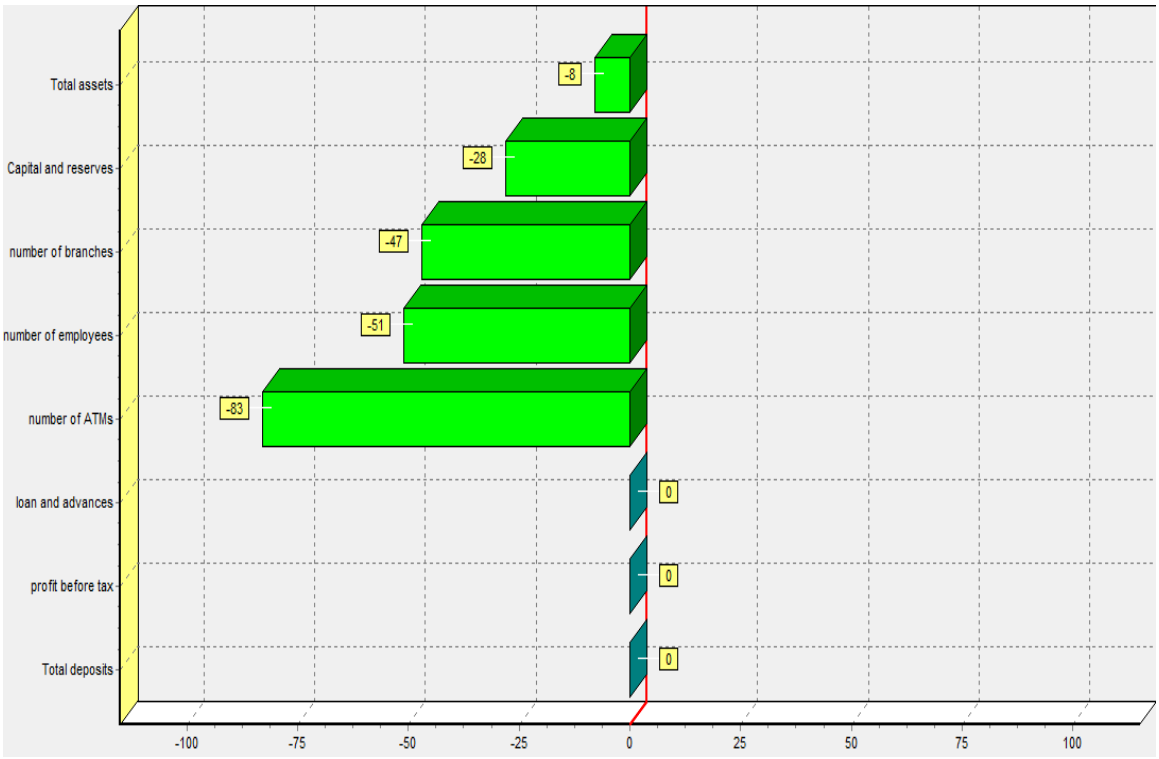

Figure 4.3.30

Efficiency target score for CIMB Bank Berhad (88.09%)				
Variables	Actual	Target	To Improve (%)	Achieved (%)
Bank Branches (numbers)	294	117.86	59.91	40.09
Staffs (persons)	13,152	11,017.75	16.23	83.77
ATMs (units)	2,283	254.12	88.87	11.13
Total Asset (RM in thousand)	264,948,946	233,405,936.78	11.91	88.09
Capital and Reserves (RM in thousand)	23,861,001	16,709,559.87	29.97	70.03
Loans and Advances (RM in thousand)	150,874,563	156,783,853.35	3.92	96.08
Deposits (RM in thousand)	205,858,870	205,858,870	0	100
Profit Before Tax (RM in thousand)	3,033,172	3,033,172	0	100

Table 4.3.31

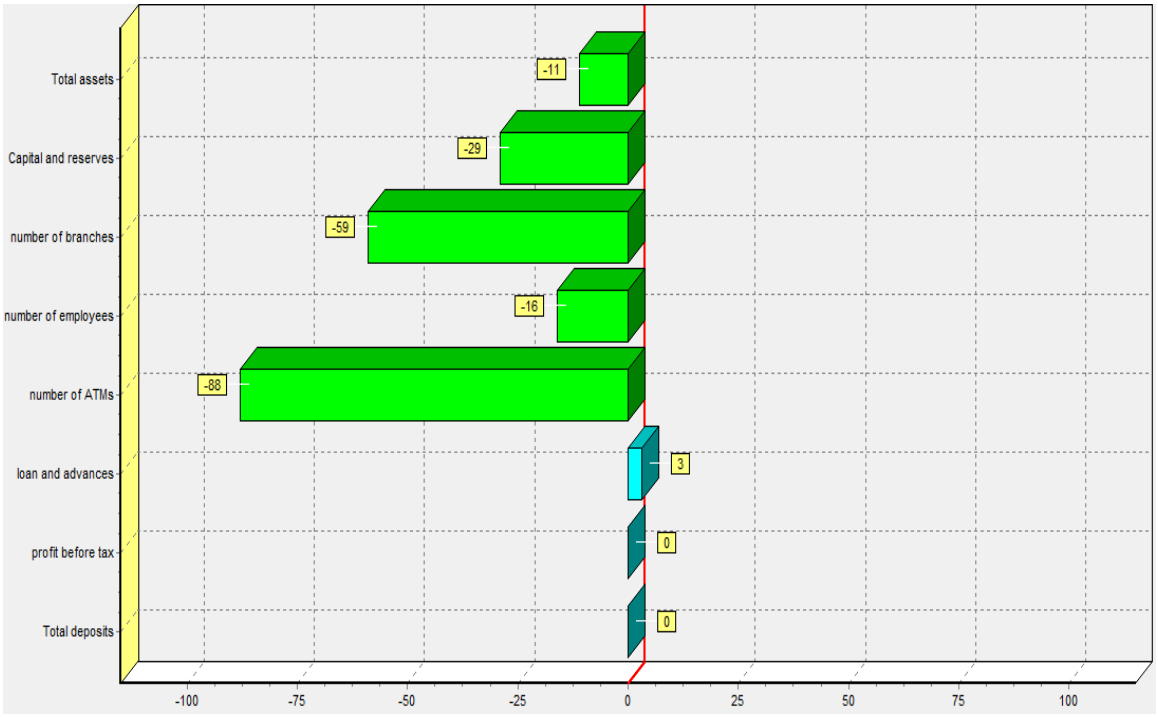

Figure 4.3.31

In table above, the efficiency score for RHB Bank Berhad, Hong Leong Bank Berhad, Malayan Bank Berhad (Maybank) and CIMB Bank Berhad are 94.90%, 91.59%, 91.30% and 88.09% respectively. These 4 banks are inefficient compared to other banks.

According to table 4.3.28, the two main variables that affected the efficiency score of RHB Bank Berhad are number of bank branches and number of ATMs. RHB Bank Berhad has excessive branches and ATMs that need to be cut down are more than 50% which are 58.62% and 87.63% respectively. This shows that RHB Bank might use their resources inefficiently and invested into unproductive assets which lowered down their efficiency score. The variable that RHB Bank Berhad achieved 100% efficiency score are deposits and loan and advances which mean that they have efficiently transformed its depositors' deposit into fund that is used to loan out to the borrowers. But, the profit before tax which is the output variable is poor for RHB Bank Berhad which only 6.58% of the target score and this eventually brought down the efficiency score of RHB Bank Berhad.

For Malayan Bank Berhad (Maybank), the main variable which seriously affected its efficiency score is the number of ATMs. Maybank has too many units of ATMs which were not efficiently used. They have 2615 units of ATM in year 2014, but based on DEA, they should only have 421.19 units of ATMs, which mean they should cut down 83.89% of their unit of ATMs which caused them to use too much cost to maintain it. Maybank bank also needs to cut down its company's employees by 51.84% to achieve 100% efficiency score. However, Maybank is efficient in the use of its outputs which are loans and advances, deposits and profit before tax which achieved 100% efficiency score. This means Maybank has efficiently used its deposits to loan out to its customers and earn profit.

Based on the efficiency score of CIMB Bank Berhad, the main input variable that affected RHB bank efficiency score are number of branches and number of ATMs. CIMB Bank Berhad has to cut down the unit of branches and ATMs by 59.91% and 88.87% in order to get 100% efficiency score for these variables. For the capital and reserve, number of employees and total assets, CIMB bank Berhad also needs to reduce them by 29.97%, 16.23%, 11.91% and in order to be efficient. CIMB Bank Berhad is efficient in the use of its outputs which are deposits and profit before tax. CIMB Bank Berhad also needs to increase its loan and advances by 3.92% to be efficient.

Based on Table 4.3.29, we can clearly see that for Hong Leong Bank Berhad's efficiency score is only 91.59%. So, they should cut down branches by 76.29% to reduce their cost as they have too many branches which lowered down their efficiency level. They also hired too many workers and Hong Leong Bank Berhad should consider laying off some workers who are not productive to increase back the efficiency score. Their number of ATM has exceeded the demand of its customer and this eventually brings down the efficiency score of Hong Leong Bank Berhad. As the maintenance cost of ATM can cost a bomb, the resources which are utilize in maintaining these ATMs can be invest in other aspects to increase the efficiency score of Hong Leong Bank Berhad. However, Hong Leong Bank is efficient in the usage of its outputs which are the deposits and profit before tax which achieved 100% efficiency score. Hong Leong Bank Berhad is efficient in the use of its

outputs which are deposits and has efficient profit before tax. Hong Leong Bank Berhad also needs to increase its loan and advances by 7.33% to be efficient.

4.4 Conclusion

In this chapter had analysed all the result from DEA software. Based on the result from DEA, foreign banks is more efficient than local banks within the sample period. In order to improve the efficiency score, DEA had provided ample of data to help those inefficient banks to adjust the distribution of inputs to optimize the outputs.

CHAPTER 5: DISCUSSION, CONCLUSIONS AND IMPLICATIONS

5.0 Introduction

In this chapter, this study will cover up the discussion, conclusion and implication of the overall research. There are also a summary to summarize the description on the entire descriptive and inferential analysis that was obtained from the result in chapter 4, and thus the research providing discussion on major findings to authenticate the research objectives and hypothesis. This chapter will talk about implication, limitation as well as recommendation for the future research are discussed. Lastly, there will be a conclusion on our research topic which is the Malaysia Banking Efficiency: A research towards local bank and foreign bank.

5.1 Summary of Statistical Analysis

This research comprises of five controlled input variables and three output variables. The input variables included number of branches, number of staffs, number of ATMs, total assets and capital & reserves as input variables while output variables included total deposits, loan & advances and profit before tax as output variables.

Throughout the selected period, all of the foreign banks obtained perfect efficiency score expect HSBC Bank Berhad which failed to do so in year 2009 with a 98.82% efficiency score. As for local banks, only Public Bank Berhad is able to achieved perfect efficiency over the selected period. Other than Public Bank Berhad, other selected local banks' efficiency score fluctuated, cause them to be classified being efficient and inefficient, depending on the year. Malayan Bank Berhad (Maybank) and CIMB Bank Berhad had

only been efficient during 2011, Ambank (M) Berhad during year 2014. In addition, RHB Bank Berhad and Hong Leong Berhad achieved 2 years perfect efficiency score which is during 2011 and 2012. EON bank had always been efficient before acquired by Hong Leong Bank.

The trend analysis report in chapter 4 shows a continuous improvement in terms of inputs and outputs in the banking industry over the sampling year. Based on the result, foreign banks performed better than local banks in Malaysia. The result shows 39 out of 40 observations in foreign banks compared to 21 out of 51. The figures stated in previous chapter proved that foreign banks are more efficient based on the result from the graph and local banks' efficiency tends to fluctuate over the selected time period.

On the other hand, larger banks in Malaysia are not necessary to be more efficient in performance. As from the result, Public Bank Berhad is able to achieved perfect efficiency score though out the selected time period and it is known as the third largest bank in Malaysia. However, the largest bank in Malaysia which is Malayan Bank Berhad (Maybank) only achieved one year perfect efficiency.

5.2 Discussion on Major Findings

Based on the result on existing outputs and inputs, input variables play an important role in computation of bank's efficiency. After DEA computation, among the input the variables, it seems that most of inefficient banks are having severe problems of excessive number of ATMs and branches. Besides, according to the result of output variables, majority of the banks managed their outputs efficiently. Financial performance is determined by the utilization of inputs and outputs conjugally. With the proper management, financial performance can be enhanced.

5.2.1 Local Banks versus Foreign Banks

This study revealed certain important findings. Figure 4.1 and figure 4.2 show that the foreign banks are more efficient than local banks in Malaysia over the selected period which starts from year 2007 till year 20014. According to Claessens et.al (2001), the entry of foreign banks to Malaysia will affect the profitability of local banks. Besides, the entry of foreign banks might forces local bank to improve their quality on their financial services and this caused by the number of competitors has increased (Levine, 1996). In order to compete with foreign banks, local banks have to improve their performance such as advancement in technology. By doing so, local banks may be able to compete with foreign banks.

There are cultural differences exist between local and foreign banks in their business operation. In order for the foreign banks to be accepted in the market, they have to adapt local's culture and this will be a big challenge for foreign banks. However, the local folks often have the performance contradict which assume foreign banks are often more efficiency than local banks. According to the result retrieved in chapter 4, foreign banks do not suffered from any losses since year 2007 till year 2014 while local bank (AmBank) did incur loss during year 2007. Based on the DEA result, there is only one foreign bank failed to being efficient during the selected period while most of local banks failed to do so over the timeframe.

According to Pantaleo (2008), banking efficiency is an impact to make economic growth. He also indicate that banking efficiency in Africa had plays an important role in promoting economic growth. The market share and the efficiency of foreign banks and local banks are closely related to the economic performance. According to Berger, Hasan & Klapper (2014), the greater the banking efficiency, the better the performance. In this study, foreign banks had been doing well compare to local banks in Malaysia. Thus, foreign banks have a better chance to lead the economy towards a more appealing sight.

5.2.2 Larger versus Smaller Local Bank

The determinant of a bank size whether it is a large bank or a small bank is totally according to the asset size of the bank (Fayman, 2009). Bank size played an important role on the bank efficiency. Larger bank is more diversified and lower earning's volatility compared to smaller bank. Through diversification, larger bank inclined to take more risk and earn a higher profit while stable earning ensures financial stability even in the financial crisis period (De Haan & Poghosyan, 2011). According to Kovner, Vickery & Zhou (2014), larger bank tend to gain advantages on the 'operational leverage' or economies of scale. In other word, the higher revenue made by the larger bank can effectively spread out the cost over it. The larger bank also may operate at the position which is closer with the production frontier at average due to the operational leverage advantage. Besides that, larger bank favor with more bargaining power against the suppliers and employees compared to smaller bank.

Although there are so many advantages enjoyed by the larger bank, there are also be some drawbacks from it which will favor the smaller bank. Small bank can reduce the systematic risk where the financial system will be stable when no bank is allowed to expand too large. Smaller bank provides better services by paying extra attention on the matter as in competing with other banks with are larger in size, capital and resources. Smaller bank can focus on coalface and at the same time reduce the risk. Unlike those larger banks, smaller bank spend lesser time on navigates and supervision their business operation and may put more effort on understanding the customers and lending risk (Mainelli & Giffords, 2010).

Regarding to the matter of optimal bank, the issue of "too-big-to-fail (TBTF)" has been addressed by policymaker over the decades in financial institution. Kaufman (2014) stated that TBIF firm is a large complex firm which require either or both special regulation and supervision by government to discourage failure while alive and/or government intervention with providing special resolution system to aid the insolvent firm from being bankruptcy. Policymakers believe that malfunction by the TBIF firms

can bring a great impact to the financial economics and country development into unfavorable situation.

Based on the efficiency score in Table 4.2, there is a robust evidence to support the hypothesis of larger bank is more efficiency than smaller bank in competing with foreign bank. Although smaller banks such as Eon Capital Berhad, RHB Bank Berhad and Hong Leong Bank Berhad managed to perform well in some years, but still it facing big challenges and pressure form the larger bank

5.2.3 Local banks without government intervention and government-link banks

In order to differentiate private and government-link bank in the commercial bank, it can be observe based on the portion of share who hold. For instance, according to Ashok Ramamurthy, CEO of Ambank, Ambank is a private bank as the major shareholder is ANZ Financial group. Thus, when they invest in Ambank, they took over the CEO position. Besides, EON Bank (EON Capital) is belongs to government link group. This financial group been set up to provide financing to support our Malaysia National Car industry, Proton. The name called EON- Edaran Otomobil Nasional berhad which is under Malaysia government.

Based on the efficiency score in Table 4.3, it seem that banks without government intervention would give off a better performance. The Public Bank Berhad had performed on full capacity and efficiency all over the empirical years that the study takes into account.

Privatization on bank sector will improve the bank efficiency. Government-link banks usually will be more concern towards society welfare rather than profit-making. However, a privatize banks which tends to maximize profit, will often came out with

a higher performance by cutting cost and revenue. Government-link banks are often influence by the political pressure rather than sound economic and business which tends to increase the chance for the bank to make indelicate decision (Pettinger, 2011). According to Chortareas et al. (2013), excessive interferences from the government in the financial institution activities will affect the efficiency of the bank's operation adversely in European Union. Banks operate more efficiently on cost controlling and generate profit in the condition where high degree of financial freedom associated with good governance is available. In the study of Di Patti and Hardy (2005) also founded that most of the time the state-owned banks performed inefficiently while the privatized banks show improvement on its profit efficiency immediately after the privatization in Pakistan.

However, there is no absolute conclusion had been drawn as not many researches and proves that are able to conclude that privatization will improve the bank efficiency over the globe. The result is subject to change based on the government policy and country condition. According to Bonin et al. (2005), there is no clear sign to indicate that private banks are operate more efficiently as state-owned banks which are performing as good as the local private banks in transition country. Moreover, Sufian and Shah Habibullah (2014) found that greater freedom to run a new business will only worsen the bank's efficiency in Malaysia banking sector and government should intervene by enforce regulations and supervision. For instance, limiting the activities that the banks can participate to avoid adverse efficiency impact.

5.2.4 Pre-merger versus post-merger banks

The bank acquisition exercise involved in this research is EON Bank and Hong Leong Bank which they merged on year 2011. The main purpose for acquisition exercise is due to efficiency gains which able to reflect higher profitability and reduction of cost, the enhancement of capability to compete, geographical diversification generated from acquisition and upgrade the ability to generate value to consumer by cross-selling of

products (Champa & Hernando, 2005). It show that there is improvement in return on equity and efficiency for bank from acquisition. This shows that acquisition exercise brings ample of positive effects. Bank will be interested in merger and acquisition exercise when they have desire on bank's growth, tax gains and managerial gains. In addition, larger bank that merged or acquired a smaller bank will obtain to ability to operate in various geographic locations through different branches. The operation area will be widen and is kind of good news for bank as it successfully approach to more potential customers. On the other hand, according to Cologoklu and Yesildag (2011), there is difficulty for small bank with low profit and lack of capital to improve performance through merger or acquisition exercise.

According to the result in chapter 4, the only acquisition exercise taken place during the research period where EON Bank absorbed into Hong Leong Financial Group. The group is able to sustain the full efficiency only for 2 years after the acquisition, before deteriorate and become inefficient. This acquisition exercise could not be categorized as a successful merger as it only contribute for short term rather than it cannot maintain the efficiency performance for long period after merger exercise. If there is a negative result on merger exercise, it could be due to Hong Leong Bank still not ready yet to take in EON Bank or emerged to become a larger entity. This might be fail to account from efficiency gain during that short period yet these gains might come in after some period (Rezitis 2008). Thus, the hypothesis of this study which post- merger bank is more efficient compared to pre-merger bank is not valid as there are no clear evidence to prove the hypothesis from the merger exercise.

Hypothesis	**Result**
H1: Foreign banks operate more efficient as compared with the local banks in Malaysia banking industry.	Yes
H2: Larger banks are more efficient than smaller banks in competing with foreign banks.	Yes
H3: Local banks without government intervention is more efficient than government-link banks in competing with foreign banks.	Yes
H4: Post-merger bank operate more efficient than pre-merger bank in competing with foreign banks.	Not clear

5.3 Implication of Study

Bank is said to be efficient when the input resources are being fully utilized and produces the maximum outcomes such as profit and deposit allocated. Throughout the DEA analysis in the previous chapter, the results showed the efficiency score and the potential improvement of each individual sample banks in the sample period. The potential improvement refers to the weakness of the banks which caused inefficiency which are able to be amended.

From the results, it revealed that most of the banks' inefficiency were caused by misallocation of the bank assets and failed to properly utilize them. These failures will further increase banks' cost burden instead of generate profits and efficiency. Thus, it is necessary to fix the cost efficiency by correcting ways of utilizing the input resources in order to generate as much outputs as possible to compete and survive in Malaysia banking sector. In term of output variables, most of the banks either foreign or local are showing efficient results and less potential improvement required.

This study also showed certain evidences against the hypothesis in term of bank size, merger and acquisition and government intervention, from the result, this might assist policy and decision makers to have a different point of view toward such issue of bank efficiency and at the same time, supply with practical suggestions and solutions in addressing bank efficiency problem in Malaysia.

5.3.1 Managerial Implication

The major common problem that most of the local banks faced is the wrong perception regarding to the number of ATMs. ATMs are one of the costly assets in banks' balance sheets. The precise number and the location of the ATMs' location should be estimated accurately. There are various way to fix this problem. Firstly, retrieve all the necessary data and further interpret them. For example, the population of the area, the demographic of the population, the conveniences of the location access for the users and so on. Size of population has a positive correlation with the number of ATMs should be implemented as always. The demographic of population refers to the age range of the population, different age range will have different perceptions towards the usage of ATMs. The elder folks usually poses unconfident in the usage of the ATMs, they rather to queue up at the counter and wait for the services from the receptionists regardless how convenience the machines are. In such extent, resources allocation should be done accordingly to the customers' banking behaviour. The ATMs also have the ability to provide basic functions of a banks such as withdrawal of money. For certain area, a branch might not be necessary, but banks are able to provide their basic banking services with the existence of ATMs.

For the bank branches, they should located in the geographically strategic location and avoid from overcrowding in the same region. When the bank had set up two or more branches in the same area, this can diversify the sources of customers and increase the banks' cost burden. In this case, one is better than two. Alternatively, banks should differentiate their customers based on region and set up adequate amount of branches

to provide face to face banking services such as consultations regarding deposit, wealth management and so on. When the banking services went digital and online, the functions of the branches will begin to adapt the trend of innovation and start to transform. Nowadays, the main reason for the customers prefer to visit the branches for banking services instead of using the online services is that they are not confident with technology yet. They are prefer to have face to face services which makes them comfortable. Instead of just focusing on the number of branches, banks should also focus in service quality. Service quality can be improved through employment of highly qualified and skilled employees so that they can provide professional and customer friendly advises to their customers as some of the customers are not well-educated in terms of business and finance theory. The advices and services provided should be in an understandable way for customers. The friendly services offered will increase the customers' satisfaction. Banks will gain a better reputation with the increasing number of satisfied customers. By making the customers to feel that they are being treated in a premium status can further enhance their satisfaction to the banks. Being invited in a fancy decorated letter, seated in a comfortable sofa in a harmony themed interior waiting room, a cup of tea or coffee while waiting, a friendly and passion greeting at the first contact, a great appreciation gratitude at the end of services, all these small actions will maximize their satisfaction level and loyalty toward the bank. The financial products sale to customers should be personally fit to their financial position, there should not be any moral hazards occurred to provide something inadequate to them just for the reason to increase the sales volume. By doing so, in the end, the result will be adverse and eventually damage the reputation of the bank tailed with the loss of customers. The power of word of mouth should not be underestimated while banks should grab the opportunities by using it in a correct manner.

Another vital factor that influence the reputation of banks in the branches level is the speed of service. Nobody wants to waste their time in waiting as the waiting process may incurred opportunity cost for them. If duration to be served is quite long, the customers will begin to feel that their time had been unproductive, hence it may cause

negative emotion such as anxiety or anger. The efficiency of the bank staffs in the bank branches should be highly supervise as they are the first line of the bank which represent the banks. The internal environment of the branches should be comfortable, so that the customers are willing to stay which tends to create more sales opportunity. Thus, the customers tends to remain satisfied with a longer waiting duration. Setting up a reading and internet surfing area can reduced the boredom of the customers and the friendly greeting and services can offset the negative feeling from the waiting time.

The deposit issue also will affect the overall bank efficiency. Deposit had always been essential elements in the banking sectors. Every banks will try their best to obtain the fund from the surplus market especially the core deposit as the hot money are highly volatile and may jeopardize the banks' liquidity. With the higher volume of deposit, banks are able to give out more loan, but in order to attract higher volume of deposit, the methods used nowadays are offering rewards or a higher rate of deposit, in the end, the higher rate of deposit will reduce the net interest income. Hence, in order to gain as higher as possible the volume of core deposit, the convenience and the service provided by banks is essential besides the competitive interest rate offering. The extension of service provided location to deposit money can attract more depositors especially outside the urban area. In such region, choices of banks is limited and the locals are more willing to deposit the money among those banks. According to statistic results from Kane (2005), it showed that people tend to deposit their money at the nearest bank to their living environment. Then, the flexible fixed deposit also attractive toward the depositors and seen to be an alternative solution to allocate the deposit as the trend of market nowadays moving in a fast pace and the high rate of uncertainty and accident. With the flexible withdrawal of certain amount of the fixed deposit for emergency uses, customers are more willing to deposit with the particular banks due to its liquidity. There is also another way to increase the deposit volume by co-operate with other companies by increasing the deposit account. Bank linked companies will release wages in the co-operate banks, in order to receive wages paid, employee of the companies required to have the particular banks' account, indirectly, the employee of those companies became the depositors of the banks. By making it

happen, incentive and rewards can provided to such companies to attract their interest and attention.

Furthermore, to further cutting down the cost burden, the uses of online banking and mobile banking (e-banking) should be greatly promoted to their customers. In this 21th century, the convenience and the coverage the internet network had been generally applied to most of the area in Malaysia including those rural area such as the "kampung-kampung". Now, most of the people own a smartphone either with high end technology specification or normal specification, the basic function still remain similar, and equipped with the function access to the internet. Hence, mobile banking trend becoming gradually popular. With the use of smartphone access to the banking services, transaction can be make instantly and paperless. For consumers, it is very user friendly and convenience. For banks, this particular functions does notthe expense of maintaining branches, staff and ATMs. In the long term, it will greatly improve the banks' cost efficiency and provide excess fund to invest and expand as the need of staff and ATMs will greatly reduce as the usage of e-banking went common in the society.

In order to make the e-banking goes mass-oriented, improvement, reward and penalty methods can be exercised simultaneously to encourage their customers become interested in the e-banking. Firstly, to improve the safety of the e-banking services as the raise of safety concern of the customers toward this e-banking, they are worry about the uncertainty and the safety net loop hole scandals that are recently reported. Implementation of the simple biometric system to avoid others from being identity thieves to spend and manage the bank account without the actual owners'' permissions. The process should be user friendly and poses no technically difficult toward the users, if failed to do so, it may create the opposite outcomes. With such technology improvement, customers will tend to utilize e-banking (Gu, Lee & Suh, 2009). Education regarding this issue should be greatly promoted to encourage customers to march along this trend, tutorial should be easily accessible, and the technical assistance should be available 24/7 as nobody will feel free to risk their money in such ways.

Rewards of using the e-banking such as discount on transactions via e-banking will lift the barrier that discourage customers from using this services. When the customers get used with this services, it will becomes their banking habits. In the long term, it provides quick, instant, paperless transaction which eventually brings mutual benefits for both parties. On the other hand, additional charges may applied in the traditional paper transaction such as cheque to discourage the usage as it is not cost friendly and not eco-friendly also. When customers approach to the branches for transaction services, banks should recommend, educate and assist the customers in the uses of e-banking or ATMs services in priority before require the staffs' service at the counter as they refuse such assistances.

In term of bank size, the results showed that the size is doesn't matter in generate efficiency. The bigger size of the bank doesn't showed that they are more efficiency and hence there is no need to grow big enough to compete with other banks. Quality is always better than quantity. Besides, since the fall of Lehman brother in year 2008, bank size became a concern for central bank as there is a chance to create domino effect as the bigger bank failed to perform and step out from the banking sector. This "too big to fail" phenomena can greatly affect a nation's economic health, even worse it can affect worldwide and raise up a lots of non-financial issues to the country. Here some advises for the central banks' decision makers, there is no need to consolidate the banks and boost up their size, size of bank is not the primary concern for the customers to choose where to place their surplus fund, only service quality and rate sensitivity poses as their main concern nowadays. Where there is higher deposit rate, they will choose to place their money with it, while where there is lower rate of borrowing, they will apply loan from the particular banks.

Talking about bank size, the need for the acquisition and merge among banks also poses a concern for the policy and decision makers. From the results showed previously, the outcome of acquisition exercise of EON Bank and Hong Leong Bank didn't showed a clearly perfect efficiency score in the post-merger period. For Hong Leong Bank, it didn't perform efficiently in the pre-merger period, and also in the post-

merger period. For the EON Bank, it did perform efficiently in the post-merger period. From here, it showed that an efficient EON Bank failed to raise up Hong Leong Bank's efficiency in the long term. Thus, from the example above, the combination of acquisition and merger bank can be far more important than the size outcome of bank in post-merger. Suitable match will further increase and maintain the banks' efficiency, while the wrongly match may lower the original bank efficiency and make the other half bear the same consequences.

Next, the bank asset should put in the right uses regardless bank size. With the maximum utilization rate of asset, banks only can generate more profit from the banking operations. Without the maximum utilization rate of asset, no matter how big the bank is, it doesn't increase bank efficiency. In general, most of the banks' assets are used for loan and leasing to generate interest bearing profit. The quantity of loan available to lend out determine the amount of interest income to be acquire. However, in order to approve such a large amount of loan, credit analysis against the loan application should be clearly screened to ensure the asset quality. As mentioned, quality come first before quantity. Each loan approved is going to bear with a certain level of default risk. In order to have assets allocation as good as possible, the quality of loan should not be taken lightly. Innovative financial products should be introduced to suit the different level of financial position market segment because the ability to absorb interest violation depends on the level of financial strength. Thus, generally small and medium enterprises (SMEs) have lower financial position and difficulty in bearing high interest financing. Thus, banks should be creative and innovative to offer lower rate financing methods and in the same time without reduce the profit that should be earned. Profit sharing from the result of financing can allows banks to earns a larger portion of profit from the business while the SMEs has less worry about the financing repayment and the business can continuously to grow.

Following with the introduction of BASEL III, the capital requirement had been strengthen and include even more restrictions. Hence, in order to fully utilize the capital allocated, banks should only keep the minimum level of reserve required and this only applied to the risk that banks expose to. If the banks faced a higher rate of

default risk, the capital reserve should be slightly higher adjusted to retain the public confident with the banks. Only with the fully utilization rate of capital and minimum rate of capital reserve, banks can generate the maximum output profit. This is because the reserve only act as the safety guard and risk absorb cushion during crisis and emergency period, in the normal period, it is not efficiency assets.

The results also showed that the private owned banks are generally superior in performance than the government linked banks. Undoubtedly, the government should reduce or discontinue their influence toward the banking sectors and let the market react simultaneously with the economy. As the government linked banks may incurred many non-bank essential concern, macro and micro economic factors, society concern and so on, this made the banks' decision in allocating the input resources will be even more inaccurate in terms of the bank efficiency concern. Reviewing the foreign banks in Malaysia, still can outperform the local banks which had been established and existed longer than them even under a number of restrictions. They may be operate in smaller scale and lack of recognition in the local folks' knowledge. However, without any influences and interventions, they can be financial and operational liberty, hence easily to make their own decisions and strategies and achieve target efficiently.

In the worst case, if Bank Negara Malaysia choose to intervene and disturbs the free competition market, they might be trying to further enhance the local bank protection net and set up more restrictions for the foreign banks. In short term, it restrict the growth of foreign banks but the local banks will lose their competitive advantages in the long run as they are being over protected. This inequity competition wouldn't last long as the local banks don't wake up from the cradle and began to run the business independently, they will be surpass easily and to survivability in the Malaysian banking sectors will became an issue.

5.4 Limitation of the study

The data set for this study are retrieved from annual reports of the respective sample banks. One of the underlying problem is the differential of the financial year end among the sample banks. For instance, Public Bank Berhad is accounted with a financial year end of fourth quarter (31 December) while Hong Leong Bank Berhad is accounted with a financial year end of second quarter (30 June) of the year. As there is no restriction on the financial year end, it is impossible to obtain data from the sample banks with the exactly financial year end.

Data Envelopment Analysis (DEA) approach cannot accommodate for any zero or negative value data exist (Steering Committee for the Review of Commonwealth/State Service Provision, 1997). For example, during year 2007, Ambank (M) Berhad suffered from a negative profit before tax which cause the DEA scoring unable to analyze the data. In the end, Ambank (M) Berhad can only be excluded during year 2007 due to the particular reason.

Furthermore, DEA scores are relatively sensitive towards the sample size (Steering Committee for the Review of Commonwealth/State Service Provision, 1997). The average efficiency score will decline if the sample size increased. This is due to DEA is able to determine similar comparison partners if more samples are included. Similarly, if too few samples are included, the average efficiency will be exaggerated as too few comparison can be make. Thus, this study only included 12 banks.

5.5 Recommendation for future study

Different input and output variables will have a different result in terms of banking efficiency. Thus, it is recommended for the future study to include other eligible input and output variables to obtain a more precise result. For example, according to NIŢOI (2009), the author proposed that core operating profits as well as other earning assets can be labelled as outputs while deposits and borrowed funds can be consider as inputs.

Despite Data Envelopment Analysis (DEA), there are many other approaches which are reliable and recommended to be use especially when DEA is restraint due to its limitations. For instance, Stochastic Frontier Approach (SFA) can be consider as an alternative for DEA approach. The main attractions for SFA approach is that it contribute a better-off specification, especially for the case of panel data (Hjalmarsson, Kumbhakar, & Heshmati, 1996).

5.6 Conclusion

This study attempts to investigate and compare between the banking efficiency of seven local and five foreign commercial banks in Malaysia. Data Envelopment Analysis (DEA) approach is applied to carry out the research and determine the efficiency of the sample banks for the period from year 2007 till year 2014. In addition, this study also reached out to determine whether the size of banks affect the efficiency of the banks. Furthermore, this study also deemed to determine whether the efficiency of the banks will be affected with government intervention. Besides that, this particular study also investigated in the effect of merger and acquisitions of banks in terms of banking efficiency. Based on the DEA scoring outcome, on average, the foreign commercial banks in Malaysia have a higher efficiency scoring than the local banks in Malaysia. Most of the foreign banks such as OCBC Bank (Malaysia) Berhad, Standard Chartered Bank Malaysia Berhad, Citibank Berhad and United Overseas Bank (Malaysia) Berhad are able to maintain its efficiency and being efficient throughout the period. Only one local commercial bank is able to have such result and which is Public Bank Berhad. This study also revealed that bank size does significantly affect the efficiency of a bank. Bank with bigger size has more bargaining power and operate better than small size bank. Government intervention will affect the banking efficiency to certain extend. For example, Public Bank Berhad which is classified as a private banks, able to operate consistently efficient than government-link banks such as Malayan Bank Berhad, CIMB Bank Berhad and Ambank (M) Berhad which failed to do so, during the period. Merger and acquisition do affect the banking efficiency until certain extend. Hong Leong Bank Berhad become efficient and lasted for two years after it acquired Eon Capital Berhad in year 2010. In a nutshell, most of the local banks are inferior in managing its inputs compare to foreign banks. In order to drive the bank to become efficient, several policies can be made such as gradually changing the conservative style in managing banking industry and encourage fair environment. Additionally, banking efficiency can incline with the little aid of healthy competition.

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