MALAYSIAN BANKS EFFICIENCY AFTER MERGING: EVIDENCE FROM DATA ENVELOPMENT ANALYSIS (DEA) AND FINANCIAL RATIOS ANALYSIS

BY

ANG SHI JUN
IDDRISU MOHAMMED AWAL
LEE TZE CHIN
LOO XIAO HUI
ONG SUAT HWA

A research project submitted in partial fulfilment of the requirement for the degree of

BACHELOR OF BUSINESS ADMINISTRATION (HONS) BANKING AND FINANCE

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF BUSINESS AND FINANCE
DEPARTMENT OF BANKING AND FINANCE

APRIL 2017

DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement 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 17,475 words.

Name of Student:	Student ID:	Signature:
1. ANG SHI JUN	13ABB06446	
2. IDDRISU MOHAMMED AWAL	14ABB04894	
3. LEE TZE CHIN	13ABB00240	
4. LOO XIAO HUI	13ABB00755	
5. ONG SUAT HWA	13ABB00238	

Date: 12TH April 2017

ACKNOWLEDGEMENT

We would like to thank everyone had helped us to successfully complete this project. First and famous, we would like to thank to our research supervisor, Dr. Abdelhak Senadjki who gave us guardian, suggestion, useful information, and also advise with his patient throughout the whole process of doing this research.

Moreover, we would also like to thank our second examiner, Dr. Zuriawati Zakaria, who gave us further guidance and comment during and after our presentation to further improve the research. And lastly, we express our warm appreciation to whoever participated in making this research a successful one.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES AND CHARTS

Page

LIST OF ABBREVIATIONS

BNM	Bank Negara Malaysia
CIR	Cost to Income ratio
DEA	data envelopment analysis
DFU	deficit funds unit
DMUs	Decision Making Units
EU	European Union
FFASB	Financial Standard Accounting Board
FR	Financial Ratios
GLS	Generalized Least Square
M	AmBank
MYR	Malaysian Ringgit
FSMP	Malaysia Financial Sector Master Plan
MPI	Malmquist Productivity Index
OLS	Ordinary Least Square
ROE	Return of Equity
SFA	Stochastic Frontier Analysis
WTO	World Trade Organization

ABSTRACT

This study examines the merger efficiency of 7 Malaysian banks (CIMB bank, AmBank, Public Bank, Alliance Bank, Hong Leong Bank, Maybank and Affin bank) in respect to their efficiency over the period from 2007 to 2015. This study would like to evaluate the technical efficiency of the banks after merging exercise took place after the Asian financial crisis that affected many Southeast Asian countries including Malaysia. Data Envelopment Analysis (DEAP) Method and Financial Ratio (FR) Method were used to examine which of the banks achieve efficiency after merging. Fixed assets, loan and advances, investment securities, government securities and Total Assets were used as inputs and output for DEA respectively. Whereas, Cost to Income (CIR) is used as inputs for (FR) to run the data analysis, in order to evaluate the technical efficiency level of the banks. By using those two methods, it has been found that, almost the 7 banks achieved efficiency during the subsequent years. But however, there has been some few slack movements (inadequacy) in those variables for the banks, in respect of its years of operation. Bank Negara Malaysia (BNM) may consider helping to improve the performance of the banks by raising the risk weighted capital Adequacy requirement, in order to enable the banks to meet their short term obligation in the moment of crisis. Bank Negara Malaysia (BNM) should further educate the banks towards assets and liability management, so that to avert the problem of negative slack movement. And lastly, Bank Negara Malaysia may consider to increase the incentives (funds) to the less efficient banks to offset their losses.

CHAPTER 1: INTRODUCTION

1.1 Background of Study

Banking industries across the globe have been subjected to some form of corporate restructuring in a way to respond to globalization, regulatory requirements or competitive pressures. Countries such as Singapore, Indonesia, South Korea, Japan, Malaysia, China, Taiwan, Thailand and Hong Kong have all undergone corporate restructuring with regards to their respective banking industries. This is mainly due to the 1998 Asian financial crisis (Yusuf & Sheidu, 2015). Whereas, according to Kowalik, Davig, Morris and Regehr (2015) in America, Europe and other part of African continent, the process of restructuring have as well taken place just to ensure that corporate consolidation has a significant impact on the financial stability in the economy. The number of banks during this restructuring process have decline steadily for some number of reasons, such as failures during periods of crisis, national interstate restrictions, consolidation spurred and mergers between unaffiliated banks (Broome & Markham, 1999). As a result of the restructuring process, mergers and consolidation have seen over the years as the effective way to revive failure banks and stabilize its financial capability (Kowalik, Davig, Morris & Regehr, 2015). In Singapore, Banks such as DBS Group Holding Ltd, Keppel Capital Holdings Ltd, Oversea-Chinese Banking Corporation Ltd, Overseas Union Bank Ltd and United Overseas Bank Ltd are the domestic commercial banks which have experienced merging program (Avkiran, 1999).

According to the table 1.1, it has been deduced by European Union (EU) Bank Report (2008) that, there has been some mergers and consolidation exercises taking place for the past 10 years. This report indicates that, the total number of Bank merger since 1997 to 2006 is 415 across Europe.

Table 1.1 European Bank Merger

Years	Bank Mergers	Domestic Mergers	Cross-Border Mergers
1997	11	6	5
1998	26	15	11
1999	40	22	18
2000	58	35	23
2001	53	32	21
2002	58	35	23
2003	43	25	18
2004	37	21	16
2005	51	22	29
2006	38	18	20
Total	**415**	**231**	**184**

Source: European Union (EU) Bank Report, 2008

The highest number of bank merger occurred in 2000 and 2002. In the year 2000, fifty-eight bank mergers took place. Thirty-five of them were domestic mergers and twenty-three were cross-border merger. While in 2002, also fifty-eight bank mergers took place. Thirty-five of the bank mergers were domestic mergers and twenty-three of them were cross-border mergers. However, the least number of bank merger occurred in 1997 and 1998 respectively. Indicating that, in 1997, only eleven bank mergers took place. Six of them were domestic and the five were cross-border merger. While in 1998, twenty-six bank mergers took place. Fifth teen of bank merger were domestic and eleven of them were cross-border merger. Overall, there are total of 231 domestic bank mergers, and 184 cross-border merger respectively. This basically shows that, merger program over the years has been effective and successful undertaken (Zepyhr, 2008; European Union (EU) Bank, 2008).

1.1.1 Definition of Bank Merger and Acquisition

Ong and Ng (2013) define merger as a coalition of two or more different entities, aiming at a business motive and with a specific objective. Whereas, Weinberg and Blank (1979), Gaughan (2002) indicate that, the word 'merger' is explained as the combination of two major assets of two separate entities in the form of investment, while these assets will be controlled by either one of the entities. When financial institutions merged together, it is significant for the name of the newly merged company to be placed, reform or maintain the existing name for both companies respectively. Besides that, the takeover bank will not only be in-charge of the assets of the targeted bank, but also be liable of their liabilities (Srivastava, 2016). However, in respect to Manne (1965) stated that, an acquisition is a transition process whereby a company with a controlling power over another, execute its power to take over the business operation of the other company. This basically occurs when the assets or the stock belonging to the targeted company, are being purchased by the acquirer. The acquirer therefore, becomes the commanding figure in the takeover process. When the transition has taken place, the targeted company will cease to exist as a company on its own. According to Berger, Demsetz, and Strahan (1999), Mishkin (1999), consolidation of financial services is the process of combining financial services from several banking institutions. Gelos and Roldo (2013) studies indicate that, the main forces encouraging consolidation in the financial industry are globalization, advances in information technology, and deregulation. While on the other hand, lack of information and transparency, cross-country differences in regulatory frameworks, ownership structures, and cultures are among those factors that discourage consolidation of financial services among financial institutions based on the rapidly emerging financial market (Jin & Myers, 2006). Based on Gelos and Roldo (2004), the main features of the consolidation process in emerging markets, includes the role of government-led restructuring and foreign bank entry.

In addition, Berger and Humphrey (1991) show that, inadequate valuation of target problem also can be solved after merging and consolidation. When one bank combines with another bank, this situation will help to increase the scale of operation and the economics of large scale production. Pahuja and Samridhi, (2016) studies indicated that, before merge and consolidation occurs, many financial institutions (such banks) initially identify their main objective for merging exercise. After that, they use the best suitable strategy to achieve their main purpose. Singh and Kohli (2006) indicated that, most of the banks use SWOT analysis (Strength, Weakness, Opportunity and Treat) to assist them to evaluate the performance of the business before and after the merger. When banks merged together, it is understood in Samridhi (2016) researched that, they share experiences and communicate with each other in order to get more culture understanding. Successful merger and consolidation comes with effective communication and discussion with stakeholders, creditors and employees (Raquib, Musif & Mohamed, 2003). Besides that, the bank's management must be prepared to handle new cultural diversification. Moreover, transparency of information is the key element to set up a trust among stakeholders (Pautler, 2001).

According to the Pahuja and Samridhi (2016), Gachanja (2013) claimed that, merger and acquisition have different characteristics. They also indicated that merger and acquisition have four types which are horizontal merger, vertical merger, co-generic merger and conglomerate merger. Merger and acquisition has given one of the opportunities to take advantage and expand to the bank. Banks go through merger and acquisition activities because they want to become bigger size and stronger so that they have ability to compete with their competitors (Nikolova, Rana & Jayasooriya, 2010). Nowadays, merger and acquisition play an important element in banking sector in order to survive for business restructuring. In addition, Berger and Humphrey (1991) show that, inadequate valuation of target problem also can be solved after merging and acquisition. Again, according to Nikolova, Rana and Jayasooriya (2010), when one bank combines with another bank, this situation will help to increase the scale of operation and the economics of

large scale production. Moreover, merger and acquisition can avoid from doing repeating activities like accounting, purchasing, marketing, productions and so on. Based on Bank Negara Malaysia (2000), the merger program is one of the measures undertaken by Bank Negara Malaysia to consolidate the finance company industry which is currently the most fragmented industry. The program is also part of pre-emptive strategy of BNM to further increase the resilience of the finance companies to withstand any risk from the slowdown in the economy.

1.1.2 Merger and Consolidation effects on Economy

According to Doytch and Cakan (2011) studies, there is not enough evidence to conclude that merger and consolidation activity affect the economic growth in thirty one Organization for Economic Co-operation and Development (OECD) countries from the year 1985 to 2008. On the other side, Ogiji, Eza and Richard (2015) argue that, banking industry is very crucial to the growth of the economy due to it is the inducement of the economy. Thus, merge and acquisition of the bank had brought a positive impact to the financial economy. However, it may also bring some negative impacts like high unemployment rate in the economy. Pautler (2001), Berger and Humphrey (1991), in particular Berger et al., (1999) stated that, by focusing on accounting information, it can help to seek evidence to improve efficiencies in the post-merger institutions by testing their principal hypothesis. Moreover, based on Amel and Rhoades (1989), Gup, Cheng and Wall (1989), Hunter and Wall (1989), show that, the efficiency gains and cost reductions realized by the merger reduce production costs and production factor costs in the merged bank. In these studies, statistically significant improvements in profitability, increases in operating efficiency, rapidly growing interest revenues, increasing noninterest income-related fees, reduction in costs, more efficient asset management, and decreased risk in the post-merger institutions are interpreted as signs of successful mergers and rationalized as the probable reasons for the mergers themselves.

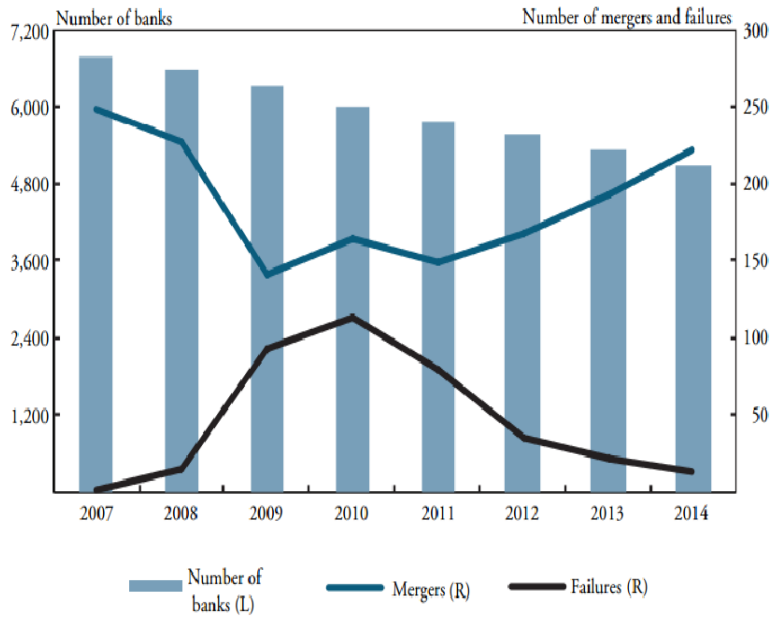
On the other hand, Kim and White (1998) found that, the operating cost is not entirely reduced after the banks merged. Further indicating that, almost all commercial bank mergers in the United States between 1985 and 1991, and found evidence of decreasing cost efficiencies in most mergers, except for mergers between very large financial institutions. For the mergers of medium and small commercial banks, they report decreased efficiencies, a finding similarly reported by Berger (1999). Moreover, Vermaelen and Xu (2010) proved that, after the merger and acquisition of US listed company return on assets is negatively associated with leverage. The result of Vermaelen and Xu (2010) is similar to the Nigerian bank (1986). In their studies, the Nigerian banks do not significantly improve the performance after merger and acquisition (Odetayo, Sajuyigbe & Olowe, 2013).

Joash, and Njangiru (2015) have shown the effect of merger and acquisition on financial performance bank in Kenya for the period from 2000 to 2014. In the competitive world, more and more bank goes through merger and acquisition because they want to increase their market share, reduce business risk and increase shareholder value. The results show that, there is a negative performance to any banking institution and a positive performance by another bank. This inconsistent result depends on the structure of the bank. However, James and Ryngaert (1994) indicated that, most of the banks earn profit and get positive significant effect after they gone through merger and acquisition in Kenya. The reason why positive significant effect exists because there is an increase of the market shares, net profit significantly after bank merger and acquisition.

Veverita (2008), Lin and Chang (2013) investigated the impact of merger on commercial bank in Indonesia for the period between 1997 to 2006 and showed the evidence that, merger is significant increase the post-merger financial and efficiency of the productivity performance when the statistically increase by using both of the financial ratio analysis and data

envelopment analysis (DEA) ways to examine the impact bank financial performance and bank efficiency performance before and after merger.

Meon and Weill (2005), Roover and Lepoutre (2011), Gunther and Robinson (1999) also investigated that, whether a bank merger can affect macroeconomic risk in Europe, which means that if the geographic risk diversification in the lending activity for bank merger also can reduce macroeconomic risk. This is because the geographic risk is related to the bank performance. Moreover, it is directed connected to the economic activities. The return of bank loan portfolio is a vital element that will influence the economic growth because the lower the non-performing loan the higher economic growth. In Europe, Europe bank does not get benefit for risk diversification opportunities because they are discovering this opportunity (Meon & Weill, 2005; Gunther & Robinson, 1999). However, this does not mean that the bank cannot diversify their macroeconomic. Meon and Weill (2005), Roover and Lepoutre (2011), Gunther and Robinson (1999), Boot (1999) showed that, the bank merger has possible gain in risk diversification with different nationalities. It shows the evidence that the cross-broader merger gain in risk diversification will gain a positive relationship between bank merger and risk diversification. And also found that, if there is a domestic merger, the improvement will not be significant because they are many similarities of the country composition of the loan portfolio between each other. This is because hedging against the risk cannot correlated between each other composition of loan portfolio. In contrast, the cross-border merger has significantly increased the risk-return efficiency scores and gets stronger gains in risk diversification. It will improve their risk efficiency score with the cross-border merger.



Note: Community banks are defined as banks with assets of $1 billion or less.
Source: Federal Reserve change-in-control data.

Chart 1.1 Change in the number of community banks since 2008.

Kowalik, Davig, Morris and Regehr (2015) stated that, based on United State, most of the community banks face failure or merge due to their asset is not strong enough to face the economic crisis or downturn between the years 2007 to 2014. In other word larger bank are rare to merge. They also found out that since the year 2007 there is 90% of 1500 community banks merge in United State. Federal Reserve change-in-control data representative figure 1.1, with the data for the number of failed bank and the merged bank. The report indicates that, the merger will help those weak banks, which have low profitability, inefficient, which will lead to financial problems, to push up the value of banks which involve in merging. It further shows that, merge can diversify bank portfolio of assets, source allocation and capital generation to reduce banks' risk. The result shows that, bank becomes more efficient and banking system become sounder after merge that also will bring benefit to the United States citizens by having better access which cost a lower fee.

1.1.3 Merger and Consolidation in Malaysian Financial Industry

On the other hand, in Malaysia economy, according to Sufian (2004), merger and acquisition of Malaysian banks will slightly improve the capital structure and performance. In 1980's, process of merger of bank in Malaysia grew rapidly because of the economic recession in the mid of year 1980. This caused the number of local banks in Malaysia to reduce from eighty in the earliest of year 1980s to fifty four at the end of year 1990s. According to Bank Negara Malaysia (1999), the banking crisis in the mid-1980s caused a number of weak commercial banks and finance companies into insolvency and financial distress. These institutions were saddled with huge levels of nonperforming loans, over-lending to the property sector and neglected to share-based lending during the early boom years. Consequently, the financial company faced a huge loss. Central Bank of Malaysia had to implement a rescue scheme to maintain integrity of public savings and the stability of the financial system in Malaysia (Abd-Kadir, Selamat & Idros, 2010). The rescue scheme involved the Central Bank of Malaysia acquired shares in some of the commercial banks and the absorption of the assets and liabilities of the insolvent finance companies by stronger finance companies (Ong & Ng, 2013). Furthermore, Ismail (2007) found that, the Asian financial crisis in year 1990s caused the Central Bank of Malaysia to encourage merger and acquisition in the Malaysian banking industry (Sufian, 2004).

Moreover, Leland (2007) mentions that, in order to minimize the potential impact of systemic risks, to limit the increasing number of banks to efficiently consolidate the banking services (such as withdrawal, accepting deposits, granting loans, issuing credit card and debit card, Automatic Teller Machine, Electronic Fund Transfer, Overdraft agreement). With greater success on the economic scale and to improve the stability of the financial system on the banking sector as a whole, following the deepening of the financial crisis, the Malaysian Government issue any security bond to some

banks who were critically affected, and took stronger measures to promote (force) merging of banking institutions (Stiglitz & Uy, 1996; Ong & Ng, 2013). The government encourages merger and acquisition in the country by introducing new plan and rule that benefit merger and acquisition like incentives. Incentives like free stamp duty and tax exemption that will increase the profit of the bank (Ong & Ng, 2013; Rao-Nicholson, Salaber & Cao, 2015).

According to Bala and Mohendran (2003), the initial recent merger in the Malaysia financial industry occurred in 1990 with the takeover of the United Asian Bank by Bank of Commerce. This entity subsequently merged with Bank Bumiputra to form Bank Bumiputra Commerce on 1 October 1999. The second mergers saw the takeover of the KwongYik Bank by Rashid Hussain Group in late 1996 to form RHB Bank. Subsequently, Sime Bank joined the RHB Group in June 1999. In more detail, initially, the total number of banking institutions in 1999 was 55, which basically consisted of 20 commercial banks, 23 finance companies and 12 merchant banks. With respect to the deadline given to all the financial institutions by Bank Negara Malaysia to observe the merging program (Central Bank of Malaysia, 2003).

Table 1.2 Lists of Domestic Banks in Malaysia

MALAYSIAN BANKS			
1.	CIMB Bank Berhad	**2.**	Maybank Berhad
3.	AmBank (M) Berhad	**4.**	Alliance Bank Berhad
5.	Hong Leong Bank Berhad	**6.**	Affin Bank Berhad Hong
7.	RHB Bank Berhad	**8.**	Public Bank Berhad
9.	Southern Bank Berhad	**10.**	EON Bank Berhad

Source: Central Bank of Malaysia, 2003

Six anchor banks were initially registered and later, the number increase to ten respectively. Subsequently, refer to above table 1, ten banking groups were formed. The ten banking groups or anchor banks are: Malayan Banking Berhad, RHB Bank Berhad, Public Bank Berhad, Bumiputra-Commerce Bank Berhad, Multipurpose Bank Berhad, Hong Leong Bank Berhad, Perwira Affin Bank Berhad, Arab-Malaysian Bank Berhad, Southern Bank Berhad and EON Bank Berhad. Each bank had minimum shareholders' funds of RM2 billion and an asset base of at least RM25 billion (Sufian, 2004; Mat-Nor, Mohd Said & Hisham, 2006). However, out of these ten banks, only seven of them exercised the merging activity. During the year 1999, a major restructuring plan by central bank Malaysia proposed, Malaysia Financial Sector Master Plan (FSMP), to achieve higher competitive and efficient financial system, which the government believes that stronger capitalized financial institutions are more competitive and efficient financial system, that will be able to comply with the dynamic economy (Rao-Nicholson, Salaber & Cao, 2015). However, the table 1.3 shows the list of Malaysia anchor banks after merger.

Table 1.3 List of Malaysian Anchor Banks after Merger

No.	Anchor Banks	Merged Banks	Year of Merger
1	Maybank Berhad	The Pacific Bank – merged	2000
2	CIMB Bank Berhad	Bumiputra Commerce Berhad acquired Southern Bank Berhad (to formed CIMB Berhad)	2006
3	Alliance Bank (M) Berhad	Multi-Purpose Bank Bhd merged with - Sabah Bank Bhd (to formed Alliance Bank Malaysia Berhad	2001
4	AmBank(M) Berhad	Arab-Malaysian Finance Berhad and MBF Finance Berhad – merged (to form Am Bank (M) Berhad)	2002
5	Hong Leong Bank Berhad	Hong Leong Finance (2001) – merged	2001
6	Public Bank Berhad	Hock Hua Bank – merged	2001
7	Affin Bank Berhad	BSN Commercial (M) Berhad-merged	2000

Source: Central Bank of Malaysia, 2011

In 2000, Pacific Bank merged together with the PhileoAllied Bank to form Maybank Berhad, by the Malaysian government directive. Bank Bumiputra Commerce Berhad and Southern Bank Berhad merged together to establish CIMB Bank Berhad later in 2006. While in 2001, Alliance Bank Berhad was form after when Mult-Purpose Bank Berhad merged with Sabah Bank Berhad accordingly. Furthermore, Arab-Malaysian Finance Berhad and MBF Finance Berhad were two separate companies, but they later became

Ambank Berhad after merging together in 2002. Again in 2001, both Hong Leong Bank Berhad and Public Bank Berhad were established as anchor banks. After Hong Leong Bank Berhad merged with EON Bank Berhad and Public Bank Berhad merged with Hock Hua Bank respectively. Lastly, Affin Bank Berhad was formed after merging with BSN Commercial Bank Berhad (Central Bank of Malaysia, 2011).

According to the Ismail and Rahim (2009), in Malaysia economy, in the year 1990, the merger policy had applied by the Government and also gets the support of the implementation of the Financial Master Plan for the year 2001 to 2010 in Malaysia. Besides, Ismail and Rahim (2009) have shown some of the reasons why a merger policy is useful and can bring many benefits to banks. Firstly, Ismail and Rahim (2009) found out the evidence to show that the bank will become more possessed capital. This is because when the local bank separate from two banks to combine one which is known as the merger, they will increase more capital after merger. Secondly, they will become more intelligent and know how to utilize the resources. In respect to Sufian (2004), Ismail and Rahim (2009), small bank will influence the economy before merger. However, the local bank also needs to restructure and they will be relocated again after the merger. So, they can manage and operation well in the market. Merger among the small banking institution can provide the availability to solve or face the major economic problem such as the Asian Financial Crisis (Ismail & Rahim, 2009). In addition, Ismail and Rahim (2009) also prove and shown the evidence that technical efficiency become better after the merger. The result had shown that they had improved from 67.65% to 95.20% after the merger. On the same time, the productivity level also will increase after the merger.

Sufian (2004), Ismail and Rahim (2009) stated that, merger and acquisition of Malaysian banks will slightly improve the capital structure and performance. Furthermore, Sufian (2004), also found that the merger and acquisition will improve the bank's performance in Malaysia. According to Sufian (2004), Ismail and Rahim (2009), the table shows the change in

productivity index, efficiency and technical during the periods before merger and after merger from 1995 to 2005. In short, different researchers came out with their own objectives. Chong, Liu and Tan (2005) argue that, the main focus was the forced of a merger scheme to enable the banking industry become bigger and stronger with domestic banks. In order to be able to compete with foreign banks in the same platform as the financial market, banking industry should be liberalized in the near future under the World Trade Organization (WTO) agreement. While, according to Mat-Nor, Mohd Said and Hisham (2006), their main objectives were, to analyze the financial performance changes of commercial banks on stand-alone basis and compare it with 'post-merger'' basis of the consolidation program. Again, Sufian (2004), intended field of research was to analyze the technical and scale efficiency of domestic incorporated Malaysian commercial banks during the merger years, pre and post-merger period.

Furthermore, Ong and Ng (2011) measured the impact of the involuntary merger on the efficiency gains on financial institutions. Sufian, Muhamad, Bany-Arrffin, Yahya and Kamaruddin (2012) primary objective was to identify the effect of mergers and acquisitions on Malaysian banks' revenue, efficiency in two events, which are pre-merger (1995-1996) and post-merger (2002-2009) period. Based on the numerous researches conducted by Odetayo, Sajuyigbe and Olowe (2013), Pautler (2001), Kowalik, Davig, Morris and Regehr (2015), Doytchand Cakan (2011), Mat-Nor, Mohd Said and Hisham (2006), Sufian (2004), Ismail and Rahim (2009), in respect to merger and consolidation of banking institutions, it is clearly unarguably understood that, this research stands out among others to deliberately discuss not only about the mergers but specifically about the effect of mergers on the economy. However, Ismail and Rahim (2009), Sufian (2004), Said, Nor, Low and Rahman (2008), Fadzlan (2004) findings were about the impact of merger on the Malaysia economy after the bank merges but with different outcome that mention previously. Thus, this study would like to identify the impact of merger and consolidation of Banking Institutions services on the institutional performance.

1.2 Problem Statement

Chong, Liu and Tan (2005) found out that, the introduction of a merger scheme to enable the banking industry become bigger and stronger with domestic banks. Of which their result indicated that, banks size increase significantly after merger compare to before the merger. Their findings also show that, merger enables local banks to compete with foreign banks in the same platform as the financial market, banking industry should be liberalized in the near future under the World Trade Organization (WTO) agreement. On the other hand, Mat-Nor, Mohd Said and Hisham (2006) proved that, the level of efficiency changes commercial banks on stand-alone basis and compare it with 'post-merger" basis of the consolidation program. Sufian (2004) helped classify and analyse the technical and scale efficiency of domestic incorporated Malaysian commercial banks during the merger years, pre and post-merger period using Data Envelopment Analysis (DEA). Furthermore, Ong and Ng (2011) stated that, the main purpose of their study is to measure the impact of the involuntary merger on the efficiency gains on financial institutions, using Data Envelopment Analysis (DEA) measure the efficiency. It was later proven that, the efficiency of some banks improves after merger. Due to the significant decline in bank cost, better customer service, increase in earnings and market share respectively. According to Sufian, Muhamad, Bany-Arrffin, Yahya and Kamaruddin (2012), the primary objective was to identify the effect of mergers and acquisitions on Malaysian banks' revenue, efficiency in two events, which are pre-merger (1995-1996) and post-merger (2002-2009) period. Chong, Liu and Tan (2005), Mat-Nor, Mohd Said and Hisham (2006) and Sufian, Muhamad, Bany-Arrffin, Yahya and Kamaruddin (2012) found that, not enough studies has so far been conducted on the measurement of bank efficiency after merger using Data Envelopment Analysis (DEA) and financial ratios method in Malaysia, to confidently conclude on whether or not Malaysian banks has achieve efficiency, after merger using both methods. Salami and Adeyemi, (2015) studies mainly focus on the Islamic bank efficiency using only Data Envelopment Analysis (DEA) by

assessing both the technical and scale efficiency. Moreover, Ada and Dalkılıç, (2014) also used Data Envelopment Analysis (DEA) and Malmquist Productivity Index (MPI) in measuring the efficiency of 4 banks and 18 banks in Turkey and Malaysia respectively. Therefore, This study is intended to deliberately discuss not only about the mergers, but to evaluate the efficiency (financial performance) of Malaysian banks after merging exercise took place, by using the Data Envelopment Analysis (DEA) and financial ratios, and lastly to compare and contrast the difference of the result based on Data Envelopment Analysis (DEA) and Financial Ratio method.

1.3 Research Questions

This study will answer the following questions:

(i) How Malaysian banks financially perform after merger, based on the Data Envelopment Analysis (DEA)?

(ii) How Malaysian banks financially perform after merger, based on the Financial Ratios Method?

(iii) How the financial performance using Data Envelopment Analysis (DEA) differs with the Financial Ratios Method?

1.4 Research Objectives

The main objective of this study is to analyse the impact of merger and consolidation has on the Malaysian economic performance. However, our specific objectives are:

(i) To evaluate the efficiency (financial performance) of Malaysian banks after merging exercise took place, by using the Data Envelopment Analysis (DEA).

(ii) To evaluate the efficiency (financial performance) of Malaysian banks after merging exercise took place, by using the Financial Ratios method.

(iii) To compare and contrast the difference of the result based on Data Envelopment Analysis (DEA) and Financial Ratio method.

1.5 Significance of Study

This study can help to analyse the efficiencies of those incorporated banks, after the merger took place in response to the year 1997 financial crisis. Besides, it can also help to interpret the impacts of these reforms on the performances of these consolidated banking institutions. Furthermore, the findings will assist the policymakers in making relevant decisions regarding the policies and regulations that govern the banking industry. The study has an important public policy implication for the domestic banking sector, with respect to the principal aim of the Malaysia Financial Sector Master Plan (FSMP), to help improve the competitiveness and efficiency of the financial system. It will also help the supervisory authorities to determine the future course of action and plan to be pursued to further strengthen the Malaysian banking sector, in particular, the domestic incorporated banks.

CHAPTER 2: LITERATURE REVIEW

2.1 Review of the Literature

2.1.1 Theories of Mergers and Consolidation

There are seven theories of merger and acquisition; these theories are relevant in several research studies, including research under mergers (Gupta, 2013; Trautwein, 1990). Efficiency theory, Monopoly theory, Raider theory, Valuation theory, Empire-Building theory, Process theory and Disturbance theory are all among other relevant theories used in the field of research under the merger. Baluch, Burgess, Cohen, Kushi, Tucker and Volkan (2010), indicated three important consolidation theories, which are Parent company theory, Entity theory and traditional theory. They claim that, those theories provides relevance and representational faithfulness of information during the decision making process in a way of consolidating a firm's information. But moreover, this study focuses more on the Parent company theory, Entity theory, Monopoly theory, Process theory and Efficiency theory respectively. As defined by Berger, Demsetz, and Strahan (1999), consolidation of financial services is the process of combining financial services from several banking institutions. Gelos and Roldo (2013) indicated that, the main forces encouraging consolidation in the financial industry are globalization, advances in information technology, and deregulation. When firms, most especially banks merged together, one important area they turn to consolidate is the financial services which have to do with the financial statements of the bank.

A parent company theory is a type of theory that assumes that the consolidated financial statements of a firm are an extension of the parent company when banks finally merged together (Baluch, Burgess, Cohen, Kushi, Tucker & Volkan, 2010). Nistor (2015) stated that, when the firm (bank) is reporting its net income for consolidation purpose, the parent company theory takes into consideration only the parent company's income (newly formed bank). Further indicating that, the newly formed bank will be liable for any losses incurred by either of the merged banks accordingly, and as well as benefit from any excess capital made by either bank respectively. This will be represented into the financial statements in such occasions. Baluch et al. (2010) explains that, it is more appropriate to used parent company theory when the merging exercise has finally taken place, and as a result, only one holding and controlling bank has been acquired. They further clarified that, in the case where this is not achieved, parent company theory will be difficult to be implemented.

Based on the Financial Standard Accounting Board (FASB) (2007), economic entity theory adopted by the FASB Statement No. 141R and 160, to measure the fair value of the acquired company for all of its shareholders of the price paid for the controlling interest portion (Chen & Chen, 2008). This theory creates consolidated financial statements that provide value to various groups, including the parent company shareholders, non-controlling shareholders of the subsidiary, and creditors. Under the Entity Theory, the controlling shareholders, non-controlling shareholders, and consolidated entity are considered equal, with no preference or emphasis given to the group (Beams, Clement, Anthony & Lowenshn, 2009). According to Motis (2007), merger and acquisition process can cause a monopoly because the reason of many firms with small stand-alone market shares are consolidated to form a high concentration market and those firms will carry out the business arrangement as well as became a big monopoly which ended up raising competition concerns. Straton (2009) stated, monopolies occur in the horizontal mergers and in the aspect of conglomerate mergers the profits in one market can be used to withstand and win a share in another market.

Moreover, there are some other ways that cause monopoly during the merger and acquisition process. Edwards (1995) showed that, the merger and acquisition process can simultaneously limit the competition in more than one market by tacit collusion with competitors in many markets. Porter (1985) stated that creating a main foothold position and replaces the competitor in competitor market can limit competition and monopolizes the market. Steiner (1975) proved that, the way to become the market leader is finding out the deterring potential entrants in the market and concentric acquisition the potential entrants. However, according to Scherer (1980) there are not efficiency gains accruing to monopolistic competition in non-horizontal mergers. On the other hands, there is some indirect evidence from the Jensen (1984) on monopolistic consequences. He argued that, shareholders cannot gain profit from monopoly power. Further proving that if the profit gains come from the monopolistic powers, there will be an advantage for industry competitors to enjoy increases in profits and stock prices. Besides that, Jensen (1984), Andrade, Mitchell and Stafford (2001) also argue that competitors gain the benefit when 2 other companies come from the same industry merger, but those benefits gains are not related to concentration in the industry or monopolistic power.

Jemison and Sitkin (1986) showed the acquisition process theory is one of the vital elements that help organizations become successful in merger and acquisition. In addition, Marks (1982), Haspeslagh and Jemison (1987), Shrivastava (1986) proved that, the theory not only becomes the element that affects the merger and acquisition process but also influence the strategic and organizational fits' result. The entire acquisition process might be essential because it may affect the outcome of acquisition and merger (Haspeslagh & Jemison, 1991). According to Picot (2002), the merger and acquisition process theory is divided into three parts which are planning, implementation and integration. The process theory of planning can become a growing concern to more than one branch of knowledge and more excellent in overall. Operational, managerial, legal techniques and

optimization are included in the planning which is relative to the implementation and integration part. The implementation part is using non-disclosed information which the both parties agree to promise secret information like confidential knowledge and information, after merger and acquisition in the bank. However, it cannot disclose to the third party about the secret information. The last part of integration is involving post-deal integration, which are complex process of combining two or more banks into one bank during merger and acquisition. Besides, integration planning can be referring to several systems such an asset, people, task and the supporting information technology. Joash, and Njangiru (2015) stated that, after merger and acquisition process, shareholder value and bank profitability is significantly related to the return on capital of the banks. This means that the process can exaggerate through the merger and acquisition in order to increase the productivity in the bank. As a result, the process can stretch to make sure that, the mutual understanding between the merger and acquisition of the organization is fulfilled.

King, Dalton and Daily (2004), Andrade, Mitchell and Stafford (2001) mention that, the motive of merger and acquisition mostly is being described by the economic theories which made up from synergy and economic scale. The definition of synergy, cooperate and work together, either one and also describes synergy in a mathematical form (Two + Two= Five) in other word it means that, after merged is more efficient than standing one by one (Gupta, 2013). In one of the economic theory that describes the merger and acquisition is efficiency theory. Trautwein (1990) clarified that, efficiency theory is planned merge and also with the main concern of achieving synergies in term of operation, financial and managerial, lead to increasing the performance of the firm. Andrade, Mitchell and Stafford (2001) explained that, the efficiency theory split up into two, which are discipline and synergistic merge motive. A firm that acquiring with the other firm which underperforming but with an objective to increase the level of performance by setting a quality goal are suggested under disciplinary merge theory. Besides, firm consolidates with another firm that are highly

performing to experience, efficiency return is suggested by synergistic merge theory.

2.1.2 Fixed Assets and Bank's Technical Efficiency

Toyin and Tajudeen (2014) indicated that, bank's fixed assets (such as building, machinery, leasehold, land, motor vehicle, fixture and fitting and information communication and technology) have a significant role in determining the technical efficiency. It was also indicated by Weinberg and Blank (1979), Gaughan (2002) claimed that, when banks merged together, there will be a combination of two major assets of two separate banks in the form of investment, while these assets will be controlled by either one of the entities. Moreover, the fixed assets will increase in respect to the merger.

Furthermore, Moffat and Valadkhani (2008), Maea (2010) pointed out that in their studies, when the higher fixed assets on the banking institutions, they will be higher in technical efficiency. However, in the Moffat and Valadkhani (2008), small size of assets of the banking institutions will more efficiency than the medium-sized of assets of banking institutions due to the reason of small scale of operation within a well-targeted market segment, they can be managed more effectively. According to Lema (2017), the size of the banks' fixed assets has a positive and significant effect on bank technical efficiency, while bank deposit, bank management, quality and bank size have a negative and significant effect on bank technical efficiency. Moreover, according to the Alrafadi, Kamaruddin and Yusuf (2014) indicated that return on assets, size of operations, capital adequacy and government link of bank and efficiency have a positive and significant effect on overall technical efficiency, while risk, bank's fixed assets, mergers and ownership structure have a negative and significant effect on overall technical efficiency. Besides that, Adusei (2016), Tesfay (2016) stated that bank holding fixed assets, credit risk and capitalization have a negative and significant effect on technical efficiency.

2.1.3 Government Security and Bank's Technical Efficiency

Government securities are basically efficient marketable debt instrument issues by the government of a particular nation to raise funds from the domestic capital market in order to finance investment projects development (Kolapo & Adaramola, 2012). However, Berger, Demsetz, and Strahan (1999) proved that, bank merger activities bring some relevant impacts to the bank, by expanding the market share in the financial market as well as strengthening the current availability of financial products and services. When the bank market share and financial products increase, these attract the government to issue a debt instrument with a periodic payment (principal with interest rate).

A modern monetary theory is a general theory that analyse banks' deposit creation and credit under fractional reserve banking which the primary credit can create deposits because banks need deposits. Therefore, the bank uses this theory to create credit through government spending (Huber, 2014). Fullwiler (2010), Fiebiger, Fullwiler, Kelton and Wray (2012), and Huber (2014) indicated that, the modern monetary theory is unsuitable for the current monetary system around the world because, most banks nowadays easily create loans without the require reserves. Banks get more money to create loans when the government spends by issuing bonds or securities and stocks to the bank to get funds to support projects. This is totally different with the theory of the loanable funds model which is a type of merger theory that allows banks to inquire about the rising and falling of bank's interest rates, in order to evaluate the good judgment of policy measures which are specifically designed to influence credit, interest rates and monetary growth. This is because major parts of bank liabilities which have been created by banks are recording in their balance sheets by purchasing asset and loans (Fullwiler, 2010).

Laeven and Valencia (2008), Andrews (2003) indicated that, bond and securities issued by government agencies are used to finance bank and restructuring with following a systemic crisis. The design of the government bonds issued is a crucial determinant of the future financial performances of restructuring bank, however, it is an important criteria in the ultimate success or failure of the restructuring bank efforts (Andrews, 2003). Moreover, Gennaioli, Martin and Rossi (2014) found that, banks hold the government securities in normal times, mostly the banks make lesser loans and operate in less-financially developing countries. However, bank holding of government securities correlates negatively with its subsequent lending when the country is in a default debt.

Therefore, Saad (2013) proved that, there is a significant positive relation between government securities and the bond yield. This indicates that, the increase the government bond to the banks, the increase in return to the banks. This is because, when the government issues debt instruments to the bank, the debt instrument is considered as risk free bond or security, therefore this will generate more income to the bank when the government uses the fund in a profitable investment (Kolapo & Adaramola, 2012; Har, Ee & Tan, 2008). Berger, Demsetzand and Strahan (1999) showed that, when the income of the bank increases, it strengthen banks financial backup, in order help improve bank's efficiency (by creating more financial products) and help fight with other competitors in the financial market. Bhatia and Mahendru (2015) indicate that, the profitability is strongly correlated with technical efficiency. Besides, Demi, Mahmud and Babuscu (2005), Tahir and Haron (2008), Lema (2017) also claimed that, the profitability level positive significant to the technical efficiency.

2.1.4 Loan and Advances and bank's Technical Efficiency

Assets of bank consist of fixed assets, current assets, loan and advances of customer and other banks, other investments. Loan and advances consider a major asset of a bank will affect the profitability of the bank in a significant way (Bhatia & Mahendru, 2015). Thus, the quality of the loan portfolio has a positive relationship with the efficiency of bank (Asimakopoulos, Brissimis & Delis, 2008). According to Demir, Mahmud and Babuscu (2005) indicated that, quality of the loan and profitability of banks is positively and significantly affects the technical efficiency of the banks. If loans assets ratio is higher, the technical efficiency of the bank is better.

Moreover, technical efficiency of banks could positively and significantly affect by share of loans. A high market power of the bank indicates that the bank is more technical efficiency (Bhatia & Mahendru, 2015). Samuel (2015) showed that, there is a significant relationship between bank performance (in terms of profitability) and credit risk management (in terms of loan performance). Indicating that, the ratio of loan and advances to total deposit is negatively related to profitability. This clearly depicts that, when bank's total deposit is low (by increasing loan and advances), the higher the profitability rate. This is because when the rate of borrowing increases the more income the bank receives. In addition, Kolapo, Ayeni and Oke (2012), Drehmann, Sorensen and Stringa (2010) stated that, banks performance increase when its total capital rises after the merge, indicating that, the bank's turnover ratio becomes higher because they have enough money to create more loans to deficit funds unit (DFU) in order to earn profit through changing interest.

2.1.5 Investment Securities and Banks Technical Efficiency

Ongore and Kusa (2013) stated that, financial performance of a bank basically rewards the shareholders for their investment significantly. Implying that, when the financial capability of the banks becomes strong after merging exercise, it encourages additional investments (from other investors not only the investments from the shareholders) and improves the economic growth. Because, when merged banks received more investments which by issuing bonds, shares, securities from all types of investors, this increase the bank efficiency by using the funds to invest in profitable projects for higher return (Berger & Humphrey, 1997; Ahmad, Mokhtar et al., 2006; Berger, Demsetz & Strahan, 1999).

Akeem and Moses (2014) indicated that, investment and technical efficiency have a significant relationship. Indicating that, banks achieve technical efficiency when merge together by providing investment strategy at lower cost to the customer. Besides that, merger and acquisition encourage banks to diversify its investment by reducing the risk and generate maximum profit. This, however, proves a significant relationship between investment and technical efficiency. On the other hand, Sufian and Habibullah (2009) proved that, there is a significant relationship between investment securities and bank technical efficiency. This is because after merger and acquisition, bank achieves high technical efficiency, which is 57.4% due to the increase investment activity. Moreover, Shao and Lin (2002) proved that, information technology investment has a positive influence to the efficiency of the bank due to the close relationship between each other.

2.1.6 Previous Empirical Studies on Efficiency after Mergers

Technical efficiency of local Malaysian banks has improved the most after merger exercise (Bhagavath, 2006; Fare & Lovell, 1978; Ismail & Rahim, 2009; Abd-Kadir, Selamat & Indos, 2014; Berger, Demsetz & Strahan, 1999). These studies proved that, the main source of the technical efficiency is the innovation and industrial improvement (such as technical changes, new product design, services and technology invention) took place after the local banks merged their services or operations together. However, Berger and Humphrey (1997), Bhagavath (2006), Ahmad Mokhtar et al. (2006) concluded that, the technical efficiency of the banks increases after merger and consolidation of their services. Indicating that, the ratio of the useful work performed by either a machine or a human being is coherently competent in achieving a specific earning rate. While, Berger, Demsetz, and Strahan (1999) stated that, merger activities bring some significant impacts to the bank's market power, as well as the current availability of products and services. In a way of acquiring the significant and necessary resources to strengthen their company's financial backup, to help fight with other competitors in the financial market, so that banks can issue better financial instruments (such as bonds, shares, stocks, corporate bonds) to other business organizations, individual investors as well as government.

Jane and Crane (1992), Grat and Chaudhry and Diaz (2006), Olalla and Azofra (2004) show that, merged banks are able to increase their profit through effective technical efficiency, and as a result are able to increase their shareholders' wealth. While Rhoades (1998) found that, technical efficiency actually helped in the cost reduction of the bank's business operation after merging took place. In the contrast, Muhammad (2011) concluded that, the merger and consolidation rather increase the non-interest expenses and reduces the level of efficiency. In the case of banks' performance, some financial companies increase their performance after merger and consolidation, for them to be able to achieve synergies,

economies of scope and scale, and greater market monopoly (Schweiger & Denisi, 1991; Larsson & Finkelstein, 1999; Pangarkar & Lim, 2003; Ikeda & Doi, 1983; Lubatkin, 1983; Sharma & Ho, 2002). Berger and Humphrey (1997), Ahmad Mokhtar et al. (2006), Berger, Demsetz and Strahan (1999) proved that, there is a positive relationship between a merger and consolidation of domestic banks and the financial market. This is because, their researches showed that, merged banks enhance the supply of funds due to increase of total assets, and reduce their operating cost through technical efficiency. Despite that, the capital of merged banks increases with respect to lager asset and equity requirement. Therefore, they have more funds to invest and expand their businesses, as well as other businesses, by supplying funds to the smaller and larger corporations to run businesses in the country through financial market. On the other hand, Chakrabarti (1990), Fang et al.(2004), Ivancevich et al.(1987), Nahavandi and Malekzadeh (1988) also indicated that, there is a negative relationship between merger and consolidation and the financial market, proving that, many firms experienced a decrease in performance after merging and acquisition activity occur, as a result of lack of innovation, low technical efficiency, incompetency, that leads some financial companies to face several obstacles, which actually prevent such contribution to the national financial market from being properly executed, leading to a decrease in funds supply.

Furthermore, in respect to Bendeck and Walker (2011), Amel (2000) findings, it showed that, there is no negative effect between the merged banks profit and financial market exposure, if technical efficiency is properly achieved. This implied that, if merged banks maximize their shareholders' wealth, by decreasing the cost and expenses of operations through technical efficiency. Banks will have less liability to distribute to the customers in the form of interest on a loan payment, which will indirectly increase the financial market participants due to an increase in loanable funds.

2.2 Finding Gaps from Previous Studies

Sufian (2004), Fadzlan (2004), Cabanda and Pascual (2007) studied only the financial performances in the post-merger banks have been interpreted. But however, they neglected the Return of Equity (ROE) as an important part of post-merger banks. Besides that, Amel, Barnes, Panetta and Salleo (2004), Pasiouras, Liadakiand and Zopounidis (2008) emphasized more on the productivity banking institutions after merged, and how it positively affect the financial market. But most of the findings from Amel, Barnes, Panetta and Salleo (2004), Pasiouras, Liadaki and Zopounidis (2008) failed to touch on how these positive impacts can benefit the financial institutions as well as the financial industry. However, they failed to explicitly stipulate the existing effect merger on the financial and banking industry. Mat-Nor, Said, Hisham (2006), Stiroh and Rumble (2006), Stiroh (2004) have proved that the coefficient of the loan growth and interest earnings ratio gives a significant and negative impact on return of equity (ROE) of banks although the banks have positive financial performances after the bank merger. Those financial results show that banks are more focus on the intermediation activities to earn high interest income by increasing loan growth and bring out the negative impacts on return on equity (ROE) of banks.

2.3 The Study Theoretical Framework

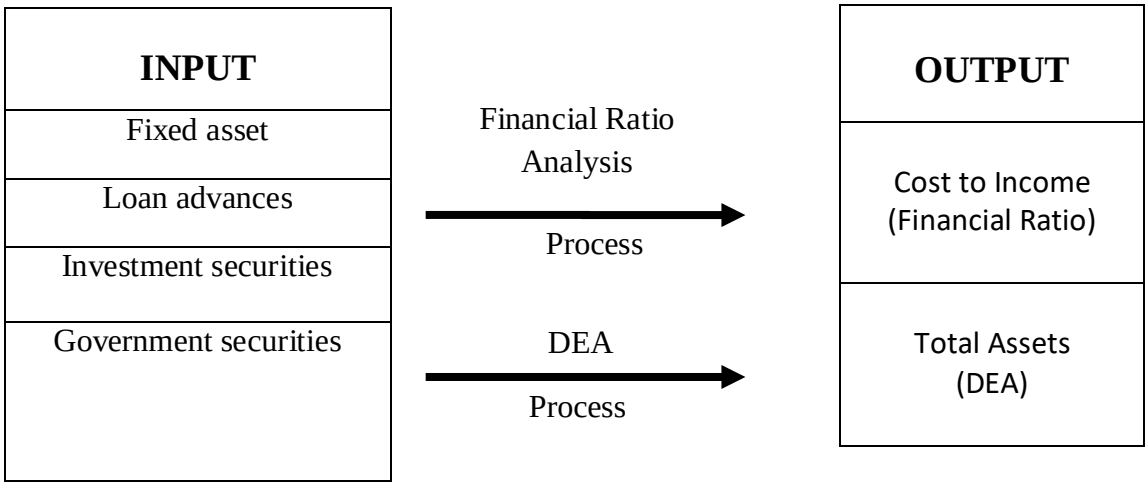


Figure 2.1: Merger and Consolidation of Banking Institutions

Source: Developed by Student

Figure 2.1 illustrates the link between the variables that influence the performance of a bank after merged and consolidation, which is fixed asset (such as building, machinery, leasehold, land, motor vehicle, fixture and fitting and information communication and technology), loan and advance, investment securities and government securities.

Based on Toyin and Tajudeen (2014), there is a significant relationship between the bank performance (net profit) and the fixed asset. After the merger and consolidation two separate entities will combine their major fixed asset together and thus this will increases their total fixed asset after merging, then to improve the bank performance by efficient fixed asset management. Investing fixed asset will also increase the bank productivity that will have a higher chance to increase the net profit (Tarawneh, 2006).

Government securities are a risk free bond. According Berger, Demsetz and Strahan (1999), expanding the market in the financial market to strengthening the current availability of financial products and services, could have some impact to the bank. This is because if the bank market share and financial product increases respectively, will influence the government to increase the debt instrument with periodic payment. Moreover, if the bank increases the government bond, it will increase in return to the banks. This is because securities and bond yield have a positive relationship between them (Saad, 2013). Besides, Berger, Demsetz and Strahan (1999) stated that, the higher the income (financial backup) of a bank the stronger the bank is to flight with the competitor in the same filed by increasing bank efficiency.

Samuel (2015) proved that, there is a significant relationship between bank performance (in terms of profitability) and credit risk management (in terms of loan performance). It shows that the ratio of loan and advance to total deposit decrease the profitability of the bank (vice versa). According Kolapo, Ayeni and Oke (2012), Drehmann, Sorensen and Stringa (2010), after merging between two entities, it will lead the total capital to increase and it make the bank turnover ratio increase because the bank has enough capital to increase the number of loans to the customer. Thus, the bank will increase the profit by collecting the interest payment from the customer and has a better bank performance (efficiency).

Flamini, Schumacher and McDonald (2009) stated that, the commercial bank can get more return on asset (securities investment). The shareholder will get reward based on the performance of the bank (Ongore & Kusa, 2013). This situation will lead to increase in additional investment from another investor if the bank performance is in the excellent condition after merged. However, Al-Tamimi and Hussein (2010), Stiglitz and Weiss (1981) indicates that, the higher the risk of an investment, the higher the return will be on the investment.

Berger and Humphrey (1997), Farrell (1957), Chen and Yeh (1998), Shahooth and Battall (2006), Ji, Song and Wang (2012), Baharuddin and Azmi (2015), Szabó (2015) proved that, total assets of bank are included as the single output in

measuring the bank efficiency using the Data Envelopment Analysis (DEA). This is because the total assets are included in order to capture the effectiveness of technical efficiency regarding the bank's business involvement. Farrell (1957), Szabó (2015), Woodbury and Dollery (2004) further clarify that, banks' efficiency can be measured using a single input and output, based on the characteristics of the Data Envelopment Analysis (DEA) process. Whereas, Drake and Hall (2003), Alzubaidi and Bougheas (2012), Emrouznejad and Podinovski (2004) used total assets as the output, while total deposit, fixed assets, total operating expense represents the inputs to measure the efficiency of the banks.

2.4 Based on the previous theories discussed as well as the empirical evidences, the study hypothesis is development as below:

H1: Fixed assets and technical efficiency in merger and consolidation of banking institutions have a positive relationship.

H2: Government securities and technical efficiency in merger and consolidation of banking institutions are positively related.

H3: Loan and advances and technical efficiency in merger and consolidation of banking institutions have a positive relationship.

H4: Investment securities and technical efficiency in merger and consolidation of banking institutions are positively related.

H5: Cost to revenue and technical efficiency in merger and consolidation of banking institutions are negatively related.

2.5 Methodologies Used to Assess Efficiency

Generalized Least Square (GLS) has been used by Ugrinowitsch, Fellingham and Ricard (2004), to solve correlated data, effectively with missing data and handle not constant measurement time points. However, Olivero, Li and Jeon (2011) found that, Generalized Least Square (GLS) have some deficiencies. The Generalized Least Square (GLS) is hard to be performed when there are certain structure must be imposed on vary. For example, the postulated structure of variables need not be correctly specified. Consequently, the resulting feasible Generalized Least Square (GLS) estimator may not be as efficient as one would like. Second, the finite-sample properties of feasible Generalized Least Square (GLS) estimators are not easy to establish. Consequently, exact tests based on the feasible Generalized Least Square (GLS) estimation results are not readily available test the some of the variable. According to Nazimand and Ahmad (2013), Ordinary Least Square (OLS) is the method use for estimation and prediction. Ordinary Least Square (OLS) can estimate the relationship between dependent and independent variable. However, using Ordinary Least Square (OLS) will have some limitations. First, one of the limitations is inaccurate results and inappropriate assumption when analysing repeated measures data. The assumption becomes constant correlation among the variables within a subject. This is due to the measurements that taken closer time were more high correlated toward to the measurement that taken further apart time. The assumption has become a constant correlation among the variables within a subject (Ugrinowitsch, Fellingham & Ricard, 2004). As a result, this type of assumption will be wrong when involving human performance. Furthermore, missing values may also be one of the limitations of the Ordinary Least Square (OLS). This is because, when the Ordinary Least Square (OLS) is in univariate setting, it will cause missing values. Even through covariance, the structure is correct, Ordinary Least Square (OLS) approach will not be accurate when there are some data missing.

According to Babatunde, Oguntunde, Ogunmola and Balogun (2014), Durbin Watson test help to detect the error of omitted in the specified error. Durbin Watson test range is calculated from 0-4. The data are non-autocorrelation when the value is near to 2. As a conclusion, the positive correlation result will be out when the value is less than 1, while negative autocorrelation applies when the value greater than 3. Besides, according to the Ebrahimi and Kordlouie (2015), Wooldridge test also can detect autocorrelation. Wooldridge test biggest advantage is the test still can be used when the data is considered as panel data. But, Diebold (2016) found that, Durbin Watson test cannot be used to run the lagged dependent variable which may cause an improper result. This test only can be used to detect the first serial correlation. As a result, Durbin h test and Breach-Godfrey test can be used to substitute Durbin Watson test. At the same time, Durbin h test and Breach-Godfrey test can detect the higher autocorrelation and the model that consist lagged dependent variable can also be detected.

Prochazkov (2011) claim that, Data Envelopment Analysis (DEA) is not suitable method used in efficiency analysis because it's unable to find out the measurement error and outlier accurately. If those errors occurred, Data Envelopment Analysis (DEA) unable to detect and two consequences will arise as a result. First, it will cause extremely inefficient in analysis even though only a small error occurs. Second, it also will cause an impact on estimates of all analysis due to the large and small variation will influence a frontier Decision Making Unit (DMU) moves the entire frontier. According to Morita, and Avkiran (2009), Data Envelopment Analysis (DEA) is a non-parametric method which can be used to assess relative efficiency based on pre-selected inputs and outputs. Input means as a desirable variable, while output means as an undesirable variable. According to the Alper (2006), the advantage of the Data Envelopment Analysis (DEA) is that the regression model can be used either in multiple inputs or multiple outputs. Besides, using Data Envelopment Analysis (DEA) also can get the number of technical efficiency by using input and output quantities. On the other hand, when the deterministic technique is more than statistical technique, the Data Envelopment Analysis (DEA) measurement will have error. As a result, it will show that the Decision Making Unit (DMU) inputs are understated while outputs are overstated.

In the regression analysis, the error tern will decrease which will affect outlier, but the Data Envelopment Analysis (DEA) still equal weight to other Decision Making Unit (Emrouznejad & Cabanda, 2013).

Moreover, Rasiah, Ming and Halim (2014) used Data Envelopment Analysis (DEA) to interpret the merger of local commercial banks. Based on the result, most of the merged banks have achieved the technical efficiency, and the larger banks showed higher efficiency levels compared to the small and medium banks. However, according to Sufian, Muhamad, Bany-Ariffin, Yahya and Kamarudin (2012), found that, there are no statistically significant influences on the bank revenue efficiency between the post-merger banks and pre-merger banks. Whereas, Cabanda and Pascual (2007) used Malmquist Productivity Index (MPI) method to interprets the productivity of pre-merger banks and post-merger banks. Based on the result, the post-merger banks shows a higher technical efficiency level if compared to the pre-merger banks.

Based on this Malmquist Productivity Index (MPI) method, Cabanda and Pascual (2007) again proved that, the post-merger of the banks can utilize the resources and increase technical efficiency if compared with the pre-merger banks. On the other hand, neither according to Mat-Nor, Said and Hisham (2006), they stated that based on the Data Envelopment Analysis (DEA) there are no significant differences in financial performances between the pre-mergers and post-mergers periods of banks. Hence, according to Sufian (2004), he used Data Envelopment Analysis (DEA) and found that, scale inefficiency dominates pure technical efficiency in Malaysian post-merger banks but the overall efficiency level is still higher than the pre-merger banks. He also stated that, the merger program is more suitable for small and medium banks, because, they can earn more benefit from scale advantages if compared with the larger banks. According to Ong and Ng (2013), there are no significant increase in the leverage ratio and performances between the post-merger and pre-mergers banks. According to Said, Nor, Low and Rahman (2008), proved that there are similar average efficiency scores before and after the merger of banks. In addition, from the result the mergers of banks did not seem stronger than the productivity efficiency of the banks.

According to Erkoc (2012), Stochastic Frontier Analysis (SFA) is a parametric method that hypothesizes a functional form which can be use the data to econometrically estimate the parameters of the function by using the set of Decision Making Units (DMUs). Hjalmarsson, Kumbhakar and Heshmati (1996) stated, the advantage of the Stochastic Frontier Analysis (SFA) is that, the parametric model can be used to test the hypothesis. Moreover, using Stochastic Frontier Analysis (SFA) can also be used to maximize likelihood econometric estimation and specifies the noise which is separate from efficiency scores. However, the disadvantage of the Stochastic Frontier Analysis (SFA) is that the regression model can only represent to meet the single output with multiple outputs. On the other hand, Stochastic Frontier Analysis (SFA) functional form needs to be specified. However, Lin and Tseng (2005) indicated that, Data Envelopment Analysis (DEA) is non-parametric method in operations research and economics for the estimation of production frontiers. It is used to empirically measure productive efficiency of Decision Making Units (DMUs).

CHAPTER 3: METHODOLOGY

3.1 Introduction

The secondary data used for the data interpretation and analysis has been derived from the annual report of each banking institution for the 7 banks (from 2007 to 2015). Based on the collected data, Data Envelopment Analysis (DEA) method is to be used to run the data and 7 different financial ratios is to be used in calculation, in order to evaluate the efficiency and financial performance level of the banks.

This study basically used Data Envelopment Analysis (DEA) since Data Envelopment Analysis (DEA) is more suitable. Fatulescu (2013) specifically proved that, the main difference between Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) is, Data Envelopment Analysis (DEA) is a non-parametric method based on empirical observed data while the Stochastic Frontier Analysis (SFA) is a parametric method based on observed data. The advantage of using Data Envelopment Analysis (DEA) is it can use as multiple output and input. However, Stochastic Frontier Analysis (SFA) only can use as the single output with multiple outputs. On the other hand, the functional form of Data Envelopment Analysis (DEA) is not specified while Stochastic Frontier Analysis (SFA) needs to be specified. Besides, the Data Envelopment Analysis (DEA) no needs accommodate noise while the Stochastic Frontier Analysis (SFA) needs specified noise (Lin & Tseng, 2005). Furthermore, Lin and Tseng (2005) revealed, the strength of the Data Envelopment Analysis (DEA) is it can presume the company efficient and effective in advance. Then, Data Envelopment Analysis (DEA) does no need to know the price information to determine a frontier and inefficiency based on that frontier. Besides, Data Envelopment Analysis (DEA) no needs to assume the functional type, but also distribution type. Lastly, the Data Envelopment Analysis (DEA) can compare with the relative efficiency as the sample size

becomes smaller. As a result, Data Envelopment Analysis (DEA) is better than Stochastic Frontier Analysis (SFA).

3.2 Data Envelopment Analysis (DEA) Steps

Data Envelopment Analysis (DEA) is a non-parameter approach methodology, in other word, it is a linear programming which uses to measure the distance of a producer, it also named as Decision Making Unit (DMU) from the efficient frontier (Said, Nor, Low, & Rahman, 2008; Mat Nor, Mohd Said & Yahya, 2006). The ratio of output over input is the simplest and commonest form to detect the efficiency. Briefly, the underlying linear method, assumes that there are inputs and output for every Decision Making Unit (DMU). Thus, the Decision Making Unit (DMU) model will be as below.

Maximum: $\theta = \frac{u_1 y_{1o} + u_2 y_{2o} + \ldots + u_a y_{ao}}{v_1 x_{1o} + v_2 x_{2o} + \ldots + v_b x_{bo}} = \frac{\sum_{r=1}^{a} u_r y_{ro}}{\sum_{i=1}^{m} v_i x_{io}}$

Subject to: $v_1 x_{1o} + v_2 x_{2o} + \ldots + v_b x_{bo} = 1$

$$u_1 y_{1j} + \ldots + u_2 y_{2j} \leq v_1 x_{1j} + \ldots + v_b x_{bj} \quad (j=1,\ldots,n)$$

$$v_1, v_2, \ldots, v_b \geq 0$$

$$u_1, u_2, \ldots, u_a \geq 0$$

Where,

θ= objective value (efficiency score)

$u_i (i = 1, \ldots, a) = output\ weights$, a= number of input

$y_{io} (i = 1, \ldots, a) = output\ for\ DMU$

$v_i (i = 1, \ldots, b) = input\ weights$, b= number of output

$x_{io} (i = 1, \ldots, b) = input\ for\ DMU$

According to Farrell (1957), measurement of productive efficiency theory, to determine the efficiency of a company, series of inputs and outputs must be obtained in order to calculate for the efficiency. Further implying that, Inputs + Outputs = Efficiency. And in order to achieve efficiency, ‘‘inputs and outputs must be equal to one ('inputs + Outputs =1'), or "Inputs + Outputs > 0. In a case where inputs and outputs are less than 1 (< 1), efficiency is explained to be low. Moreover, based on the measurement of efficiency theory by Fare and Lovell, (1978), the measuring scale for technical efficiency is either 1 or < 1, 1 indicating efficient and < 1 indicating less efficient. A company with high level of efficiency must represent a scale of 1, less than 1 means less efficiency. In IRŠOVÁ (2009), Fixler and Zieschang (1993), and Pi and Timme (1993) stated that, the efficiency measure is bounded between 'zero and one' for one (1) indicating an optimum efficient bank financial performance, while for zero implied less efficient bank financial performance. Further implying that, for a company to obtain its high financial performance, it must achieve an efficiency score greater or equal to one (score > or = 1). And for a low efficiency, the company must achieve a score less than 1 (score < 1) (Berger, Hunter & Timme, 1993; Miller & Noulas, 1996; Bhagavath, 2006). The inputs data are fixed asset, loan and advance, government securities and investment securities while the output data is total assets.

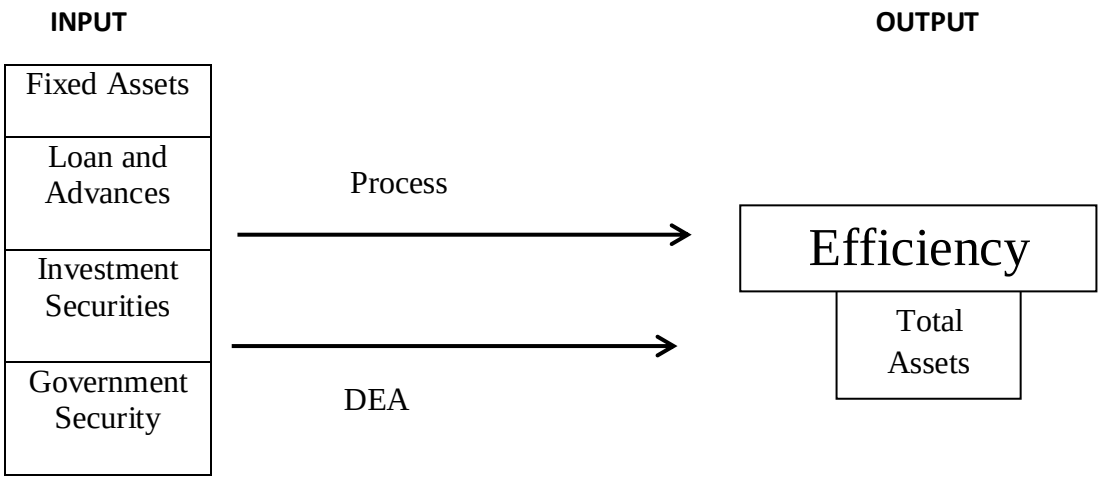


Figure 3.1: Data Envelopment Analysis (DEA) Process

Source: Developed by Students

The Data Envelopment Analysis (DEA) will be used to process the input variables to produce an output result. The first input is the fixed assets which are the combination two major assets of two separate banks and controlled by either one of the entities (Gaughan, 2002). For the criteria of fixed assets, it consists of net income, total assets and total liabilities. The second input is loan and advances. The reason why we choose a loan and advances is we need to compare the borrowing cost and the ability to hedge the risk after the merger. The criteria of the loan and advances will be total loans, total deposit, operating expenses and operating income. The third input is investment securities, when the bank merges, it will increase financial capability and affect the bank issues more bonds, shares and securities to attract more investors (Berger, Demsetz & Strahan, 1999). For the criteria of investment securities, it consists of net income, dividend on preferred shares, average outstanding shares, net income, shareholder's equity which is more concerned about the aspect of shareholders. The last inputs will be government securities, which is the securities issued by government to help banks restructuring after a system crisis (Laeven & Valencia, 2008). The criteria for government securities will be total shareholder equity, preferred equity and total outstanding shares.

3.3 Financial Ratios (FR) Process

Table 3.2: Financial Ratios (FR) Process

EFFICIENCY	
Cost to Income (CIR)	Operating Expenses / Operating Income

Source: Developed by students

According to the table 3.2, this study uses Financial Ratios (FR) to evaluate and analyze the performance of merger and consolidation in the banking industry. Cost to Income ratio (CIR) is to measure the degree of technical efficiency of merged banks (Y).

Based on Burger and Moormann, (2008) concept of Cost to Income ratio (CIR) which is the same as Efficiency Ratio claim that, when measuring the productivity and efficiency, banks, with a high Cost to Income ratio (CIR) is equivalent to low productivity and low efficiency and vice versa. According to Mat-Nor, Mohd Said and Hisham (2006), Hussain (2014), Cost to Income ratio (CIR) also indicated the efficiency of the bank, with prove of an increase in Cost to Income ratio (CIR) indicates a low efficiency and otherwise. Further explaining that, any score of Cost to Income ratio (CIR) above 50% is considered inefficient while a score lower than 50% is considered as efficient.

Cost to income also known as Cost-to-Income Ratio (CIR) or efficiency ratio or expense-to-income ratio (Burger & Moornam, 2008; Hussain, 2014). Cost-to-Income Ratio (CIR) defined as operating cost divide by operating expense of the bank. Cost-to-Income Ratio (CIR) indicated how many Malaysian Ringgit (MYR) was needed in a given time period to generate one MYR in revenue. Cost-to-Income Ratio (CIR) measures the output of a bank in relation to its utilized input (Hussain, 2014).

CHAPTER 4: RESULT & INTERPRETATION

4.1 Data Analysis & Interpretations

The table 4.3 below present result of Data Envelopment Analysis (DEA) efficiency score of financial performance of the domestic merger banks after the merging and consolidation has successfully taken place due to the financial crisis, from the year 2007 to 20015 respectively.

4.1.1 Data of Domestic Banks DEA Efficiency Result

Table 4.3 Domestic Banks DEA Efficiency Results (Financial Performance Measurement Scores)

Table 4.3.1 CIMB Bank Berhad: Data Envelopment Analysis (DEA) Result

Periods	CIMB BANK BERHAD		Slack movement on inputs (0 = positive)			
	Efficiency score	Benchmark Score	Fixed assets	Loans and advances	Investment securities	Government securities
2007	1	(1.000000)	0	0	0	0
2008	1	(1.000000)	0	0	0	0
2009	1	(0.712344)	0	0	0	0
2010	1	(0.513159)	0	0	0	0
2011	1	(1.000000)	0	0	0	0
2012	1	(1.000000)	0	0	0	0
2013	0.901674	(0.389130)	-12442	-2629389	0	0
2014	1	(1.000000)	0	0	0	0
2015	1	(1.000000)	0	0	0	0

Table 4.3.2 Hong Leong Bank Berhad: Data Envelopment Analysis (DEA) result

Periods	**HONG LEONG BANK BERHAD**		Slack movement on inputs (0 = positive)			
	Efficiency score	Benchmark Score	Fixed assets	Loans and advances	Investment securities	Government securities
2007	1	(1.000000)	0	0	0	0
2008	1	(1.000000)	0	0	0	0
2009	1	(1.000000)	0	0	0	0
2010	1	(1.000000)	0	0	0	0
2011	1	(1.000000)	0	0	0	0
2012	1	(1.000000)	0	0	0	0
2013	1	(1.000000)	0	0	0	0
2014	0.997313	(0.866987)	-92993	0	-1358165	-3183409
2015	1	(1.000000)	0	0	0	0

Table 4.3.3 AmBank (M) Berhad: Data Envelopment Analysis (DEA) Result

Periods	**AMBANK(M) BERHAD**		Slack movement on inputs (0 = positive)			
	Efficiency score	Benchmark Score	Fixed assets	Loans and advances	Investment securities	Government securities
2007	1	(1.000000)	0	0	0	0
2008	1	(1.000000)	0	0	0	0
2009	1	(1.000000)	0	0	0	0
2010	1	(1.000000)	0	0	0	0
2011	0.998739	(0.409506)	0	0	-576815	-34532.6
2012	1	(1.000000)	0	0	0	0
2013	0.991207	(0.093029)	-131615	-131614	-540223	-2138944
2014	1	(1.000000)	0	0	0	0
2015	1	(1.000000)	0	0	0	0

Table 4.3.4 Maybank Berhad: Data Envelopment Analysis (DEA) Result

Periods	**MAYBANK BERHAD**		Slack movement on inputs (0 = positive)			
	Efficiency score	Benchmark Score	Fixed assets	Loans and advance	Investment securities	Government securities
2007	1	(1.000000)	0	0	0	0
2008	1	(1.000000)	0	0	0	0
2009	0.985201	(0.940269)	-26428.88	0	0	-14567953
2010	0.956479	(0.650524)	-13579.53	0	0	-628331.61
2011	1	(1.000000)	0	0	0	0
2012	1	(1.000000)	0	0	0	0
2013	1	(1.000000)	0	0	0	0
2014	1	(1.000000)	0	0	0	0
2015	1	(1.000000)	0	0	0	0

Table 4.3.5 Public Bank Berhad: Data Envelopment Analysis (DEA) Result

Periods	**PUBLIC BANK BERHAD**		Slack movement on inputs (0 = positive)			
	Efficiency score	Benchmark Score	Fixed assets	Loans and advance	Investment securities	Government securities
2007	1	(1.000000)	0	0	0	0
2008	1	(1.000000)	0	0	0	0
2009	0.983909	(0.519151)	-47253.17	0	-2354033	0
2010	0.950189	(0.343631)	-29124.52	0	0	0
2011	0.967143	(0.562712)	-87416.60	0	-5058555	0
2012	0.97286	(0.710555)	-15907.67	0	0	0
2013	1	(1.000000)	0	0	0	0
2014	1	(1.000000)	0	0	0	0
2015	1	(1.000000)	0	0	0	0

Table 4.3.6 Alliance Bank Berhad Data Envelopment Analysis (DEA) Result

Periods	ALLIANCE BANK BERHAD		Slack movement on inputs (0 = positive)			
	Efficiency score	Benchmark Score	Fixed assets	Loans and advances	Investment securities	Government securities
2007	1	(1.000000)	0	0	0	0
2008	1	(1.000000)	0	0	0	0
2009	0.975623	(0.814567)	-8656.50	-510245.3	-394966.7	0
2010	1	(1.000000)	0	0	0	0
2011	0.952843	(0.547549)	0	0	-316333	-1112878.4
2012	1	(1.000000)	0	0	0	0
2013	1	(1.000000)	0	0	0	0
2014	1	(1.000000)	0	0	0	0
2015	1	(1.000000)	0	0	0	0

Table 4.3.7 Affin Bank Berhad Data Envelopment Analysis (DEA) Result

Periods	AFFIN BANK BERHAD		Slack movement on inputs (0 = positive)			
	Efficiency score	Benchmark Score	Fixed assets	Loans and advances	Investment securities	Government securities
2007	1	(1.000000)	0	0	0	0
2008	1	(1.000000)	0	0	0	0
2009	1	(1.000000)	0	0	0	0
2010	1	(1.000000)	0	0	0	0
2011	1	(1.000000)	0	0	0	0
2012	1	(1.000000)	0	0	0	0
2013	1	(1.000000)	0	0	0	0
2014	1	(1.000000)	0	0	0	0
2015	1	(1.000000)	0	0	0	0

4.1.2 Findings and Interpretation for Data Envelopment Analysis (DEA)

Referring to the table 4.3.1 above, for CIMB Bank Berhad, the results indicates that during the year 2013, the bank failed to achieve an optimum efficiency as it displays a low efficiency of 0.901674 (which is less than 1), displaying a score which is below the benchmark score of1.000000. while, the efficiency scores for the rest of the years indicates significantly an optimum efficiency level for 2007, 2008, 2010, 2011, 2012, 2014 and 2015 accordingly. Even though the scores proved that, there is an inadequacy in the independent variables, CIMB Bank Berhad almost achieves a well efficient financial performance for the past decade.

The low score in 2013 is as a result of a negative slack movement in the total fixed assets and loan and advances. This implied that, the two variables have an inadequate performance, which has significantly affected the total efficiency. Hughes and Mester (2013), and Acharya, Saunders and Hasan (2002) stated that, when a proper screening and monitoring are not conducted on the borrower before granting a loan, and lack of loan diversifications in the banking operation, these can affect the total loan performance of the bank. Because the bank default rate will rise. Okwo, Ugwunta and Nweze (2012), Toyin and Tajudeen (2014) stated that there is a significant relationship between banks' technical efficiency (reduce cost and increase net profit) and its total fixed assets. Providing that, a proper investment in the banks fixed assets can help the bank generate more net income and on the other, improper investment will result in inadequate return. Those variables are positively related. When one variable goes high the other goes the same way (Aboody, Barth & Kasznik, 1999). However, for the rest of the years, this score proved that, there has not been any slack movement in none of the inputs, proving that, there has been an adequate technical efficiency in the subsequent years.

In the table 4.3.2, the technical efficiency result for Hong Leong Bank Berhad shows an optimum efficiency level from 2007 to 2013, displaying a score of 1 (1=1), respectively meeting its benchmark of 1.000000. But however, in 2014, the bank failed to obtain an optimum level of technical efficiency (financial performance) as it's indicate a score of 0.997313 (even though it exceeded the benchmark value of 0.866987). Moreover, the bank technical efficiency reaches its optimum level of efficiency with a score of 1 for the year 2015.

The failure to reach its optimum efficiency level in the year 2014 is due to a negative slack movement in total fixed assets, investment securities and government securities. According to the financial report for (2014), the bank involve in the restructuring of its assets and investment operations that significantly made a negative impact to the financial performance. This further explains that, there is an inadequate performance in those variables. For the fixed assets, Aboody, Barth and Kasznik (1999) explains if the total fixed assets of the bank failed to contribute in the development of performance (by increasing the return), is either, there has not been a proper use of the fixed assets, lack of investment or it there is a mismanagement in fixed assets. Marcus (1984), and Keeley (1990) claim that, a high value and investment opportunities significantly maximize the expected market return. Again specified precisely, a proper execution of proper investment strategy can influence a high level of investment performance by increasing the return on the money invested. This eventually affects the overall technical efficiency level of that year. However, the overall performance explains that, Hong Leong Bank Berhad's operations achieved a well technical efficient (financial performance) for the previous years after merger and consolidation.

From the Table 4.3.3 above, the efficiency scores for AmBank (M) Berhad displays a consistent level of financial performance, as it's almost attain an optimum efficiency level for the respective years. For the first four years, AmBank (M) Berhad obtains a significant optimum efficiency level (that is

1=1). In 2011 and 2013, it displays a score of 0.998739 and 0.991207 indicating a nearly peak performance (as both years exceed its benchmark). While in 2012, 2014 and 2015, efficiency scores also followed with an optimum financial performance accordingly.

The slightly low score for the both years is as a result of a negative slack movement in variables 3 &4 (investment securities and Government securities) proving that, there is an inadequate performance in terms of the bank's bond investments regarding risks and returns. The inadequacy in these inputs could be due to improper investment strategies which has significantly affected the technical efficiency level for that year. Besides that, lack of diversification of investments, the bank failed to practice a well diversification of their portfolio in order to reduce risk of investment and maximize the expected market return. (Marcus, 1984; Keeley, 1990).
Based on Ab Rahim (2015), Data Envelopment Analysis (DEA) results and findings, it indicated explicitly that, in the year 2011, AmBank (M) Berhad failed to achieve its high technical efficiency (recording a score of 0.9358), which is almost consistent with this study. The only difference between the two results is, Ab Rahim (2015) uses Super-Efficiency Model to measure the efficiency of the bank, and this study used, the basic envelopment Efficiency Model to measure the performance. Studies in the merger of Malaysian banks, indicated most of the merged banks achieve a higher level of financial efficiency due to the combination of capital and assets of the various banks that occur after the financial crisis, of which the result is consistent with this study respectively (Ab Rahim, 2015).

By referring to table 4.3.4, overall financial performance for Maybank Berhad displays an optimum efficiency level in the result. For 2007 and 2008, Maybank Berhad shows its efficiency in the result. Deng, Wong, Wooi and Xiong (2011) indicated that during 2001-2008, there is a high technical efficiency by using the DEA approach. This is because Maybank was under the first Financial Sector Masterplan (2000–2010). During this period, the Malaysian financial system has become more diversified,

competitive and elasticity. Institutional capacity building, financial infrastructure development, regulatory reforms and widely use on technologies have yielded a financial system that is able to offer the range of financial products and services to consumers and businesses with more efficient delivery channels (Bank Negara Malaysia, 2012). But, for Maybank Berhad, it is nearly to achieve an optimum technical efficiency in the year 2009 and 2010 with the record 0.985201 and 0.956479 respectively. It is because in DEA software shows that there is a negative slack movement in both inputs (government securities & fixed assets).

According to 2009 and 2010 Maybank Berhad's annual report proved that, sub-prime crisis in the prior year worsened due to the global financial crisis, leading internationally renowned banking groups such as Lehman Brothers declaring bankruptcy in September 2008, this however, badly hit Maybank Berhad financial performance during those years respectively. Therefore, Maybank Berhad needs to reduce their government securities and fixed assets to obtain more liquidity towards the loss on the global financial crisis. While, for 2009 and 2010 the scores are not equal to 1 but the benchmark score is 0.940269 and 0.650524 respectively. For the 2011 to 2015, Maybank Berhad has achieved to the peak technical efficiency by the score of 1 in the result of efficiency score and benchmark score. This mainly because, starting from 2011, Maybank Berhad began to use Basel II (Pillar 3 disclosure) which is disclosure requirements around risk management of the market place covering (Annual reports of Maybank Berhad, 2011). This application will more concentrate on capital management and risk management in order to reduce credit risk (Annual reports of Maybank Berhad, 2011). Another reason why Maybank Berhad scored perfect in technical efficiency score from 2011 to 2015, this is because Maybank Berhad is under Financial Sector Blueprint 2011-2020. In order to achieve this objective of Financial Sector Blueprint, the domestic banking sector has become more dynamic, diversified, inclusive and integrated to better serve the growing domestic, regional and global needs (Balachandher, Kathireson, Murugesu & Ramasamy, 2015).

For the Public Bank Berhad as the result indicated in table 4.3.5, it displays that in 2007, 2008, 2013, 2014 and 2015, Public Bank Berhad achieve a peak of technical efficiency. But, the result for the rest of the years shows a low technical efficiency score. According to the Deng, Wong, Wooi and Xiong (2011), Ng, Wong, Yap, Khezrimotlagh (2014), Echchabi, Olaniyi, Ayedh (2015), the efficiency result of Public Bank Berhad on 2007 and 2008 also equal to 1 by using the Data Envelopment Analysis (DEA) approach. In 2009 and 2011, the efficiency score for these two years is 0.983909 and 0.967143 with the benchmark score of 0.519151 and 0.562712 respectively. For these two years, the Data Envelopement Analysis (DEA) software shows that there is a negative slack movement on the inputs of fixed assets and investment securities. Explaining that, there is an insufficient performance on the two inputs. For 2010 and 2012, the efficiency score is 0.950189 and 0.97286 respectively, and the benchmark score is 0.343631 and 0.710555. The reason why these two years cannot achieve the optimum efficiency is because there is a negative slack movement on fixed assets.

Lai, Ling Eng, Cheng and Ting (2015), indicated that within 2001 to 2010 the return of assets of Public Bank Berhad is decreasing due to the sale of some assets to offset losses after merger by using the DEA analysis. In this case, it's clear to see the reason why the fixed assets of Public Bank Berhad will show negative slack on 2009 and 2010. Moreover, for 2009 and 2010, Public Bank Berhad tries to recover their fixed assets and securities from the global financial crisis 2008 by cooperate with Malaysia government. Balachandher, Kathireson, Murugesu & Ramasamy, (2015) stated, the result of the Data Envelopment Analysis (DEA) test for Public Bank Berhad from 2009 to 2013 is lower than Maybank, Affin Bank, Heong Leong Bank, Ambank, RHB Bank. In this case, we can prove that why Public Bank Berhad will show negative slack from 2009 to 2013. When positive output and input slacks exist at the optimal solution linear programming problem, the relative radial projection of an in-sample input-output combination cannot meet the criterion of optimality and that will not qualify to be an efficient point (Sinha, 2016).

Based on the result of the table 4.3.6, Alliance Bank Berhad has been considered as absolute technical efficiency in 2007, 2008, 2010, 2012, 2013, 2014 and 2015 by a score of 1, in the result of the technical efficiency score and benchmark score. Balachandher, Kathireson, Murugesu and Ramasamy, (2015) proved that, the result on efficiency of Alliance Bank Berhad between the periods of 2009 to 2013 is higher than the result of Maybank Berhad and Public Bank Berhad. However, in 2009, the efficiency score of Alliance Bank Berhad is 0.975623 and the benchmark score is 0.814567 which is near to the optimum technical efficiency score. According to the annual report of Alliance Bank Berhad in 2009, indicated that the global financial crisis also affected the operation and make some financial problem. The result shows that in 2009, Alliance Bank Berhad faces a negative slack movement in three inputs which is fixed assets, loan and advances and investment securities. In 2011, there is 0.952843 technical efficiency score and 0.547549 in benchmark score. The reason why Alliance Bank Berhad cannot achieve optimum technical efficiency score is there is a negative slack movement in investment securities and government securities. One of the reasons that stated in the annual report of Alliance Bank Berhad, 2011, reducing in investment securities and government securities is off-set by recovery from a defaulted Collateralised Loan Obligation.

For Affin Bank (table 4.3.7), the result shows that overall performance is absolutely efficiency and also for the benchmark score from 2007 to 2015. Both the technical efficiency and benchmark score are 1. According to Deng, Wong, Wooi and Xiong, (2011), the score of efficiency of Affin Bank is equal to 1 in 2007 and 2008. Echchabi, Olaniyi, Ayedh, (2015) also indicated that the Affin Bank is absolutely efficiency for 2006 to 2010 by using the Data Envelopment Analysis (DEA) approach. Ng, Wong, Yap, Khezrimotlagh, (2014) indicated that the Data Envelopment Analysis (DEA) score on Affin Bank is equal to 1 which was achieved to the peak of the efficiency in 2013.

To conclude from the above discussion, after using the Data Envelopment Analysis (DEA), the results proved that, after the merger and consolidation of the domestic banks, which occurs after the financial crisis, the financial performance of all the banks has been better, proven to be efficient during the subsequent years, as a result of consolidation of the banking services. However, in some years for the respective banks, the technical efficiency of the financial performance has not reached its optimum level due to inadequacy in the performance of some inputs (independent variables).

4.1.3 Data of Domestic Banks: Financial Ratio Measurement Results

The Table 4.4 below present result of Financial Ratios of the domestic merger banks after the merging and consolidation has successfully taken place after the financial crisis, from the year 2007 to 20015 respectively.

Table 4.4.1 Financial Ratio Results of Hong Leong Bank, Public Bank, Affin Bank and Alliance Bank

Period	Hong Leong Bank Berhad	Public Bank Berhad	Affin Bank Berhad	Alliance Bank Berhad
	Cost to Income	Cost to Income	Cost to Income	Cost to Income
2007	0.87324	0.5649	0.671267243	0.53424213
2008	0.84032	0.532	0.629848729	0.46200205
2009	0.84874	0.58707	0.618437663	0.53342526
2010	0.85609	0.51558	0.543622986	0.52101559
2011	1.00333	0.45309	0.47015378	0.48276094
2012	0.95406	0.46293	0.448003658	0.47559868
2013	0.86883	0.47207	0.425007652	0.47956124
2014	0.80203	0.44857	0.539448833	0.4656618
2015	0.77899	0.4496	0.693671872	0.46777089

Table 4.4.2 Financial Ratio Results of Hong Leong Bank, Public Bank, Affin Bank and Alliance Bank.

Period	AmBank (M) Berhad	CIMB Bank Berhad	Maybank Berhad
	Cost to Income	Cost to Income	Cost to Income
2007	0.44236164	1.150389592	0.86692541
2008	0.4585408	1.517791814	1.04115503
2009	0.4928639	1.499952648	3.53010373
2010	0.41972057	1.429372923	1.22167911
2011	0.3991658	1.274213158	1.08421945
2012	0.41644181	1.350067245	1.05373164
2013	0.45857562	1.445980316	1.02263352
2014	0.44974808	1.938995043	1.01819911
2015	0.44224327	2.363054303	1.15041304

Table 4.4.3 The Average Cost to Income (CIR) Ratio of Each Bank Results.

Malaysia Commercial Banks	Cost to Income (CIR)
Hong Leong Bank Berhad	0.8695
Public Bank Berhad	0.4984
Maybank Berhad	1.3321
CIMB Bank Berhad	1.5522
AmBank (M) Berhad	0.4422
Alliance Bank Berhad	0.4913
Affin Bank Berhad	0.5599

4.1.4 Findings and Interpretation for Financial Ratios (FRs)

Table 4.4.1 represents the Cost to Income (CIR) result for Hong Leong Bank Berhad. The result indicates a score of 50% from year 2007 to 2015 which means less efficiency. In the meantime, the Cost to Income (CIR) of Hong Leong Bank Berhad reached at 100% in 2011 again indicating less efficiency.

According to Table 4.4.1 Public Bank Berhad has a low Cost to Income (CIR) which is 0.50 and indicates Public Bank Berhad need 50% of its cost to deliver a product or services between the years 2011 to year 2015. However, before the year 2011, Public Bank Berhad's Cost to Income (CIR) ratio is more than 0.5, which is 0.57, 0.53, 0.59, and 0.52 between the years 2007 to year 2010 respectively.

According to the table 4.1.1, Affin Bank Berhad had less efficient result in Cost to Income (CIR) from 2007 to 2015. Nevertheless, in 2011, 2012 and 2013 (47.01%, 44.8% and 42.5%) considered as efficient since the Cost to Income (CIR) of the particular year was below 50%. Cost to Income (CIR) of Affin Bank Berhad considered less efficiency for the year of 2007 to 2015 which is 44.22% on average (refer to table 4.4.2). Besides that, Cost to Income (CIR) of Alliance Bank Berhad is in between 46.2% to 53.4%. In the year 2009, Alliance Bank Berhad reaches the highest Cost to Income (CIR) which is 53.4%, while, in the year 2008 reach the lowest Cost to Income (CIR) which is 46.2%.

In table 4.4.2, it shows that the AmBank (M) Berhad did a good job in controlling costs of the bank this is because their Cost to Income (CIR) is in the good range which is below than 0.5 throughout the year 2007 to 2015. In the year 2011, AmBank (M) Berhad had a lowest CIR which is 0.399. It also indicates that AmBank (M) Berhad is efficiency based on the result in the table shown above.

The results show that the Cost to Income (CIR) for CIMB Bank Berhad is more than 1 throughout the research year, which is between the years 2007 to year 2015. In the year of 2011 to 2015, Cost to Income (CIR) for CIMB Bank Berhad has increased from at 1.274 to 2.363. This indicates that, CIMB bank is less efficiency from the year 2007 to 2015. On the other hand, Maybank Berhad has a Cost to Income (CIR) 1.3321 and indicates that Maybank Berhad need 133% of its cost to deliver a product or services. Maybank Berhad has a fluctuation in 2007 to 2012. But, there is a slight decrease from 0.911 to 0.910 in the year 2015.

The table 4.4.3, shows the overall average cost to revenue result for Hong Leong Bank Berhad, Public Bank Berhad, Affin bank Berhad, Alliance Bank Berhad, AmBank (M) Berhad, CIMB Bank Berhad and Maybank Berhad. Based on Mat-Nor, Mohd Said and Hisham (2006); Hussain (2014) findings, Cost to Income (CIR) also indicate the efficiency of the bank. Most of the banks need more than 50% of resources to generate every Malaysia Ringgit of revenue. Hong Leong Bank Berhad displays a high CIR (Cost to Income) which is 0.87 in average between the calculated years. It also explains that Hong Leong Bank Berhad need 87% of cost that the bank incurred to deliver a product and services to customers. This significantly indicates that, Hong Leong Bank Berhad recorded a low level of efficiency. This is due to excessive increasing of cost of products. On the other hand, Public Bank Berhad has a low Cost to Income (CIR) which is 0.50 and indicates Public Bank Berhad need 50% of its cost to deliver a product or services, indicating an average level of efficiency. Besides that, the Cost to Income (CIR) score for Affin Bank Berhad, Alliance Bank Berhad and AmBank (M) Berhad are 55.99%, 49.13% and 44.21% on average for nine years respectively. Proving a high level of efficiency for Alliance Bank Berhad and Ambank (M) Berhad accordingly. Moreover, CIMB Bank Berhad has 155% of Cost to Income (CIR) in average and Maybank Berhad is 133% respectively.

From table 4.3, Hong Leong Bank Berhad, Maybank Berhad, CIMB Bank Berhad and Affin Bank Berhad are considered to be less efficient after merging since the ratios are greater than 50%. Veverita (2008), Lin and Chang (2013), Said, Nor, Low and Rahaman (2008), Sufian (2004) also proved that the failure to achieve an efficient performance is due to the bank's inability to enhance the product efficiency during the subsequent years after the merger. Based on the overall average efficiency score, Public Bank Berhad, AmBank (M) Berhad and Alliance Bank Berhad prove to be efficient in their financial performance after merged. Burger and Moormann (2008) shows that, the efficiency achieved was due to a significant improvement and enhancement of banks operation which positively affected productivity.

4.2 Data Envelopment Analysis (DEA) and Financial Ratios (Based on Results)

This research was conducted by using data of 7 banks (Hong Leong Bank Berhad, Public Bank Berhad, Maybank Berhad, CIMB Bank Berhad, AmBank (M) Berhad, Alliance Bank Berhad and Affin Bank Berhad) during the period 2007 – 2015. The data were compiled from the financial statement of each bank. Moreover, we adopt the intermediation approach for banking analysis to test on the efficiency of the bank operation. In order to successfully measure the financial performance of the various domestic banks, in a way of evaluating their efficiency. This study specifically uses the Data Envelopment Analysis (DEA) and Financial Ratio (Cost to Income) to evaluate the efficiency performances of each bank.

First, the Data Envelopment Analysis (DEA) approach showed that the result of Hong Leong Bank Berhad is efficient because the majority of the years reach the peak of efficiency. However, the Cost to Income (CIR) of Hong Leong Bank Berhad is 86.95 percent, which means that Hong Leong Bank Berhad needed to use 86.95 percent of cost that the bank incurred to deliver a product and services to customers.

Based on the score, it is less efficient because the score is above 50 percent, which indicates that, 50% of resources are needed to generate every ringgit it of revenue. Beside this, Maybank Berhad and CIMB Bank Berhad also showed higher Cost to Income (CIR) with the figure of 133.21 percent and 155.22 percent respectively. It showed that both banks were less efficient in Financial Ratio approach. Moreover, both results for Maybank Berhad and CIMB Bank Berhad on Data Envelopment Analysis (DEA) approach indicate that both banks were efficient. It is because; Maybank Berhad and CIMB Bank Berhad reach the peak of efficiency with most of the year. Apart from that, Affin Bank Berhad was less efficiency when the Financial Ratio approach was implemented, indicating a percentage of 55.99 of the Cost to Income (CIR). However, Affin Bank Berhad showed, there was an efficiency in Data Envelopment Analysis (DEA) approach. Affin Bank Berhad was absolutely efficient in the period of our research (2007-2015).

The inconsistency result of both methods used is due to the distinguish input that Data Envelopment Analysis (DEA) and Financial Ratio Analysis used. For the Data Envelopment Analysis (DEA) method, total asset, government securities, investment security and loan advance used as inputs (Mousa, 2015). While, for the Cost to Income (CIR) used operating assets and operating expenses as inputs in this research. In short, different types of input components used will show the different outcomes. Besides, Mousa (2015) proved that, Data Envelopment Analysis (DEA) uses multiple inputs and multiple outputs in order to measure the efficiency. However, for Financial Ratio Analysis, there is a fix formula to calculate the respective ratios in order to determine the efficiency. According to Yu, Barros, Tsai and Liao (2014) stated that, Financial Ratio can use one single input to produce one output.

Moreover, based on the previous researchers view of points, the accuracy of this two methods are not consistent as well, this also shows that the reason of the output inconsistent in the finding. Erkut and Hatice (2007) explained that, the primary objective of Data Envelopment Analysis (DEA) is used to analyze the efficiency of nonprofit institutions, including hospitals and schools because the inputs and outputs of these non-profit institutions are not measured in unified units (Friedman

& Sinuany-Stern, 1998; Wei et al., 2012). Nevertheless, the monetary value of other business institutions also can be measured by using Data Envelopment Analysis (Erkut & Hatice, 2007). One of the advantages of Data Envelopment Analysis (DEA) is there is no any specification required on predetermined weights to the input and output variables (Yu et al., 2014).

On the other hand, Yu, Barros, Tsai and Liao (2014) claimed that, effects of economies of scale and efficiencies estimations do not take into consideration when using Financial Ratio Analysis and lead to lack of sufficient information that will lead to the outcome impropriate. Ludwin and Guthrie (1989) stated that, measure the ratios of outputs to inputs is limited in a complex company, that produces a multiple products. Moreover, there is no standard or exactly ratio that the bank needs to choose, this will lead to instability (Ho & Zhu 2004), which mean the efficiency of banks based on the calculation of Financial Ratio Analysis did not have a standard benchmark to evaluate it. However, according to the Kumbirai and Webb (2010), the company uses Financial Ratio to evaluate the company liquidity, profitability and the credit quality of the performance in bank. This is because Financial Ratio Analysis can be effective in measuring the different level of the performance between banks and easy recognize the strength and weakness of the bank. On the other hand, Data Envelopment Analysis (DEA) method can determine the bank efficiency.

Lastly, with the way of measuring or calculating for both Data Envelopment Analysis (DEA) and the Financial Ratio Analysis, it have showed differs between these two methods. The Data Envelopment Analysis (DEA) measures the efficiency by using the software called DEAP 2.1 version; while FRA is formula base. However, Financial Ratio Analysis and Data Envelopment Analysis (DEA) are both popular to use because it is easy to use, interpret and easy to compare between banks (Mousa, 2015). On the other hand, Public Bank Berhad achieved to the peak of efficiency in Data Envelopment Analysis (DEA) approach. While, Public Banks Berhad also scored efficiency result in financial ratio approach with Cost to Income (CIR) of 49.84 percent. It proved that both results are the same based on the two approaches. Furthermore, AmBank (M) Berhad and Alliance Bank Berhad indicate

efficiency on Data Envelopment Analysis (DEA) approach because both banks reached optimum efficiency for most of the years. While in Financial Ratio approach, both banks also show efficiency with results of 44.22 percent and 49.13 percent respectively. This clearly indicates that, the result on AmBank (M) Berhad and Alliance Bank Berhad were efficient by Data Envelopment Analysis (DEA) approach and Financial Ratio approach.

CHAPTER 5: CONCLUSION & DISCUSSIONS

5.1 Summary

This study demonstrates that there are different techniques for measuring merger and consolidation of banks' performance, each with its benefits and setbacks. The determination of the strategies for estimation is significant to the outcomes drawn, consequently ought to be chosen with extraordinary care. Based on the main objectives of this study, which is to evaluate the efficiency of Malaysian banks after the merging exercise had taken place mainly by using Data Envelopment Analysis (DEA) and Financial Ratio methods, as well as compare and contrast the difference in the findings. After the application of the Data Envelopment Analysis (DEA) methods in evaluating the efficiency of the banks, the major findings from the results significantly proved that, after the merger and consolidation of the domestic banks, which occurs after the financial crisis, that forced the Central Bank of Malaysia (Bank Negara Malaysia (BNM)) to enforce a merger policy to encourage the affected local banks to merge in order to compete with the foreign banks, since they were not affected by the financial crisis. The financial performance of seven banks has been proven to be efficient during some subsequent years. According to Khoon and Mah-Hui (2010), Sufian (2009) and Guisse (2012), Bank Negara Malaysia (BNM) and Bank's financial statements, (2010) stated that, the banks were able to achieved efficiency in some years due to significant improvement and enhancement of banks operations which positively affected banks' technical efficiency.

However, in some of the years for the respective banks, the efficiency of the financial performance has not reached its optimum level, proven to be less efficient due to inadequate performance of some inputs (independent variables). Which according to Hazzi and Kilani (2013), Khoon and Mah-Hui (2010), Bank Negara

Malaysia, and Bank's Annual Reports, the less efficiency eventually occurred as a result of the large number of non-performing loans, significant losses from investments and liquidating of assets to recover from the severe losses after the 2008 global financial crisis, and later leading to high borrowing from Bank Negara Malaysia. Khoon and Mah-Hui (2010), Abidin and Rasiah (2009), Sufian (2009) and Guisse (2012), proved that, after the global financial crisis in 2008 which originated from the United States and spread across the world including Asian, this affected Malaysian financial sector (including financial and non-financial institutions). This lead to huge losses in the industry due to the high number of non-performing loan, huge funds in an investment, of which the banks struggle to recover back. Further implying that, even after the crisis, the banks experienced some loss from non-performing loans, insufficient liquid assets etc. in some years of operation. And again, based on the respective annual reports on the examine banks (except Affin Bank Berhad), almost all the fixed assets of the banks were less efficiency due to accumulated impairment losses from the property, plant and equipment that indicating a reduction in the recoverable amount of fixed below the book value. These findings aligned with the results of Data Envelopment Analysis (DEA) in this study.

While after the application of the Financial Ratio method, the findings indicate that, more than half of the seven banks obtain efficiency (financial performance) during the subsequent years, due to a combination of the banking assets and services, interbank business transactions, and also significant enhancement of banks technical efficiency which positively affected overall efficiency (Khoon & Mah-Hui, 2010; Bank Negara Malaysia and Bank's Annual Reports; Abidin & Rasiah, 2009). Whereas, few banks (including CIMB Bank Berhad, Maybank Berhad, Hong Leong Bank Berhad, Affin Bank Berhad) failed to achieve an optimum efficiency (financial performance) was due to banks severe losses before and after merging excise took place, indicating high profit off-set the losses incur by the other merger party, total cost maximization without increasing total return, low liquidity and high credit risk (Hazzi & Kilani, 2013; Abidin & Rasiah, 2009; Sufian, 2009 & 2010; Guisse, 2012; Bank Negara Malaysia, & Bank's Annual Reports). For both methods of evaluating, it is clear that almost all the banks achieve a better efficiency during

the subsequent years (from 2007 to 2015). With this finding, the main objectives of this study have been answered significantly.

5.2 Policy Implications

In reference to the major findings, which has been found and highlighted in chapter 4 and also in the summary above, this study encourages Bank Negara Malaysia (BNM) should further educate the banks towards assets and liability management, so that to avert the problem of negative slack movement (related to its input affected area). Moreover, Bank Negara Malaysia (BNM) may consider helping to improve the performance of the banks by raising the risk weighted capital adequacy requirement, so that, the banks may be able to meet their short term obligation in the moment of crisis. This however may help improve the banks solvency. Guisse (2012), International Monetary Fund Malaysia (2013) and Bank Negara Malaysia (2015), further emphasize on the need to increase the risk weighted capital adequacy ratio. Mukhtar Malik Hussain (Chief Executive Officer of HSBC Bnak Malaysia Berhad, 2016) also highlight on the importance of the risk weighted capital adequacy requirement, claiming that, the minimum capital requirement improve market discipline, that adjusting the requirement to enable make to hold enough capital to run their business will not only improve businesses but it gives the banks more financial stability.

Bank Negara Malaysia should increase the incentives (funds) to the less efficient banks to offset their losses. And lastly, affected banks should create more attractive products and services to attract loyal customers. Lee and Feick (2001), and Kandampully (1998) showed that, there is positive relationship between bank's financial products and liquid assets, indicating that, the more attractive banks' financial products are to customers, the more liquid its assets. This is because if the financial products are attractive to customers, buy and selling of the financial products will increase, which, however, will help increase the bank efficiency in terms of financial performance.

5.3 Limitation

This study only emphasizes on technical efficiency, while productivity efficiency and other types of efficiencies were not included in the scope of study. Moreover, variables such as taxation and regulation indicators, indicators of the quality of the offered services and expenses paid to bank management were also not included as the main variables in this study. Furthermore, the bank size between large, medium and small or the bank profitability between high and low also related to merger of banks, has not been emphasized in this research (Sufian 2004; Cabanda & Pascual, 2007).

5.4 Recommendations

This study recommends future researchers who will be undertaking a similar research to focus more on the other types of efficiency (such as productivity, operating efficiencies, etc.) on their studies and do some comparison, or do analysis on the bank's performance as a whole. Moreover, future researchers can do more detailed analysis of the variables that affect the bank's efficiency and compare with the main components of this study regarding each of the banks efficiency.

REFERENCES

Ab Rahim, R. (2015). Ranking of malaysian commercial banks: super-efficiency data envelopment analysis (DEA) approach. *Asian Academy of Management Journal of Accounting and Finance (AAMJAF)*, *11*(1).

Abd-Kadir, H., Selamat, Z., &Idros, M. (2010). Productivity of Malaysian banks after mergers and acquisition. *European Journal of Economics, Finance and Administrative Sciences,* 24(1).

Abidin, M. Z., & Rasiah, R. (2009). The global financial crisis and the Malaysian economy: impact and responses. *Kuala Lumpur: UNDP Malaysia*, 7 (2).

Aboody, D., Barth, M. E., & Kasznik, R. (1999). Revaluations of fixed assets and future firm performance: Evidence from the UK. *Journal of Accounting and Economics*, *26*(1), 149-178.

Acharya, V. V., Saunders, A., & Hasan, I. (2002). The effects of focus and diversification on bank risk and return: evidence from individual bank loan portfolios.

Ada, A. A., & Dalkılıç, N. (2014). Efficiency analysis in Islamic banks: A study for Malaysia and Turkey. *Journal of BRSA Banking and Financial Markets*, *8*(1), 9-33.

Adusei, M. (2016). Determinants of bank technical efficiency: Evidence from rural and community banks in Ghana. *Cogent Business & Management,* vol *3, 1-15.*

Alrafadi, K. M., Kamaruddin, B. H., & Yusuf, M. (2014). Efficiency and determinants in Libyan banking. *International Journal of Business and Social Science, 5(5), 156-168*.

Asimakopoulos, I. G., Brissimis, S. N., & Delis, M. (2008). The efficiency of the Greek banking system and its determinants. *Economic Bulletin*, 30(5), 7-27.

Al-Tamimi, H., & Hussein, A. (2010). Factors influencing performance of the UAE Islamic and conventional national banks. *Global Journal of Business Research*, 4(2), 1-9.

Alzubaidi, H., & Bougheas, S. (2012). *The impact of the global financial crisis on European Banking Efficiency* (No. 12/05).

Amel, D., Barnes, C., Panetta, F., & Salleo, C. (2004). Consolidation and efficiency in the financial sector: A review of the international evidence. *Journal of Banking & Finance*, 28(10), 2493-2519.

Andrade, G., Mitchell, M. L., & Stafford, E. (2001). *New evidence and perspectives on mergers*, 15(2), 103-120.

Andrade, G., Mitchell, M. L., & Stafford, E. (2001). New evidence and perspectives on mergers, 01-070.

Andrews, M. (2006). Issuing Government Bonds to Finance Bank Recapitalization and Restructuring: Design Factors That Affect Banks' Financial Performance. *Bank Restructuring and Resolution*, 3(4), 119-141.

Ariff,M., Setapa, A., & Lin, E.Y.S. (2011).III. Governance Re-Invented: Progress, Constraints, and remaining afenda in bank and corporate restructuring in Malaysia.

Babatunde, O. S., Oguntunde P. E., Ogunmola A. O & Balogun O. S. (2014). On the Performance of RESET and Durbin Watson Tests in Detecting Specification Error, *International Journal of Modern Mathematical Sciences, 11*(3), 144-151.

Baharuddin, N. S., & Azmi, S. N. A, (2015). The Determinants Of Financial Industry Profitability In Malaysia, 9-14.

Balachandher, K. G., Kathireson, S., Murugesu, T., &Ramasamy, S. (2015). Application of the Transportation Algorithm for Selecting Bank Merger Partners. *Journal of Internet Banking & Commerce*, 20(2).

Baluch, C., Burgess, D., Cohen, R., Kushi, E., Tucker, P. J., & Volkan, A. (2010). Consolidation theories and push-down accounting: Achieving global convergence. *Journal of Finance and Accountancy*, *3*(1), 2-5.

Baluch, C., Burgess, D., Cohen, R., Kushi, E.,Tucker, P. & Volkan, A. (2010). Consolidation theories and push-down accounting: Achieving global convergence. *Journal of Finance and Accountancy*, 3, 1-12.

Berger, A. and Humphrey D. (1997), Efficiency of Financial Institutions: International Survey and Direction for Future Research, *European Journal of Operation Research*, 98, 175-212.

Berger, A. N., Demsetz, R. S., & Strahan, P. E. (1999). The consolidation of the financial services industry: Causes, consequences, and implications for the future. *Journal of Banking & Finance*, *23*(2), 135-194.

Berger, A. N., Hancock, D., & Humphrey, D. B. (1993). Bank efficiency derived from the profit function. *Journal of Banking & Finance*, *17*(2), 317-347.

Berger, A. N., Hunter, W. C., & Timme, S. G. (1993). The efficiency of financial institutions: A review and preview of research past, present and future. *Journal of Banking & Finance*, *17*(2), 221-249.

Bhagavath, V. (2006). Technical efficiency measurement by data envelopment analysis: An application in transportation. *Alliance Journal of Business Research*, *2*(1), 60-72.

Bhatia, A., & Mahendru, M. (2015). Assessment of technical efficiency of public sector banks in India using data envelopment analysis. *Eurasian Journal of Business and Economics*, 8(15), 115-140.

Boot, A. W. (1999). European lessons on consolidation in banking. *Journal of Banking & Finance*, 23(2), 609-613.

Burger, A. & Moormann, J. (2008). Productivity in Banks: Myths & Truths of the Cost Income Ratio. *Banks and Bank Systems*, 3(4), 85-94.

Bhagavath, V. (2006). Technical efficiency measurement by data envelopment analysis: An application in transportation. *Alliance Journal of Business Research*, *2*(1), 60-72.

Cabanda, E. & Pascual, M.P. (2007). Merger Merger In The Philippines: Evidence In The Corporate Performance Of William, Gothong, And Aboitiz (WG&A) Shipping Companies. *Journal of Business Case Studies*, 3(4), 87-100.

Chee, K. C., Yusop, Z., Siong, H. L., & Liew, V. K. S. (2005). Financial development and economic growth in Malaysia: *The stock market perspective*, 2(4), 178.

Chen, T. Y., & Yeh, T. L. (1998). A study of efficiency evaluation in Taiwan's banks. *International Journal of Service Industry Management, 9*(5), 402-415.

Chen, M. L., & Chen, R. (2008). Economic Entity Theory: Non-Controlling Interests and Goodwill Valuation. *Journal of Finance and Accountancy,* 1, 1-8.

Chong, B. S., Liu, M. H., & Tan, K. H. (2006). The wealth effect of forced bank mergers andcronyism. *Journal of Banking & Finance, 30*(11), 3215-3233.

Drake, L., & Hall, M. J. (2003). Efficiency in Japanese banking: An empirical analysis. *Journal of Banking & Finance, 27*(5), 891-917.

Demir, N., Mahmud, S. F., & Babuscu, S. (2005). The technical inefficiency effects of Turkish banks after financial liberalization. *The Developing Economies*, XLIII(3), 396-411.

Deng, Q., Wong, W. P., Wooi, H. C., & Xiong, C. M. (2011). An engineering method to measure the bank productivity effect in Malaysia during 2001-2008. *Systems Engineering Procedia,* 2, 1-11.

Doytch,N., &Cakan,E. (2011) . Growth Effects of Mergers and Acquisitions: A Sector-levelStudy of OECD countries. *Journal of Applied Economics and Business Research,* 1(3), 120-129.

Drehmann, M., Sorensen, S., & Stringa, M. (2010). The integrated impact of credit and interest rate risk on banks: A dynamic framework and stress testing application. *Journal of Banking & Finance,* 34(4), 713-729.

Dutz, M. A. (1989). Horizontal mergers in declining industries: Theory and evidence. *International Journal of Industrial Organization, 7*(1), 11-33.

Ebrahimi, M. A.A., &Kordlouie,H.R.(2015).Comparing relationship between quality of earnings and stock return of companies listed in tehran stock exchange. *International Journal of Management, Accounting and Economics,* 2(5), 2383-2126.

Edwards, C. D. (1955). Conglomerate bigness as a source of power. *In Business concentration and price policy*. Princeton University Press, 331-359.

Emrouznejad, A., & Podinovski, V. (Eds.). (2004). *Data envelopment analysis and performance management*. Aston Business School, Aston University.

Emrouznejad, Ali, and Emilyn Cabanda, (2013). "Introduction to data envelopment analysis and its applications." Handbook of Research on Strategic Performance Management and Measurement Using Data Envelopment Analysis, 235.

Erkoc. T. E. (2012).Estimation Methodology of Economic Efficiency: Stochastic Frontier Analysis vs Data Envelopment Analysis. *International Journal of Academic Research in Economics and Management Sciences,* 1(1), 1.

Erkut, D., & Hatice, D. (2007). Measuring the performance of manufacturing firms with super slacks based model of Data Envelopment Analysis: an application of 500 major industrial enterprises in Turkey. *European Journal of Operational Research*, 182(3), 1412-1432.

European Commission (1997). "Impact on services: Credit institutions and banking." Single Market Review Subseries. *Office for Official Publications of the European Communities and Kogon Page Earthscan, London*, 2(4), 451-468.

Färe, R., & Lovell, C. K. (1978). Measuring the technical efficiency of production. *Journal of Economic theory*, *19*(1), 150-162.

Farrell, M. J. (1957). The measurement of productive efficiency. *Journal of the Royal Statistical Society. Series A (General)*, *120*(3), 253-290.

Farrell, M. J. (1957). The measurement of productive efficiency. *Journal of the Royal Statistical Society. Series A (General)*, *120*(3), 253-290.

Fatulescu,P.(2013). A dea-sfa comparison of the impact of ict's utilization. *European Scientific Journal*, 24-26.

Fiebiger, B., Fullwiler, S., Kelton, S., & Wray, L. R. (2012). Modern Monetary Theory: A Debate. *University of Massachusetts Amherst working paper series*, 279, 1-32.

Fixler, D. J., & Zieschang, K. D. (1993). An index number approach to measuring bank efficiency: An application to mergers. *Journal of Banking & Finance*, *17*(2-3), 437-450.

Flamini, V., Schumacher, M. L., & McDonald, M. C. A. (2009). The determinants of commercial bank profitability in Sub-Saharan Africa. *International Monetary Fund, 9-15.*

Friedman, L., & Sinuany-Stern, Z. (1998). Combining ranking scales and selecting variables in the DEA Context: the case of industrial branches. *Computers & Operations Research*, 25(9), 781-791.

Fullwiler, S. T. (2010). Modern monetary theory-a primer on the operational realities of the monetary system. Available at SSRN 1723198.

Gachanja, R. (2013).Merger and Acquisition strategies and performance of commercial banks in Kenya. *A Research Project Submitted In Partial Fulfilment of The Requirement Award of the Degree of Master of Business Administration, School of Business, University of Nairobi*.

Gelos, R.G., & Roldo, J. (2013).Consolidation and market structure in emerging market banking systems. *Emerging Markets Review*, 5, 39–59.

Gelos, R. G., &Roldós, J. (2004). Consolidation and market structure in emerging market banking systems. *Emerging Markets Review*, *5*(1), 39-59.

Gennaioli, N., Martin, A., & Rossi, S. (2014). Banks, government bonds, and default: what do the data say? *European Corporate Governance Institute (ECGI)-Finance Working Paper*, 14(120), 1-54.

Guisse, M. L. (2012). *Financial performance of the Malaysian banking industry: Domestic vs foreign banks* (Doctoral dissertation, Eastern Mediterranean University (EMU)).

Gunther, J. W., & Robinson, K. J. (1999). Industry mix and lending environment variability: What does the average bank face?. *Economic & Financial Review*, 1-24.

Gupta, P. K. (2013). Merges and Acquisitions (M&A): The Strategic Concepts for the Nuptials of Corporate Sector. *Innovative Journal of Business and Management*, 1(4), 60-68.

Gupta, P. K. (2013). Mergers and acquisitions (m&a): The strategic concepts for the nuptials of corporate sector. *Innovative Journal of Business and Management, 1*(4), 64-65.

Guru, B. K., Kathireson, S., Murugesu, T., & Ramasamy, S. R. (2015). Application of the Transportation Algorithm for Selecting Bank Merger Partners. *An open access journal, Vol 20, Issue 2,1000106*

Gyimah, S.F. & Oscar, A.J. (2011). Effects of Share Pricing on Firms' Performance in Ghana. *Journal of Economics and Sustainable Development*, 2(4), 140-153.

Har, W. M., Ee, C. S., & Tan, C. T. (2008). Stock Market and Economic Growth in Malaysia: Casuality Test. *Asian Social Science*, 4(4), 86-92.

Hassan, Y., & Aminu, D. S. (2015). Mergers and Acquisitions in the Banking Sector and Implications for Return on Equity (ROE): Evidence from Nigeria. *International Journal of Business and Social Science*, 6(9), 184-191.

Hays, F. H., De Lurgio, S. A., & Gilbert, A. H. (2009). Efficiency ratios and community bank performance. *Journal of Finance and Accountancy*, 1(1), 1-15.

Hazzi, O. A., & Kilani, M. I. A. (2013). The financial performance analysis of Islamic and traditional banks: Evidence from Malaysia. *European Journal of Economics, Finance and Administrative Sciences*, *57*, 133-144.

Hjalmarsson, L., C. Kumbhakar, S., & Heshmati, A. (1996).DEA, DFA and SFA: a comparison. *The journal of productivity analysis*, 1(7),303-327.

Ho, C-T and Zhu, D-S (2004) .Performance measurement of Taiwan's commercial banks, *International Journal of Productivity and Performance Management*, Vol. 53, No.(5/6), pp.425-434.

Huber, J. (2014). Modern Money Theory and New Currency Theory. *A Comparative Discussion, real-world economics review*, (66), 38-57.

Hughes, J. P., & Mester, L. J. (2013). Measuring the performance of banks: theory, practice, evidence, and some policy implications.

Hussain, S. (2014). The Assessment of Operational Efficiency of Commercial Banks in India Using Cost to Income Ratio Approach. *International Journal of Management and Business Research*, 4(3), 225-234.

Hutton, A. P., Marcus, A. J., & Tehranian, H. (2009). Opaque financial reports, R 2, and crash risk. *Journal of financial Economics*, 94(1), 67-86.

International Monetary Fund Malaysia, (2013). Financial System Stability Assessment, 8-12.

Ilhomovich, S. E. (2009). Factors Affecting the Performance of Foreign Bank in Malaysia ,*Doctoral dissertation, Universiti Utara Malaysia* , 1(3), 57-60.

IRŠOVÁ, Z. (2009). Measuring Bank Efficiency. *Institute of Economic Studies*. (9) 78-79

Ismail, F. B. (2007). A Study on Productivity of Malaysia's Banking Sector: Before and After Merger. *Faculty of Economics and Business with Honours*.

Ismail, M. (2009). Impact of Merger on Efficiency and Productivity in Malaysian Commercial Banks. *Journal of Economics and Finance*, 1(2), 225-231.

Ismail, M., & Rahim, H. A. (2009). Impact of merger on efficiency and productivity in Malaysian commercial banks. *International Journal of Economics and Finance*, *1*(2), 225.

Ji, K., Song, W., & Wang, R. (2012). Research on China's commercial banks rating and ranking based on DEA.

Joash, G. O., & Njangiru, M. J. (2015). The Effect of Mergers and Acquisitions on Financial Performance of Banks (A Survey of Commercial Banks in Kenya). *International Journal of Innovative Research and Development ISSN , 4(8), 2278–0211*.

Jensen, Michael C.(1984) Takeovers: Folklore and science, *Harvard Business Review,* 62(6), 1984, 109-121.

Joash,G,O., & Njangiru,M.J., (2015). The Effect of Mergers and Acquisitions on Financial Performance of Banks (A Survey of Commercial Banks in Kenya). *International Journal of Innovative Research & Development,* 4(8), 101-113.

Kandampully, J. (1998). Service quality to service loyalty: A relationship which goes beyond customer services. *Total quality management*, *9*(6), 431-443.

Karceski J., Ongena, S., & Smith, D.C. (2004). The Impact of Bank Consolidation on Commercial Borrower Welfare. *Journal of Finance*, 60(4), 2043-2082.

Keeley, M. C. (1990). Deposit insurance, risk, and market power in banking. *The American Economic Review*, 1183-1200.

Khoon, G. S., & Lim (Mah-Hui.). (2010). *The impact of the global financial crisis: the case of Malaysia*. Third World network (TWN).

King, D. R., Dalton, D. R., Daily, C. M., & Covin, J. G. (2004). Meta-analyses of post-acquisition performance: Indications of unidentified moderators. *Strategic management journal*, 25(2), 187-200.

Kolapo, T. F., Ayeni, R. K., & Oke, M. O. (2012). Credit risk and commercial banks' performance in Nigeria: a panel model approach. *Australian Journal of Business and Management Research*, 2(2), 31-38.

Kolapo, F. T., & Adaramola, A. O. (2012). The impact of the Nigerian capital market on economic growth (1990-2010). *International Journal of Developing Societies*, 1(1), 11-19.

Kosmidou, K. (2008). The determinants of banks' profits in Greece during the period of EU financial integration. *Managerial Finance*, 34(3), 146-159.

Kosmidou, K., Pasiouras, F. & Floropoulos, J. (2004). Linking profits to asset-liability management of domestic and foreign Banks in the UK, *Applied Financial Economics*, 14, 1319-1324.

Kowalik, M., Davig, T., Morris, C. S., & Regehr, K. (2015). Bank Consolidation and Merger Activity Following the Crisis. *Economic Review - Federal Reserve Bank of Kansas City*,2-3, 31-49.

Kumbirai, M and Webb, R (2010). A financial Ratio Analysis of Commercial Bank Performance in South Africa, *African Review of Economics and Finance*, 2(1), 30-53.

Laeven, L., & Valencia, F. (2008). Systemic banking crises: A new database. *IMF working papers*, 1-78.

Lai, K. Y., Ling, T. P., Eng, T. K., Cheng, L. S., & Ting, L. F. (2015). Financial Performance of Malaysia Local Banks: During Periods of Pre-Merger and Post- Merger. *Journal of Economics, Business and Management, l3(9), 826-830*.

Lee, J., Lee, J., & Feick, L. (2001). The impact of switching costs on the customer satisfaction-loyalty link: mobile phone service in France. *Journal of services marketing*, *15*(1), 35-48.

Leland (2007). Financial Synergies and the Optimal Scopeof the Firm: Implications for Mergers, Spinoffs, and Structured Finance. *The Journal of Finance*. 2(2), 765-807.

Lema, T. Z. (2017). Determinants of bank technical efficiency: Evidence from commercial banks in Ethiopia. *Cogent Business & Management (2017), vol 4, 1-13*

Lin, T. Y., & Chang, M. Y (2013). The influence of mergers & acquisitions on the management performance of financial institutions in the Taiwan region. *Problems and Perspectives in Management,* 11(4).

Lin, L. C., & Tseng, L. A. (2005, September). Application of DEA and SFA on the measurement of operating efficiencies for 27 international container ports. *In Proceedings of the Eastern Asia Society for Transportation Studies*. 5, 592-607.

Ludwin, W. G., & Guthrie, T. L. (1989). Assessing productivity with Data Envelopment Analysis. *Public Productivity Review,* 12(4), 361-372.

Maea, S. F. (2010). The efficiency of the commercial banks in six Pacific Island countries*: A dissertation in partial fulfilment of the requirements for the degree of Doctor in Philosophy, Banking Studies, School of Economics and Finance, Massey University, Palmerston North, New Zealand (Doctoral dissertation, Massey University).*

Malaysia, Bank Negara (2011). Financial sector blueprint 2011–2020.

Manne, H. G. (1965). Mergers and the market for corporate control. *The Journal of Political Economy*, p110-120.

Marcus, A.J. (1984). Deregulation and bank financial policy, *Journal of Banking and Finance* **8**, 557-565.

Markowitz, H. M. (1991). Foundations of portfolio theory. *The journal of finance*, *46*(2), 469-477.

Mat-N, F., Mohd Said, R., & Hisham, M. (2006). Financial performance and efficiency changes of Malaysian banking institutions in mergers and acquisitions. Bank and Bank Systems, 1(1), 102-109.

Mat-Nor, F., Mohd Said, R., Wah low,S., & Abdul Rahaman, A. (2008). The Efficiency Effects of Mergers and Acquisitions in Malaysian Banking Institutions. *Asian Journal of Business and Accounting*, 1(1), 47-66.

Méon, P. G., & Weill, L. (2005). Can mergers in Europe help banks hedge against Macroeconomic risk? Applied Financial Economics, 15(5), 315-326.

Meglio, O., & Risberg, A. (2010). Mergers and acquisitions—Time for a methodological rejuvenation of the field? *Scandinavian Journal of Management*, *26*(1), 87-95.

Miller, S. M., & Noulas, A. G. (1996). The technical efficiency of large bank production. *Journal of Banking & Finance*, *20*(3), 495-509.

Morita, H., & Avkiran, N. K. (2009). Selecting inputs and outputs in data envelopment analysis by designing statistical experiments. *Journal of the Operations Research Society of Japan*, 52(2), 163-173.

Mousa, G. A. (2015). Financial Ratios versus Data Envelopment Analysis: The Efficiency Assessment of Banking Sector in Bahrain Bourse. International Journal of Business and Statistical Analysis, 2(2), 75-84.

Nadia Straton. (2009). Reasons Behind Merging Activity In Europe. A Study of Cross Border Acquisitions: Why Companies From Western Europe Acquire Ukrainian Business? , *Thesis in Finance and International Business*. *University of Aarhus*.

Nazim, A., & Ahmad, S. (2013). A Comparison between ordinary least square (OLS) and structural equation modeling (SEM) methods in estimating the influential factors of 8th grades student's mathematics achievement in Malaysia. *International Journal of Scientific & Engineering Research*, 4 (7), 2229-5518.

Ng, K. H., Wong, S. C., Yap, P. K., & Khezrimotlagh, D. (2014). A survey on Malaysia's banks efficiency: using data envelopment analysis. *Scholars Journal of Economics Business and Management*, *1*, 586-592.

Nikolova, N., Rana, S., &Jayasooriya, I. (2010). The role of corporate culture in mergers and acquisitions-the case of Swedbank.

Odetayo, Sajuyigbe & Olowe (2013). Empirical Analysis of the Impact of Post-Merger on Nigerian Banks Profitability. Research Journal of Finance and Accounting, 4(17), 91-97.

Ogiji, F., Eza, &Richard. O. (2015).Impact of Merger and Acquisition on the Growth of Nigerian Banking Industry. *Research Journal of Finance and Accouting*.13 (6), 2222-2484.

Ogilo, F., & Mugenyah, L. O. (2015). Determinants of Liquidity Risk of Commercial Banks in Kenya. The International Journal of Business & Management, 3(9), 469-473.

Okwo, I. M., Ugwunta, D. O., & Nweze, A. U. (2012). Investment in fixed assets and firm profitability: Evidence from the Nigerian Brewery industry. *Eur. J. Bus. Manag*, *4*(20), 10-17.

Oliveira, R.S.L.P., Pedro, M.I.C., & Da Cunha Marques, R.D.R. (2015). Efficiency Evaluation of Portuguese Hotels in the Algarve using Data Envelopment Analysis (DEA). *Rev. bus. manag. São Paulo, Vol. 17, No. 54, pp. 788-805, J*

Olivero, M.P., Li, Y., &Jeon, B. N. (2011).Consolidation in banking and the lending channel of monetary transmission: Evidence from Asia and Latin America. *Journal of International Money and Finance.*30, 1034–1054.

Olokoyo, F.O. (2011). Determinants of Commercial Banks' Lending Behavior in Nigeria. *International Journal of Financial Research*, 2(2), 61-72.

Omisore, I., Yusuf, M., & Christopher, N. (2011). The modern portfolio theory as an investment decision tool. *Journal of Accounting and Taxation*, *4*(2), 19-28.

Ong, T.S. & Ng, P.P. (2013). Capital Structure Before and After Merger and Acquisition: Banking Industry in Malaysia. *International Journal of Management Sciences and Business Research*, 2(1), 1-22.

Ongore, V. O., & Kusa, G. B. (2013). Determinants of financial performance of commercial banks in Kenya. *International Journal of Economics and Financial Issues,* 3(1), 237.

Pahuja,H., and Samridhi. (2016). Impact of merger and acquisition on india economy. *International Journal Of Science Techonology And Management, 5*(1).

Pasiouras, F., Liadaki, A., & Zopounidis, C. (2008). Bank efficiency and share perfor,mance: Evidence from Greece. *Applied Financial Economics*, 7(14), 1121-1130.

Pautler, Paul A. (2001) "Recent Empirical Evidence on Mergers and Acquisitions," Antitrust Bulletin 38:4 (Winter 1993), 741-797.

Pazarskis, M., Vogatzogloy, M., Christodoulou, P. & Drogalas, G. (2000). Exploring the Improvement of Corporate Performance After Mergers-Greece. *International Research Journal of Finance and Economics*, C: VI, 184 – 192.

Pi, L., & Timme, S. G. (1993). Corporate control and bank efficiency. *Journal of Banking & Finance*, *17*(2), 515-530.

Rani, A. (2012). The modern portfolio theory as an investment decision tool. *International Journal of Management Research and Reviews*, *2*(7), 1164.

Rao-Nicholson, R., Salaber, J., & Cao, T. H. (2016). Long-term performance of mergers and acquisitions in ASEAN countries. *Research in International Business and Finance*, 36, 373-387.

Raquib, M. A., Musif, M. P. B., & Mohamed, M. B. (2003). Strategic Issues Relating to Corporate Mergers and Acquisitions for Small and Medium Companies-A Thoughtful Analysis from the Viewpoint of Challenges of Changes. *Asia Pacific Management Review*, *8*(1), 99-111.

Rarooq, U., Maqbool, M.Q., Humanyun, A.A., Nawaz, M.S., Abba, M. (2015). An Empricial Study on Impact Liquidity Risk Management on Firm Performance in the Conventional Banking of Pakistan. *IOSR Journal of Business and Management*, 17(2), 110-118.

Rasiah, D., Ming, T. T., & Hamid, A. H. B. A. (2014). Mergers Improve Efficiency of Malaysian Commercial Banks. *International Journal of Economics and Finance*, 6(8), 289.

Rengasamy, D. (2014). Impact of Loan Deposit Ratio (LDR) on Profitability: Panel Evidence from Commercial Banks in Malaysia. *Proceedings of the Third International Conference on Global Business, Economics, Finance and Social Sciences (GB14Mumbai Conference) Mumbai, India*, 1-12.

Roover. T. D., & Lepoutre. H. (2011). Effect of Bank Mergers on Shareholder Wealth. *Faculty of economics and business from University of Ghent*.

Saad, N. M. (2013).Government Bonds Performance in Malaysia. *Journal of Entrepreneurship and Business*, 1(1), 52-60.

Said, R.M., Nor, F.M., Low, S.W., & Rahman, A.A. (2008). The Efficiency Effects of Mergers and Acquisitions in Malaysian Banking Institutions. *Asian Journal And accounting*, 1(1). 47-66.

Salami, O. L., & Adeyemi, A. A. (2015). Malaysian Islamic Banks'efficiency: An Intra-Bank Comparative Analysis Of Islamic Windows And Full-Fledged Subsidiaries. *International Journal of Business and Society*, *16*(1), 19.

Samad, A. & Hassan, M.K. (1999). The Performance of Malaysian Islamic Bank during 1984-1997: An Exploratory Study. *International Journal of Islamic Financial Services,* 1(3),

Samuel, O. L. (2015). The effect of credit risk on the performance of commercial banks in Nigeria. *African Journal of Accounting, Auditing and Finance,* 4(1), 29-52.

Shahooth, K., & Battall, A. H. (2006). Using data envelopment analysis to measure cost efficiency with an application on Islamic banks. *Scientific Journal of Administrative Development, 4*(6), 134-156.

Shimomoto, Y. (1999). The capital market in Malaysia. *Asian Development Bank, Manilla*.

Singh, D., & Kohli, G. (2006). Evaluation of private sector banks in India: A SWOT analysis. *Journal of Management Research*, *6*(2), 84.

Singh, G., & Gupta, S. (2015). An Impact of Mergers and Acquisitions on Productivity and Profitability of Consolidation Banking Sector in India. *Management & Technology*, 4(9), 33-48

Sinha, R. P. (2016). Benchmarking with a Dynamic DEA Model: Evidence from Indian Banking Sector. *IUP Journal of Bank Management*, *15*(3), 7.

Srivastava, C. (2016).Nexus between merger, acquisitions and complete law. *Bharati Law Review*. 89-112.

Stiglitz, J. E., & Uy, M. (1996). Financial markets, public policy, and the East Asian miracle. *The World Bank Research Observer*, 11(2), 249-276.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American economic review*, 71(3), 393-410.

Stiroh, K. J. (2004). Diversification in banking: Is noninterest income the answer? *Journal of Money, Credit, and Banking*, 36(5), 853-882.

Stiroh, K. J., & Rumble, A. (2006). The dark side of diversification: The case of US financial holding companies. *Journal of banking & finance*, 30(8), 2131-2161.

Sufian, F. (2004). The Efficiency Effects of Bank Mergers and Acquisitions in a Developing Economy: Evidence from Malaysia. *International Journal of Applied Econometrics and Quantitative Studies*, 1(4), 53-74.

Sufian, F. (2009). Assessing the impact of mergers and acquisitions on bank profit efficiency: Empirical evidence from Malaysia. IJDSRM *International Journal of Decision Sciences, Risk and Management*, 1(3/4), 258.

Sufian, F. (2009). Determinants of bank efficiency during unstable macroeconomic environment: Empirical evidence from Malaysia. *Research in International Business and Finance*, *23*(1), 54-77.

Sufian, F. (2010). Developments in the performance of the Malaysian banking sector: opportunity cost of regulatory compliance. *International Journal of Business Competition and Growth*, *1*(1), 85-103.

Sufian, F., Muhamad, J., Bany-Ariffin, A. N., Yahya, M. H., & Kamarudin, F. (2012). Assessing the effect of mergers and acquisitions on revenue efficiency: Evidence from Malaysian banking sector. *Vision: The Journal of Business Perspective*, *16*(1), 1-11.

Szabó, R. (2015). Efficiency of the Financial Services Institution. *Proceedings of FIKUSZ 2015*, 219.

Tawose, J. O. B. (2012). Effects of bank credit on industrial performance in Nigeria. *International Business and Management*, 4(2), 158-168.

Thanassoulis, E. (1993). A Comparison of Regression Analysis and Data Envelopment Analysis as Alternative Method for Performance Assessment. *Operation Research Society Limited*, 44(11), 1129-1144.

Tesfay, T. (2016). Determinants of Commercial Banks Efficiency: Evidence from Selected Commercial Banks of Ethiopia. *International Journal of Scientific and Research Publications, vol 6, 551-556.*

Toyin, E. O., & Tajudeen, A., A, (2014). Investment in fixed assets and firm profitability: Empirical evidence from the Nigerian banking sector. *Asian Journal of Social Sciences and Management Studies,* 1(3), 78-82.

Trautwein, F. (1990). Merger motives and merger prescriptions. *Strategic management journal*, *11*(4), 283-295.

Tugas, F. C., CISA, CPA. (2012). A Comparative Analysis of the Financial Ratios of Listed Firms Belonging to the Education Subsector in the Philippines for the Years 2009-2011. *International Journal of Business and Social Science,* 3(21), 173-190.

Ugrinowitsch, C., Fellingham, G. W., &Ricard, M. D. (2004). Limitations of ordinary least squares models in analysing repeated measures data. *Medicine and science in sports and exercise, 36,* 2144-2148.

Viverita, L. (2008). The Effect of Mergers on Bank Performance: Evidence from Bank Consolidation Policy In Indonesia. *International Review of Business Research Papers Vol. 4 No, 4*, 376-77.

Wei, C. K., Chen, L. C., Li, R. K., Tsai, C. H., & Huang, H.L. (2012). A study of optimal weights of Data Envelopment Analysis – development of a context-dependent DEA-R Model. *Expert Systems with Applications*, 39(4), 4599-4608.

Woodbury, K., & Dollery, B. (2004). Efficiency measurement in Australian local government: The case of New South Wales municipal water services. *Review of Policy Research*, *21*(5), 615-636.

Yu, Y. S., Barros, A., Tsai, C. H., Liao, K. H. (2014). A comparison of ratios and Data Envelopment Analysis: efficiency assessment of Taiwan public listed companies. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 4(1), 212–219.

Yusuf, H., & Sheidu, A. D. (2015). Mergers and Acquisitions in the Banking Sector and Implications for Return on Equity (ROE): Evidence from Nigeria.