THE EFFECT OF CREDIT RISK MANAGEMENT (CRM) ON THE PROFITABILITY OF COMMERCIAL BANKS IN MALAYSIA

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due 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 17,592 words.

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LIST OF ABBREVIATIONS

BLUE	Best Linear Unbiased Estimator
BNM	Bank Negara Malaysia
BPLM	Breusch and Pagan Lagrange Multiplier
BS	Bank Size
CLA	Cost per Loan Asset
CLRM	Classical Linear Regression Model
CRM	Credit Risk Management
CV	Control Variable
DR	Default Rate
E	Error Terms
FEM	Fixed Effects Model
JB	Jarque-Bera
LF	Liliefors
NPL	Non-Performing Loan
NSE	Nigerian Stock Exchange
OLS	Ordinary Least Square
POLS	Pooled Ordinary Least Square
r	Correlation Coefficients
REM	Random Effects Model
ROA	Return on Assets
ROCE	Return on Capital Employed
ROE	Return on Equity
TETA	Total Equity to Total Assets
TOL	Tolerance Factor
VaR	Value at Risk
VIF	Variance Inflation Factor

PREFACE

Credit risk is the possibility of bank facing losses when the borrower unable to repay the loan provided by bank. It considered as one of the risk usually faced by bank which will affect the gain. Hence, Malaysia commercial banks have took serious actions for controlling the credit risk confronted.

In this research we would like to prove that the credit risk management will really affect the profitability of Malaysia commercial banks. Return on asset (ROA) had been used as the dependent variable for measuring the banks' profitability. At the same time, the independent variables involved are default rate (DR), total equity to total asset (TETA) and cost per loan asset (CLA). One control variable, bank size (BS) have been added in the model. We focus on the eight local banks in Malaysia while the data have been collected since year 2001 to year 2016.

It is not an easy task for us to complete this research. However, those challenges have been overcome through ours collaboration. Our determination enhance us continuing the research. We believe that our hard work will be paid off instead of waste. We sincerely hope that our research able to help us or others to understand more about the credit risk management effect on profitability of bank. We also hope that the limitation and recommendation in this project can as a reference to the other researchers in their relevant research.

ABSTRACT

The main purpose of this study is to examine the effect of Credit Risk Management (CRM) on profitability (ROA) of commercial banks in Malaysia from the period of 2001 to 2016. This study focuses on 8 local commercial banks which are Affin Bank, Alliance Bank, AmBank, CIMB Bank, Hong Leong Bank, Maybank, Public Bank, and RHB Bank. This study is used Pooled Ordinary Least Square to use to regress the balanced panel data. The dependent variable used in this research is return on assets (ROA) and independent variables are default rate (DR), total equity to total asset (TETA), and cost per loan asset (CLA). The only control variable in this research is bank size (BS). From the empirical results, it show that default rate, total equity to total asset and bank size have a significant impact on return on assets of commercial banks in Malaysia while cost per loan asset has insignificant impact on return on asset of commercial banks in Malaysia. Moreover, there have a positive relationship between return on assets of commercial banks in Malaysia and default rate, cost per loan asset, and bank size. On the other hand, there is a negative relationship between return on asset of commercial banks in Malaysia and total equity to total asset.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

For this chapter, the aim is to discuss fundamental characteristics of the topic chosen and some intentions of conducting this research. There are several parts to be discussed in this chapter. This includes the research background explaining about the background of commercial banks, different risks encountered by banks as well as credit risk management. It will be followed by problem statement, research questions, research objectives and hypotheses as a guidance in carrying out this research. Next, significance of study will be provided to show the contribution of this study, followed by chapter layout which provides an outline of the whole research and ended with conclusion.

1.1 Research Background

Commercial banks act as a financial intermediary to receive the funds deposited by the customers and give out loans to the borrowers for their further actions such as hire purchase, housing loan, personal loan and credit card loan. Other than the earnings received from investments, the profitability of a bank is also based on the loans that it gives to its. However, a bank may face the risk caused by borrower if the borrower is unable to fulfil its loan obligations and therefore turning the loan into a bad debt. This will cause the bank to incur a loss on the fund and interest charged to the borrower.

Risk is defined as an uncertain future event that could affect the realisation of the objectives that may be caused by ambiguity or lack of information (Au Yong, 2014). Commercial banks are exposed to various risks. For example, credit risk, operational risk, market risk, and interest rate risk. Veizi, Mano and Koçiu (2016) stated that credit risk is the greatest risk among the other risks which can affect the bank's financial performance.

Credit risk is the risk in which borrower might be unable to repay the loan and cause the lender to suffer from the loss of the principal together with the interest associated. The default of a small group of borrowers could cause a huge loss and in an extreme case, it could lead the bank to become insolvent (Tefera, 2011). Therefore, the bank needs to always investigate the background of the potential borrower before proceeding with the loan process as well as to monitor the repayment status of the borrower consistently in order for the bank to protect its interest and the wealth of its depositors and shareholders.

Credit risk management (CRM) is a practice of reducing the losses of the lender by understanding whether a bank's capital and loan loss reserves are adequate at any time period. It is a robust process that allows the bank to manage the loan portfolios proactively so that the losses can be minimized and satisfactory return can be earned by depositors (Bizuayehu, 2015).

The effectiveness of CRM has a huge impact towards the profitability, solvency, loan portfolio, liquidity and financial leverage of the commercial banks in all countries (Tefera, 2011). The importance of CRM towards the banks and policy makers is that a strong banking system can promote the country's financial stability and improve the economic flexibility which can cope with the economic crises (Tafri, Hamid, Meera & Omar, 2009).

When a bank's credit risk is well-managed, the profitability of the bank will increase. This is due to the risk that a borrower unable to repay the principal and interest will be reduced. When the profit of the bank is increased, it will not lead the bank to the banking crisis and bring economy into systematic crisis (Noman, Pervin, Chowdhury & Banna, 2015). However, improper CRM will reduce the bank's profitability. This will affect the quality of the bank's assets as well as increase the loan losses and non-performing loan (NPL) which may cause financial distress (Duaka, 2015).

Different countries have conducted study on the impacts of CRM on the profitability. For example, the research done by Achou and Tenguh (2008) found that the profitability which indicates the bank performance and CRM in terms of loan performance have a significant relationship between them. Besides, the researchers such as Ara, Bakaeva and Sun (2009) and Li and Zou (2014) have analysed the relationship between CRM and profitability of Sweden and Europe commercial banks respectively. At the end of their research, they found that CRM has a positive effect on the profitability of the banks.

There are past research being done in Malaysia but the study was focusing on the risk management on commercial banks which do not focus specifically on CRM. Therefore, in this research, the extent to which CRM will affect the profitability of Malaysian local commercial banks will be discussed.

1.2 Problem Statement

Credit risk is the risk of a counterparty neglecting to carry out its obligations under the contract. Throughout the years, the nature, difficulty and measure of credit risk by financial institutions have advanced in the midst of significant changes to the Malaysian financial landscape. Hence, CRM plays a significant role to ensure

sustainable development of financial institutions because it is an essential part of the loan process (Kurawa & Garba, 2014). This risk was more prominent among other types of risk, specifically after the global economic crisis had happened. The financial healthiness of a financial institution will be indicated by the sign of credit quality because the primary business activity of a bank is to supply credit to borrowers.

A noticeable consequence of the global economic crisis is it will cause banks to suffer from serious pressure to come out with better CRM strategies. As the administrative bodies were searching for higher protections of liquidity and capital requirements, the cost of managing an account business is rising worldwide. Njanike (2009) stated that the poor CRM system is the main reason for the occurrence of banking crisis during 2003 to 2004. A study conducted by Boahene, Dasah, and Agyei (2012) also mentioned that a weak asset quality is the major factor that causes bank distress. In the past, the inefficiency of the financial institution to practice CRM produced similar issues in many countries.

Meanwhile, one of the major functions of commercial bank is to grant loans to customers and because profitability is a function of earnings resulting from viable loans and advances, an effective credit risk management is vital (Kurawa & Garba, 2014). Having an effective CRM is crucial for banks to minimize the probability of banks to face negative impacts of credit defaults. CRM helps to maintain credit risk exposure to capitalize on adjusted risk rate of return and bank risk. It enhances financial performance of bank and adjusts the risk-free rate of return by protecting banks from those negative credit risk impacts. In contrast, practicing an improper CRM could minimise the bank's profitability, affect the asset quality, and increase non-performing loan which may result in financial distress. According to Kaplan and Stein (1991), their study found that a bank is more likely to face bankruptcy when the debt level is high. Meanwhile, this result is further supported by Andrade and Kaplan (1997) who stated that a high leverage or also known as a poor credit risk management of a firm was the major factor that lead to financial distress.

There may be a situation when the commercial banks tend to lend loan uncontrollably for the intention to be outstanding in competing with other banks. The banks might did so as to reach their targets of lending loan amount and as a result, they lend loan to many customers without conducting an appropriate evaluation. This reckless practice by banks would eventually incur losses due to the rising credit risk and will give a negative impact on the banks' profitability (Kalume, 2016). Again, it emphasizes that a proper CRM is essential to influence the profitability level of commercial banks.

The reason to be interested in doing the topic of "The effect of credit risk management (CRM) on the profitability of commercial banks in Malaysia" is due to there were several researchers said that CRM will positively affect bank's profitability while there was a researcher in Indonesia who found a negative relationship between these two variables. According to the study done by Hosna, Manzura and Juanjuan (2009), the study stated that a positive relationship was figured out between CRM and commercial banks' profitability in Sweden. It is supported by other researchers such as Kolapo, Ayeni and Oke (2012) in the case of Nigeria. In contrary, the research by Ruziqa (2013) shown an inverse relationship between CRM and profitability of conventional banks located in Indonesia. This result shows a conflict with the previous studies which claimed that CRM is positively related to the profitability of commercial banks (as cited in Noman et al., 2015). Nonetheless, the extent of this research does not provide any convincing or certain evidence to prove the adverse effect of CRM on the commercial banks' profitability in Indonesia.

These kind of researches shown that an exact conclusion is yet to be made until now, thus making this area worth to have a further study. Plus, there is a significant lack of research that examine the effect of CRM on the commercial banks' profitability in Malaysia. Most of the past researches were done in the case of countries such as Kenya, Nigeria, and Nepal but not in Malaysia. Hence, there is an existing gap to be completed in order to do research on the case in Malaysia. Being an emerging country, a well-developed CRM is essential to boost up the confidence of investors

to invest in Malaysia. Based on Ibrahim (2011), Bank Negara Malaysia has intensively putting in hard work to improve the infrastructure of CRM and underwriting practices after the occurrence of Asian financial crisis. This enhancement has applied to all banking institutions in Malaysia by requiring to have a stricter provisioning policies and write-off of irrecoverable loans. As a result, the net non-performing loan ratio shown improvement from 4.6% during the beginning of 2007 to 2.1% in September 2009.

As referring to the Bank Negara Malaysia report (2008), the bankruptcy cases occurred in Malaysia (including public listed companies, private companies and individual business) has risen from 1899 cases in June of 2013 to 2366 cases in July of the same year (as cited in Manab, Ng & Rus, 2015). This indicate that the increasing number of bankruptcy cases revealed that the number of companies which failed to fulfill their obligations to repay debt and continue their businesses was increasing gradually. Again, this shown that a poor CRM would eventually cause low profitability or even worse, leading a bank to bankruptcy.

In conclusion, different researchers might obtain different conclusion with others because they may be using dissimilar models and methods while conducting the research. Therefore, it is an interesting study to do a specific research that can provide an effective and efficient claim on the relationship between effective CRM and commercial banks profitability.

1.3 Research Question

Several research questions have been developed which they will play important roles to guide the path during the conduction of research. The following shows the research questions of this study:

1. Is there any relationship between default rate (DR) ratio and profitability of commercial banks in Malaysia?
2. Is there any relationship between total equity to total assets (TETA) ratio and profitability of commercial banks in Malaysia?
3. Is there any relationship between cost per loan asset (CLA) ratio and profitability of commercial banks in Malaysia?
4. Is there any relationship between bank size (BS) and profitability of commercial banks in Malaysia?

1.4 Research Objective

Research objective is the purpose of conducting this research. It can be divided into general objective and specific objective. After completing the research, it should achieve all the stated objectives.

1.4.1 General Objective

The purpose of conducting this research is to determine whether CRM has effect towards profitability of commercial banks in Malaysia.

1.4.2 Specific Objective

1. To investigate the relationship between default rate (DR) ratio and profitability of commercial banks in Malaysia.

2. To investigate the relationship between total equity to total assets (TETA) ratio and profitability of commercial banks in Malaysia.
3. To investigate the relationship between cost per loan asset (CLA) ratio and profitability of commercial banks in Malaysia.
4. To investigate the relationship between bank size (BS) and profitability of commercial banks in Malaysia.

1.5 Hypothesis of Study

There are several hypotheses included in this study in order to conduct the research on how CRM affect the profitability of commercial banks in Malaysia.

H_1: There is a relationship between default rate (DR) ratio and profitability of commercial banks in Malaysia.

H_2: There is a relationship between total equity to total assets (TETA) ratio and profitability of commercial banks in Malaysia.

H_3: There is a relationship between cost per loan asset (CLA) ratio and profitability of commercial banks in Malaysia.

H_4: There is a relationship between bank size (BS) and profitability of commercial banks in Malaysia.

1.6 Significance of the Study

From this research paper, the main objective is to determine the relationship between the dependent variable, return on asset (ROA) which is used to measure bank's profitability and the independent variables which are default rate (DR) ratio, total equity to assets (TETA) ratio, cost per loan asset (CLA) ratio, and bank size

(BS) among the commercial banks in Malaysia. The previous researchers' study, paper, idea and information will be taken as the references for this paper while the data will be obtained from Bursa Malaysia.

This research paper is vital for public to have a clear understanding in banking sectors about the impacts of CRM towards a bank's profitability and performance. It is an essential knowledge and information for the public especially investors, businessmen and depositors to help them gain more understanding on how well the CRM that the bank has performed. They are able to analyse and evaluate the potential risks that can reduce their profits by using the adequate information before the decision making process such as avoid investing in riskier banks to prevent losses. When public are clear and understand about the management of the banks and thus can assist them in making a good decision that can satisfy their needs and returns in future.

Besides, this paper also helps the banking institutions to maintain their financial performance in Malaysia by operating CRM effectively and efficiently in order to generate more income and profit in future. This paper can contribute the banking institutions to operate in correct manners and ways to maintain the bank's profitability such as developing or using efficient strategies to sustain the high capital adequacy and low default rate. So, by having deep understanding about the uses and importance on CRM, the banking institutions are able to continuously improve and enhance the banking management to increase the profit of banks.

Furthermore, as the effects of CRM are understood by policy and marketing makers, they have sufficient information when undergoing the making decision process which will lead to greater impact to bank's performance. Through the adequate information provided in this study, they are having more chances to explore more opportunities, choices and management strategies either in local or foreign country to reach their objectives and goals. Also, the probability of making wrong decisions

and mistakes also can be reduced. Thus, they are able to come out with a better, accurate and effective decision as well as the strategy.

1.7 Chapter Layout

1.7.1 Chapter 1: Research Overview

In chapter one, it will provide an overview of study and concept of the research paper including the research topic's introduction and background, description of problem statement, research objective, research hypothesis, and significance of the study.

1.7.2 Chapter 2: Literature Review

In chapter two, a literature review on those past studies regarding variables that will affect the profitability of commercial banks by previous researchers will be included. Basically, this chapter will provide the explanations on how the independent variables such as default rate ratio, total equity to total assets ratio, cost per loan asset ratio, and bank size can affect the profitability (ROA) of the banks. Besides, the model specification and findings reviewed by previous researchers will also be included.

1.7.3 Chapter 3: Methodology

In chapter three, it will focus on description of variables and data collection methods, sources of data, requirements, modelling and methods in analysing on this research topic will be included. Besides, it performs the study starts from the first step of collecting data to the final step of data being transformed into useful information in order to determine how the profitability of commercial banks will be affected by the parameters.

1.7.4 Chapter 4: Data Analysis

In chapter four, it will provide the results on how the variables influenced the profitability of the commercial banks in Malaysia. Furthermore, the interpretation of the relationship between dependent variable and independent variables and empirical results will be conducted and reported in this chapter.

1.7.5 Chapter 5: Discussion, Conclusion and Implications

In chapter five, research findings will be summarized and concluded and hypothesis developed will be discussed too. Through the result, the policy implications for future research will be discussed in this chapter. Moreover, the limitations of study and recommendations for future research will be discussed in order to act as a reference and guideline for other researchers who show great interest in this research topic.

1.8 Conclusion

In short, this chapter covers the background, research background, problem statement, research objective, research questions, hypothesis, and significance of study. The main risk that faced by commercial banks in Malaysia is credit risk. It will reduce the profitability of banks and the reputation of banks will be indirectly affected when they are lack of vault cash for emergency cases. So, the primary purpose for this research is to investigate various variables, which are default rate ratio, total equity to total assets ratio, cost per loan asset ratio, and bank size to CRM as it affects commercial banks' financial performance (ROA) in Malaysia for the period from year 2001 to year 2016. From this study, it mentioned that CRM is relatively crucial for banks because it helps to minimize the bank risk and adjust risk rate of return. Furthermore, the detailed review of the study will be discussed in following chapter.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

The literature review, relevant theoretical models review, proposed theoretical framework and hypotheses development will be included in this chapter. This chapter is mainly discussing on the literature review of past studies and researches for the effect of CRM on the commercial banks' profitability in Malaysia. There are total three independent variables could affect the banks' profitability, which are DR ratio, TETA ratio, and CLA ratio. Besides, the control variable of bank size also included in the regression model in order to measure the dependent variable, profitability of banks which represented by ROA.

2.1 Review of Literatures

2.1.1 Dependent Variable: Bank's Profitability

2.1.1.1 Return on Assets (ROA)

Return on assets (ROA) ratio is a useful statistic in determining the bank's profitability. Besides, ROA also used to measure the performance of managers in managing and using the banks' assets. The formula for ROA is

total net income over total asset. When the commercial bank has a high ROA ratio, it shows that it has more efficiency in utilizing its assets; when the commercial bank has a low ROA ratio, it shows that it is underutilizing its assets to generate profits. There are many countries using ROA ratio as an indicator to examine their bank's profitability such as Poudel (2012) and Shrestha (2017) in Nepal, Kurawa and Garba (2014) in Nigeria, and Alshatti (2015) in Jordan.

Based on Muda, Shaharuddin, and Embaya (2013), they mentioned that ROA is selected as the dependent variable for measuring the profit earned per unit of assets in Malaysian Islamic banks in this study. This is because they found that ROA is a better proxy for bank's profitability which compared with return on equity (ROE) since ROA reflects to bank management's ability to generate profits by utilizing the banks' financial and real investment resources while ROE reflects the effectiveness of bank management in utilizing the funds of the shareholders in the banks. This is supported by another researcher which is Sufian (2008) who also used ROA as the dependent variable in the study. This is because the bank's policy decisions and the uncontrollable factors in economy and government regulations are reflected by ROA for any bank. Besides, Sufian (2008) also pointed out that ROA is the best indicator of measurement for bank's profitability since high equity multipliers will not warped ROA.

On the other hand, Goddard, Molyneux, and Wilson (2004) argued that ROE is the most optimal measurement for bank's profitability compared with ROA. This is because ROE is evidently higher than ROA which reflects to the increase of bank's tendency in managing their equity in order to attain benchmark shareholder value targets in the study. Also, Alexiou and Sofoklis (2009) supported that ROE is the most appropriate measurement for bank's profitability compared with ROA. This is because the off-balance-sheet does not include in ROA but it has made an important

contribution to total profit. So, Alexiou and Sofoklis (2009) stated that ROE is the key ratio in evaluating the bank profitability.

Furthermore, a researcher, Davydenko (2011) conducted a research and pointed out ROE calculates by dividing net income to average equity and the weakness of ROE which is when the banks has a lower capital level will generate a higher ROE ratio and this high financial leverage level is not suitable in associating with high degree of risk. Therefore, Davydenko (2011) mentioned that ROE is not an appropriate measure of bank profitability. Besides, Bashir (1999) stated that ROE only measures profitability from the shareholders' perspective and it overlooked at the financial leverage while ROA is measured the bank profitability from the banks' overall efficiency in utilizing their total assets.

2.1.2 Independent Variables

2.1.2.1 Default Rate (DR)

Default rate (DR), also known as credit rate, is the possibility that a borrower will be unable to repay the promised principal and interest payments. Default rate can be measured by dividing non-performing loans from total loans. A borrower who has a higher default rate means that the borrower has a higher chance in going bankrupt and defaulting on the loans which compared with the borrower who has a lower default rate.

Noman et al. (2015) aimed to study the effect of credit risk on profitability of the banking sectors of Bangladesh by using an unbalanced panel data and

172 observations from 18 private commercial banks. The finding of this study found that non-performing loan ratio and profitability has a negative relationship which means the profitability of the banks and sound CRM reduce by non-performing loan. The result shown that non-performing loan increases 1 unit will lead to return on asset (ROA) decreases 0.05 units.

Abiola and Olausi (2014) had conducted a study to establish the impact of credit risk management on the commercial banks performance in Nigeria and there were a total of seven commercial banking firms' financial reports from 2005 to 2011 being used in this study. Abiola and Olausi (2014) surprisingly found that non-performing loan has a positive and statically significant at 1% significant level in the finding. This finding is considered unusual because in theory, there will have an inverse relationship between non-performing loans and bank's profitability. Even if the banks found a positive relationship and huge defaulted loans, the banks still can earn profits through their operations. In this study's result also shown that non-performing loans has a strong positive relationship with commercial banks performance. This can be found that the commercial banks in Nigeria did not have effective institutional measures when they are dealing with credit risk management.

Furthermore, a research was conducted by Ndoka and Islami (2016) to study the relationship between credit risk management and profitability of commercial banks in Albania. They used 16 banks' data for this research in Albanian banking system from 2005 to 2015. Ndoka and Islami (2016) found that non-performing loans ratio has a negative correlation with the variable ROA which mean a higher level of defaulted loans will cause more losses for the bank since the bank earned a smaller profit only. The result shown that when there is a unit of the non-performing loans ratio increases, it will lead to 0.28694 unit decreases in ROA. Besides, the result mentioned an effective credit risk management will help Albanian commercial banks to earn higher profits which compared with inefficient credit risk management.

Apart from that, Mustafa, Ansari, and Younis (2016) conducted a research to investigate the impact of loan provisions of banks on the performance of the banks operating in Pakistan. In the finding, the loan loss provision ratio is expected to have an inverse relationship with profitability. From the result in this research, it shown that the loan loss provision is one of the important paramount in affecting its profitability. Mustafa et al. (2016) found that the loan loss provision has a negative and statically association with bank profitability. It disclosed the banks faced high credit risk in the borrowing and advancing activities. Therefore, they create a loan loss provisions to reduce the risk. While this risk adverse policy caused the bank profitability decrease because it is created from earnings of banks on annual basis and reduce the ability of the banks to undertake more lending activities.

Subsequently, majority of the research supports that default rate has a negative and statistically significant relationship with the profitability of the commercial banks in difference countries. The researchers such as Pervin et al. (2015), Ndoka and Islami (2016), and Mustafa et al. (2016) supported this evidence because a higher default rate will have a direct influence on the commercial banks' profitability. At the same time, the researchers who are Abiola and Olausi (2014) have an inverse view with the previous researchers. They mentioned that DR and bank's profitability are positively related because even if the bank has large amount of failed loans but it still can earn profits though others operating activities. Hence, it is expected to be a positive relationship between DR ratio and return on assets in this study based on most of the findings in past studies.

2.1.2.2 Total Equity to Total Assets (TETA)

Capital adequacy is used to absorb the losses and handle risks that unexpectedly faced by the bank (Muhammad, 2013). The ratio is able to determine and measure the financial strength of banks. It is measured by the

Total Equity to Total Assets Ratio (TETA or ETA) which the total assets of company is divided by the total equity (Muhammad, 2013). The higher the ratio, it means the safer for the banks from loss or liquidity problem and lower the need from external fund sources (Shamki, Alulis & Sayari, 2016).

Based on the research of Acaravci and Calim (2013), the TETA ratio able to measure the general safety and wellness of bank. It is expected to have significant and positive relationship in local bank. From the theory of capital structure, the higher the equity within a certain range, the capital cost of bank will follow to increase too. Once there is a positive coefficient shown in the research on bank, it means the bank is efficient in capital structure management. The higher the TETA ratio, the external funding the bank have to obtain will be lower and lastly the profitability will be higher. Besides, researchers Noman et al. who had completed a research in year 2015 also obtained the same result as Acaravci and Calim. The research had involved 35 banks and data from year 2003 to year 2013 had been collected. In addition, research by Samad which involved the Bangladesh banks in 2015 also supports the relationship of two variables. Moreover, a research done by Kawshala and Panditharathna (2017) also found that the ROA and TETA ratio are moving in same direction. The more the capital the Sri Lanka banks hold, the lower the external funds required hence the banks' profitability will be higher. It also proved that the ratio is significant to the profitability of banks at 5% significance level. Next, Ally (2014) stated that the result obtained is positive and significant. The researcher explain that the banks that consist sufficient capital considered good in using high technology is high efficiency and hence able to reach high profit. According to the research Tabari, Ahmadi and Emami (2013), the total equity to asset ratio prove to be positive with the profitability which same as expectation. The reason given is the bank with well-capitalized will have lower risk and therefore can have additional time and flexibility to eliminate the problem like the unexpected and sudden loss.

However, there is still some argument between the two variables. Muhammad had conducted a research in which a total of six years data was collected starting from year 2005 in Jordan. The result obtained stated that the ratio does not show any statistical effect on bank's profitability. The hypothesis which stated the positive relationship of two variables was rejected. Next, Almazari (2013) and Cekrezi (2015) also supported the negative sign in the research. A total of 16 commercial banks have been involved with the sample size of 48.

According to research of Alper and Anbar in year 2011, the TETA ratio also used in measuring the strength of bank. They expect that the capital and profitability of banks should be moved in same direction. The high TETA ratio show that the bank's dependence on external source of fund is lower. The bank able to absorb the losses easier and overcome risk exposure with shareholder once it is well-capitalized. It can be said that probability of bank with enough capital to bankrupt will be reduced and at the same time it also minimized the cost for funding and risk. However, the result show that the TETA ratio not vital in affecting the bank profitability.

From the previous researcher, the TETA ratio can be having both positive and negative impact on the bank's profitability. Most of them expect that there will have a positive relationship as following the capital theory. Some of the result even shown that the TETA ratio does not have effect or insignificant in affecting the bank profitability.

2.1.2.3 Cost per Loan Asset (CLA)

Cost per loan asset (CLA) ratio is defined as the average cost per loan advanced to customer in monetary term (Poudel, 2012). It can be computed by dividing the total operating costs by the total amount of loans. This ratio's

purpose is to specify the efficiency of banks in lending out loans to customers (Appa, 1996; Ahmed et al., 1998; Kolapo et al., 2012). Banks that are efficient in managing their costs are able to earn high profits, holding the other factors constant. So, it is predicted that the CLA ratio and the bank performance have a negative relationship. (Bhattarai, 2014).

Based on the study conducted by Bhattarai (2014), he examined the effect of credit risk on the performance of Nepalese commercial banks. The study used pooled data consists of 14 commercial banks from 2010 to 2015 which was collected through their annual reports. According to Bhattarai (2014), the regression results unveiled that the CLA ratio has a positive and statistically significant impact towards the bank performance at 1% significance level. Its positive coefficient of CLA ratio implied that the bank is efficient in distributing loans to customers and collecting higher level of interest revenue as compared to the interest expenses and other operational costs. Based on the study, CLA is considered as an influential credit risk variable which can determine the bank performance.

The research conducted by Kurawa and Garba (2014) is to analyse the effect of CRM on the profitability of Nigerian banks. The data are sourced from 16 Nigerian banks and six companies listed in Nigerian Stock Exchange (NSE). The collected data are from annual reports and accounts of banks from 2002 to 2011. The research findings showed that CLA has a positively significant relationship with the returns on assets (ROA). According to Kurawa and Garba (2014), the CLA and default rate are affected by the loan losses, operating expenses, and the proportion of non-performing loans which are the key determinants of asset quality of a bank.

In addition, Shrestha (2017) conducted a research to investigate the impact of credit risk management on profitability of commercial banks in Nepal. This research is based on secondary data that obtained from the bank

supervision reports published by Nepal Rastra Bank as well as the annual reports of eighteen selected commercial banks from 2007/08 to 2013/14 for seven years. The result generated from the study showed a positive relationship between CLA and profitability which measured in terms of ROA and ROE. An increase in cost per loan assets lead to an increase in ROA and ROE.

Awoke (2014) has conducted a research to examine the quantitative effect brought by credit risk on the banking performance of commercial banks in Ethiopia for the period from 2008 to 2012. The sample taken are consisting of eight banks and the data are sourced from the published statements of accounts (annual reports) of commercial banks in Ethiopia. In the research of Awoke (2014), CLA is to compare the impact of provisions and non-provision costs on the profitability of banks. It is surprisingly to find out that CLA is negative but affecting significantly to the bank's performance in the research. He then pointed out the bank's ability to lend loans at lowest cost and further studied the efficiency of commercial banks in intermediation.

Despite the positive and significant relationship between CLA and ROA found, there are other researchers who found out that the CLA and ROA occur to have insignificant relationship. Poudel (2012) has conducted a research to explore various variables pertinent to credit risk management as it affects banks' financial performance. The data sample are collected from 31 banks in Nepal through financial reports from 2001 to 2011. The results showed that CLA has an inverse relationship with the banks' performance, which measured in terms of ROA. Although there is a negative relationship between CLA and ROA, the relation is not statistically significant which meant no relationship between CLA and bank performance. In another words, CLA is an insignificant predictors of bank performance.

The research done by the brothers of Ajayi (2017) is to study the credit risk management effects on the performance of Nigeria deposit money banks. The research was conducted based on secondary data retrieved from the financial statements of the ten chosen Nigeria banks from 2001 to 2015. According to the result, it indicated that the CLA showed a negative and insignificant relationship to profitability, which measured using ROA. Ajayi explained that a lower profit was due to higher administrative cost. They also further analysed that the high interest charged on loans and advances by Nigerian deposit money banks contributed an insignificant CLA to banks' profitability.

Most of the researchers such as Bhattarai (2014), Kurawa and Garba (2014) and Shrestha (2017) concluded that CLA is positively related to the bank's performance while Awoke (2014) has a negative significant result. However, this result was contradict with other researchers such as Poudel (2012) and Ajayi (2017) which indicated that there is a negative and insignificant relationship between CLA and bank's performance. It is expected when CLA ratio increases, the performance of banks will increase too.

2.1.3 Control Variable

2.1.3.1 Bank Size (BS)

The bank size is vital in stabilizing bank market position. It is measured by using natural logarithm of banks' total assets instead of total assets to reduce the scale effect (Christos & Geoffrey, 2004). It is used in detecting potential economies or diseconomies of scale within the banking sector (Yong & Christos, 2012). It also controls for cost differences, product and risk spread (Yong & Christos, 2012).

According to Yigemal's study in 2017, there is a positive expectation of bank size to the ROA ratio. This is due to the banks with larger size are able to enjoy the economies of scale by lowering the bank cost and raising the profit gained. The expectation is proved by the researcher's result which the return of bank is affected positively by the size. Chinado (2014) in Zimbabwe and Ally (2014) in Tanzania supported the point with concluding that there is a significant positive relationship between the two variables. Both of them used the secondary data which the financial report as their main sources of data. The results come out with the positive and significant coefficient by two researches. The positive result successfully proved that the two variables are having relationship. Apart from that, the results also supported the theory of economies of scale. The high volume of services allow the bank to diversify the fixed cost. The large bank enjoy economies of scale up till specific level by the profit raise with its size and reduce if diseconomies of scale occur (Ally, 2014). Large size also always optimises the bank by allowing it to operate in low competitive market.

Besides, another research had been made by Kawshala and Panditharathna in year 2017. The purpose is to determine the influence of certain factors on profitability of Sri Lankan commercial banks. The result shown that in order to enhance the profitability of bank, the bank size should be expanded. The firm size is considered as vital factors in affecting the Sri Lankan commercial bank gains. The profitability of bank can be improved by increased the bank's asset base or size based on most of the previous researches. In addition, the large size with more diversification opportunities successfully reduced the risk at the same time maintained or even raise the probability of gain (Yong & Christos, 2012).

On the other hand, the research done by Naceur and Goaied (2008), with the objective to identify the banks' financial structure, characteristics, and macroeconomic indicators are affecting on the profitability and net interest margins of banks in Tunisian. The research shown that the bank size has a negative relationship with ROA ratio. It mentioned that the profitability of

banks in Tunisian did not enhance by the increasing of bank size. This is supported by another researcher, Aladwan (2015). According to Aladwan (2015), he stated that the banks will less likely to earn more when their size increase. This is because even though the larger banks have a lot of additional financing sources, but they need to face the liquidity problems and diversify risk. Therefore, Aladwan (2015) had supported and concluded that the size of bank is negatively impact on the profitability of bank.

Based on the research by Shamki et al. (2016), there is an expectation the bank size will affect the profitability of bank significantly. However, the expectation had been rejected by having the result that the size is negative insignificantly to the return. They concluded that the negative relationship between both variables might cause by bureaucratic and other reasons hence the bank size not suitable as the determinants of bank profitability. Yong and Christos (2012) who had done a research in China by involving data from year 2003 to year 2009 also agreed with the bureaucratic reason. The larger bank size is more challenging in well management and might be the consequences of bank's aggressive growth strategy. Therefore, the bank size might non-linear with the return.

Moreover, the profit of bank might decline due to the diminishing margin returns (Staikouras & Wood, 2004). The diseconomies scale happen once the bank size reach a certain level. As a provident, Staikouras and Wood had completed a strong research by involving 685 European banks either consist US$ 10,000 billion above or below in year 1998. The result come out with the smaller bank is significant positive while larger bank show negative. This might due to the smaller bank able to enjoy information superiority at the same time enforcement power obtained is significant. When the size of bank increased, the diseconomies of scale situation occur and the hardness in monitoring rises. At the end, the bank will face bureaucracy seriously and affect the return badly (Almazari, 2013).

2.2 Review of Relevant Theoretical Models

2.2.1 Value at Risk Theory

Value at Risk (VaR) can be defined as the probability of the maximum loss with a given confidence level over a specified period of time (Adamkoa, Spuchľáková, & Valášková, 2015). VaR has been widely applied in finance sector as a tool of financial risk assessment for quantitative risk management. VAR gives the answers to the question, "What is my worst case scenario?"

According to Manganelli and Engle (2001), VaR acts as a standard measure used by financial analysts to measure the market risk. It was due to in the past decade, the volatility of financial markets has risen that encouraged the researchers, regulators and practitioners to come out with a much better risk management tools, and VaR was introduced as a tool for quantitative risk management. VaR describes the quantile of the revenue and loss distribution predicted within the target range.

Most of the commercial banks apply this VaR Theory to have a general idea on the ways in managing risk. It is by defining the amount of assets that should have in order to compensate its expected losses. Since VaR provides commercial banks with information on the extent of the sufficiency of the bank's capital to cover for the expected losses, it is helpful for commercial banks to estimate any possible loss earlier before the losses has been really incurred in a bank. For commercial banks, their major concern is to avoid or minimize the financial distress costs in the process of risk management (Duffie & Pan, 1997).

This theory has been applied by several researchers in doing their research relating in CRM with the financial performance of commercial banks. For instance, it has been applied by Kalume (2016) and Mwangi (2012). The reasons that VaR Theory has been commonly used in risk management include it is easy to compute and it is flexible as its existence can be in many forms. Nonetheless, VaR also has some

drawbacks such as there might be a tendency undervalue the worst results and leading to a deceitful sense of security (Adamkoa et al., 2015).

2.2.2 Efficient Structure Theory

Efficiency Hypothesis was first proposed by Demsetz to define on the market structure-performance relationship. In banking sector, this hypothesis stated that a bank that has a more efficient operation with a lower operational cost will tend to have higher profit than the competitors (Mensi & Zouari, 2010).

Efficiency can be defined as a measure of performance level that uses the least amount of inputs to generate the maximum amount of outputs. It is an important concern for bank managers, policymakers and customers to determine the bank's position in the market. There are a wide range of definitions of efficiency of banks. According to Rose (1997), efficiency can be defined as an indicator of both the bank managers' and staff's capability to ensure the rate of increase in revenues is always greater than the increase in operational costs (as cited in Siudek, 2008). Meanwhile, Jaworski (2006) mentioned that efficient banking activities are the activities which not only beneficial for achieving goals but also ensure economic welfares exceeds inputs.

Besides, based on Siudek (2008), the researcher stated that an efficient bank has greater potential to increase the bank's profitability. Efficient Structure Theory also indicates how well the bank could manage its capital and debt while providing the quality of the offered services to customers. The Efficient Structure Hypothesis stated that the banks with excellent management and technology tend to incur a lower cost and therefore, higher profit could be earned by the bank (Hoffmann, 2011). Normally, those banks which are capable to develop a superior production technologies are those banks with a larger size as compared to the small banks. In short, efficiency is the ability of banks to easily align resources with products (Mensi & Zouari, 2010).

2.2.3 Economies of Scale Theory

Economies of scale can be defined as the competitive advantage a large firm can obtain over a small firm. It occurs when the cost of producing one unit of product is low given that the firm is producing many products at once. Another scenario could be when the firm is purchasing inputs at large quantities and enjoying at a cheaper cost per unit.

The bank size is measured by log of total assets. Based on Bashir (1999), he stated that a bank with large size can promote efficiency by bringing economies of scale. This is because large banks could get advantage from the lower costs of collecting and processing information. Furthermore, a larger bank size is also said to make the bank to be more diversified to enhance mobilization of funds, better diversification of loan product and easier accessibility to capital markets. Thus, it helps to produce greater returns to the bank's depositors and shareholders, thereby leading to a higher profitability for bank.

The earliest researchers who have studied the relationship between bank size and profitability were Emery (1971) and Vernon (1971). In the research done by Emery, he found that those banks with larger bank size tend to generate greater returns. His result was confirmed by Haron (1996), Said and Tumin (2010) and Alexiou and Sofoklis (2009). The researchers stated that bank size will have a positive impact towards the profitability of banks. Meanwhile, the study conducted by Vernon (1971) shown some conflicts with the study by Emery (1971). The study shown that that bank size will not bring significant effect on bank's profitability. This is supported by Kwast and Rose (1982) and Smirlock (1985).

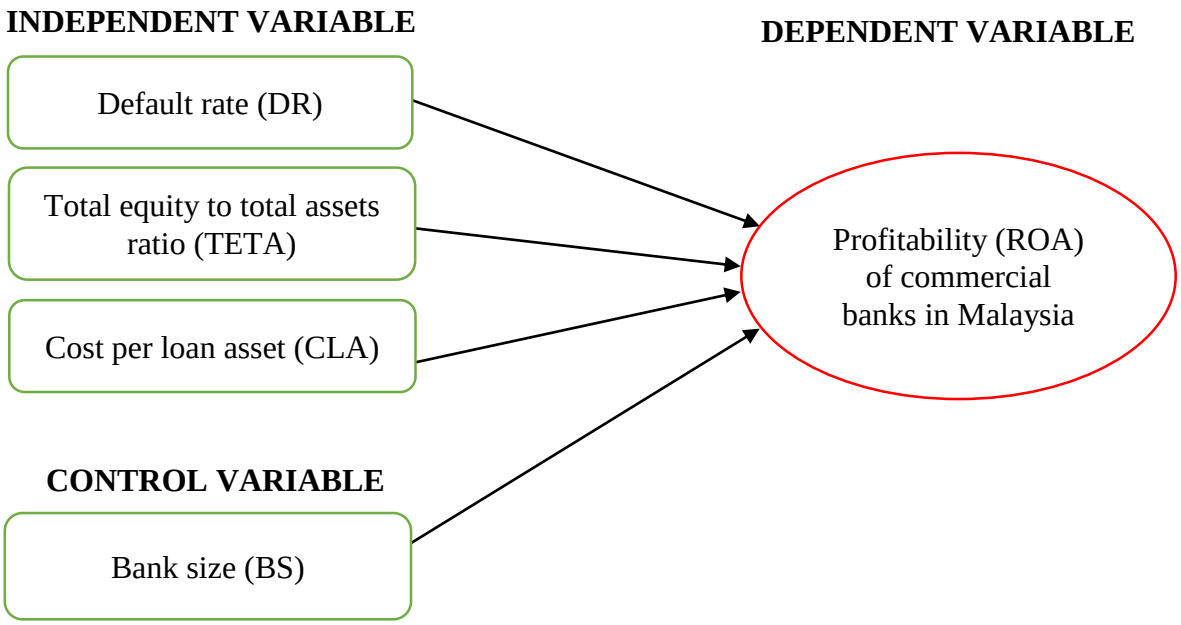
Based on the study by Bennaceur and Goaied (2008), they stated that bank size will inversely affect the profitability of bank. The effect on bank size might remain as positive and when it reached certain limit, it could be negative and resulting in

diseconomies of scale. This indicates that the banks which are expanding in size are no longer efficient due to the high level of administration and agency cost. In short, not every bank is suitable to keep growing in bank size and the respective risks and costs should be taken into consideration.

2.3 Proposed Theoretical/ Conceptual Framework

This section will display the relationship between the independent variables and the dependent variable. This framework is developed following to the research objective which is to examine the relationship between the bank-specific variables that will bring impact on the profitability (ROA) of commercial banks in Malaysia.

Figure 2.1: Conceptual Framework



2.4 Hypothesis Development

2.4.1 To Test the Relationship between Default Rate Ratio and Return on Assets

H_0: There is no relationship between default rate and return on assets among commercial banks in Malaysia.

H_1: There is a relationship between default rate and return on assets among commercial banks in Malaysia.

Referring to Chapter 2.1, it has stated that there are many authors supported there is a significant relationship between the default rate ratio and profitability of banks. The authors of Noman et al. (2015), Ndoka and Islami (2016), Mustafa et al. (2016) and Abiola and Olausi (2014) have indicated that there is a negative significant relationship between default rate and return on assets among commercial banks in Malaysia. It means that when the default rate increase will lead to decreases in return on assets and low bank's profits. Besides, the lending activities of bank will be reduce when the default rate increase. This is because the bank is not extra funds to invest in other investments. Hence, this study is assumed that there is a negative significant relationship between default rate and return on assets among commercial banks in Malaysia although the authors of Abiola and Olausi (2014) have argued these two variables are positively correlated in their findings.

2.4.2 To Test the Relationship between Total Equity to Total Assets Ratio and Return on Assets

H_0: There is no relationship between total equity to total assets ratio and return on assets among commercial banks in Malaysia.

H_1: There is a relationship between total equity to total assets ratio and return on asset among commercial banks in Malaysia.

According to the Acaravci and Calim (2013), it showed there is a significant yet positive relationship between both two variables. The positive relationship between both variables also has been defined in the theory of capital structure. The higher the capital structure management's efficiency, the lower the external fund sourcing needed and this can bring to the high profitability of a bank (Acaravci & Calim, 2013). Muhammad (2005) has agreed the positive relationship of two variables even though there is an adverse result obtain. In addition, the findings obtained by Naceur and Omran (2008), Gatete (2015) and Kurawa (2014) have clearly showed that there has positive and significant relationship between total equity to total assets ratio and return on asset in banks. Hence, from the findings of these researchers, this study is assumes there is a positive relationship between both variables.

2.4.3 To Test the Relationship between Cost per Loan Asset Ratio and Return on Assets

H_0: There is no relationship between cost per loan assets and return on assets among commercial banks in Malaysia.

H_1: There is a relationship between cost per loan assets and return on assets among commercial banks in Malaysia.

The researcher of Bhattarai (2014) has proved that there is a positive significant relationship between the cost per loan assets and return on assets by its findings. Past study done by Kurawa and Garba (2014) also has same view on the relationship between these two variables. Moreover, it also mentioned that the cost per loan can be affect by others factors of asset quality of bank and thus result in affecting the return on assets. Awoke (2014) also has proved that there is a significant relationship between cost per loan and return on assets. The positive relationship between two variables mean bank has high efficiency in lending the loans to customers and able to receive more interest revenue. In conclusion, it will assume to be positive relationship among cost per loan assets and return on assets in this study.

2.4.4 To Test the Relationship between Bank Size and Return on Assets

H_0: There is no relationship between bank size and return on assets among commercial banks in Malaysia.

H_1: There is a relationship between bank size and return on assets among commercial banks in Malaysia.

Based on Bennaceur and Goaied in year 2008, the result indicated bank size is negative significant relationship towards the profitability of bank and this reflects the bank's scale inefficiencies. The authors of Staikouras and Wood (2004) also stated that there will lead to diseconomies scale when the bank size reaches a certain level. Hence, when the bank size is higher, it will lead to lower profitability of bank. This statement also supported by Almazari (2013). Moreover, through the expansion in Jordanian banking industry as stated in Aladwan (2015), it proved that there always have arguments about the larger the bank, the lower the profitability of bank. Some reasons such as the larger the bank, the high the costs needed. For

example is the cost for technology maintenance or software that will lead to low profits. The outcomes get by Aladwan (2015) also identified there is negative relationship between bank size and ROA. Thus, this study assumed both variables are inversely related although there is many researchers stated there is positive relationship among both variables.

2.5 Conclusion

To conclude, the things that have been discussed in Chapter 2 include the literature review about the past studies on how bank-specific determinants affect the profitability of commercial banks in Malaysia. Besides, the theoretical relationship between variables have been supported by some important theoretical models. Also, a proposed conceptual framework was built by revising and referring to the previous conceptual frameworks and the hypotheses development was included in this chapter as well.

CHAPTER 3: METHODOLOGY

3.0 Introduction

In this particular chapter, it is discussing about the study methodologies that will be used to determine the objectives. In general, the data used is secondary data which will be obtained from year 2001 to 2016 for each of the local commercial banks in Malaysia in order to run the model and analysis.

3.1 Research Design

This research is conducted to examine the relationship between the bank-specified variables and the profitability of the domestic commercial banks in Malaysia. The bank-specific variables are default rate (DR), total equity to total assets (TETA), cost per loan asset (CLA) and bank size (BS). The dependent variable of this research is return on assets (ROA) which used to measure the profitability of the commercial banks. The research is conducted based on the secondary data collected from the annual reports of each bank on the Bursa Malaysia website. In order to conduct the research, the quantitative data of dependent variable and bank-specified variables has been computed and expressed in numerical form and in log form. The data is used to analyse the profitability of the commercial banks in Malaysia.

3.2 Data Collection Methods

3.2.1 Secondary Data

The secondary data will be used in order to estimate the profitability of banks. There are total eight commercial banks in Malaysia will be involved for this study, which are Hong Leong Bank, CIMB Bank, Affin Bank, Alliance Bank, Public Bank, AmBank, Maybank and RHB Bank. The secondary data obtained is from year 2001 until 2016 and with a total sample size of 128 for the estimation of banks' profitability. The data is collected from the balance sheets, income statements inside the annual reports that obtained via Bursa Malaysia official websites.

Table 3.1: Information of Variables Used in Research

Variable	Formula	Explanation	Data Source
Return on Assets	$\frac{Total\ net\ income}{Total\ asset}$	It is used in measuring the bank's profitability.	Annual reports
Default Rate	$\frac{Non-performing\ loan}{Total\ asset}$	It is the possibility of failure to pay back principal and interest.	Annual reports
Total Equity to Total Assets	$\frac{Total\ equity}{Total\ asset}$	It determines the financial strength of bank in order to	Annual reports

		overcome the risk.	
Cost per Loan Asset	$\frac{Total\ operating\ cost}{Total\ amount\ of\ loans}$	It is to specify the efficiency in distributing loans to customers.	Annual reports
Bank Size	Log($asset$)	It measures the logarithm of bank's total assets.	Annual reports

3.3 Sampling Design

3.3.1 Target Population

Secondary data was used in order to conduct the research. The research will focus on the performance in terms of the profitability of the domestic commercial banks in Malaysia. According to the information provided on the website of Bank Negara Malaysia (BNM), there are a total of 8 domestic banks and 19 foreign banks in Malaysia. However, the banks that are chosen for this research are those who setup and base in Malaysia. The data are collected from 8 domestic commercial banks.

They are Affin Bank, Alliance Bank, AmBank, CIMB Bank, Hong Leong Bank, Maybank, Public Bank as well as RHB Bank. There is a total of 16 years (2001-2016) data have been obtained in order to examine the result.

3.3.2 Sampling Frame and Sampling Location

There are a total of eight domestic commercial banks in Malaysia being chosen to conduct the analysis of the profitability of the banking institutions. In this research, the profitability of banks included the banks that are setup and base in Malaysia and excluded the commercial banks that are setup in Malaysia but base in foreign countries. Hence, the profitability of the banks will only measure the eight local banks that are within Malaysia boundaries.

3.3.3 Sampling Elements

According to Ghebregiorgis and Atewebrhan (2016), profitability can be determined by using various financial measures including return on assets (ROA), return on equity (ROE), yield on earning assets, rate paid on funds as well as interest margin. In this research, the method to analyze the profitability of banks is being fixed by looking into the ROA of the banks. As the research is conducted based on the domestic banks in Malaysia; therefore, all the 8 local banks are selected as sampling units. The profitability of 8 banks will be determined and compared within each other.

3.3.4 Sampling Technique

There are two different types of banks available in Malaysia which are local banks and foreign banks. As the purpose of the research is to investigate the relationship between the local banks' profitability in Malaysia, so the sampling will based on all the local banks that are available in the country. There are a total of 8 local banks

being chosen for the conduct of the research. The banks are Affin Bank, Alliance Bank, AmBank, CIMB Bank, Hong Leong Bank, Maybank, Public Bank and RHB Bank. The ROA will be used as the indicator to analyse the profitability of the local commercial banks in Malaysia.

3.3.5 Sampling Size

The financial institutions in Malaysia can be grouped into three main categories, which are Investment bank, Islamic bank and Commercial bank. From these categories, commercial bank category is being selected as the sample. Twenty-seven commercial banks were established in Malaysia with 8 local banks and 19 foreign banks. After some unavoidable circumstances occurred during the research, only the 8 local banks will be choose to continue the remaining research. The table below shows the 8 local banks being chose.

Table 3.2: Eight Local Commercial Banks Chosen for Sample

No.	Banks
1.	Affin Bank
2.	Alliance Bank
3.	AmBank
4.	CIMB Bank
5.	Hong Leong Bank
6.	Malayan Bank (Maybank)
7.	Public Bank
8.	RHB Bank

3.4 Data Analysis

3.4.1 Panel Data Regression Model

Panel data regression model is a model based on longitudinal or panel data. Panel data is a set of date which includes both cross section and time dimension. Based on the study with the title of "Diagnostic Testing for Dynamic Panel Data Models" done by Lee (2006), panel data can be in one-way or two-way error components, and the individual and time effect can be in fixed or random, and the data can be balanced or unbalanced.

In this study, the data used would be balance panel data which consists of the same period of observations for each of individual firm. The main reason is that the panel data provides many sample data on each individual firm over the time period. Moreover, it can help in controlling the variables that cannot be observe and measure across individual firms or the variables that were changes over the time in same individual firms. The panel data regression model can bring a lot of benefits, such as can increase the sample size by providing more information, decrease the multicollinearity problem among the independent variables, increase the degree of freedom, and allow users to study the changes in dynamic in cross-sectional units over time period (Hurlin, 2010).

There are different types of models to be used in panel data analyses, which are pooled OLS model (POLS), fixed effects model (FEM) and the random effects model (REM). POLS is a homogeneous panel, which means this model is assuming all coefficients for each firms are the same. Meanwhile, FEM and REM are both a heterogeneous panel, both models are taking individual effects into account and the models indicate the coefficients for each firms are different. FEM allows the

individual effect to correlate with other independent variables while REM assumes the individual effects are not related with any independent variables. There are three tests in order to test which model is suitable, which are Poolability test, Breusch and Pagan test and Hausman test.

The model of this study is as follow:

$$ROA_{it} = \alpha + \beta_1 DR_{it} + \beta_2 TETA_{it} + \beta_3 CLA_{it} + \beta_4 BS_{it} + \varepsilon_{it}$$

Table 3.3: Definition of Symbols

Symbol	**Definition**
ROA	Return on assets
A	Intercept
β_{it} (i=1,2,3,4,5,6,7,8) (t=2001, 2002,2003,…..2016)	Coefficient of each independent variables
DR	Default rate
TETA	Total Equity to Total Assets
CLA	Cost per loan asset
BS	Bank size
E	Error terms

3.4.1.1 Poolability Test

Poolability test is used to test which model is more preferable between the pooled OLS (POLS) and fixed effects model (FEM) (Kunst, 2009). The test is to test the fixed cross sections or fixed in periods against POLS mode. In this study, poolability F test can use to test the poolability across cross sections in panel data models.

H_0 = POLS is more preferable

H_1 = FEM is more preferable

Decision Rule: Reject H_0 if the p-value is less than significance level of 0.05. Otherwise, do not reject H_0.

3.4.1.2 Breusch and Pagan Test

Breusch and Pagan Godfrey test also named as Breusch-Pagan test. It is used to test for heteroscedasticity errors in regression. The homoscedasticity is an important assumption in regression (Stephanie, 2016). This study will use this test to determine which model is more preferable between the pooled OLS (POLS) and random effects model (REM).

H_0 = POLS is more preferable

H_1 = REM is more preferable

Decision Rule: Reject H_0 if the p-value is less than significance level of 0.05. Otherwise, do not reject H_0.

3.4.1.3 Hausman Test

Hausman test also known as Hausman specification test. This test also considered as test for model misspecification (Stephanie, 2017). This test will be carried out if reject null hypothesis in Poolability test and Breush and Pagan test. Hausman test will carry out in this study to determine which model is more preferable between the FEM and REM in panel data analyse.

H_0 = REM is more preferable

H_1 = FEM is more preferable

Decision Rule: Reject H_0 if the p-value is less than significance level of 0.05. Otherwise, do not reject H_0.

3.4.2 Diagnostic Testing

Based on Lee (2006), the diagnostic testing is important in detecting various specifications errors in a regression model. The errors include whether the model is having multicollinearity, autocorrelation or non-normality. Hence, diagnostic testing is necessary in order to make sure the model is valid and able to provide correct result at the end. Besides, diagnostic testing also can be used to determine either the model is fully matching or not fully matching the assumption of Classical Linear Regression Model (CLRM). The Best Linear Unbiased Estimator (BLUE) only can be reached when the model if fulfilled all the CLRM assumptions. Thus, the result will be unbiased, efficient, reliable and more accurate.

3.4.2.1 Multicollinearity

Multicollinearity occurs when the independent variables in the regression model are highly correlated among each other. Multicollinearity problem means the data is overlapped and thus lead the result being inaccurate. Hence, when there is multicollinearity problem in regression model, it indicate that the regression model do not fulfil the assumption of classical linear regression model (CLRM), which stated the independent variables is no exact linear relationship among them.

Multicollinearity can divide into two categories, which are perfect multicollinearity and imperfect multicollinearity. The perfect

multicollinearity problem is more serious when compare with imperfect multicollinearity in a model. Williams (2015) stated that when multicollinearity problem occurs, it can bring to many problems. For example the standard error will increase corresponding to multicollinearity problem. Muticollineariy problem also will lead the coefficients of confidence intervals become widely and high standard errors of estimates of β's, obtained small value of t-statistics which will affect the result.

Based on Jeeshim and Kucc (2002), Marshall and Karadimitriou (n.d.), Williams (2015) and Stephanie (2015) showed that there have few methods to detect multicollinearity problem, it included high R^2 but few significant t-ratio, high pair-wide correlation among independent variables, Variance Inflation Factor (VIF) and Tolerance Factor (TOL). When using the square of the coefficient (r-squared), the higher the R^2 ratio, it means the correlation between the variables are high. As the ratio is above 0.8, it means there has a multicollinearity problem. Besides, when the correlation coefficients, r for every pair of independent variables is perfectly +1 or -1, it indicated as perfect multicollinearity. If the correlation coefficients, r is more than 0.8, it showed there is multicollinearity problems, and one of the variables need removed from the model. For the VIF approach, when the VIF value is more than 10, it means the independent variables are highly interrelated and has serious multicollinearity problem. Otherwise, there is no serious multicollinearity problem. For TOL approach, when the value is near to 0, it means a serious multicollinearity problem exists in the model.

$$VIF = \frac{1}{1 - R^2} ; TOL = \frac{1}{VIF}$$

3.4.2.2 Autocorrelation

The autocorrelation happens when correlation occurs between the error terms observations in regression model. It can divide into two types, which are pure correlation and impure correlation. Autocorrelation occurs maybe due to various reasons, such as omitted important variables, misspecification of the model and manipulated data. Based on Babatunde, Ikughur, Ogunmola and Oguntunde (2014), stated that the main reason of autocorrelation problem occurred is the model is omitted important variables.

If the relevant independent variable is omitted, it will cause the error term include dependent variable. Others than that, the effects of the problems also include the estimators no longer be BLUE. The estimator will become inefficient, variance of estimator become underestimated, and thus the large value of t-statistics which will lead to the insignificant variables to be considered as significant. Hence, the t-test and F-test are invalid. Babatunde et al. (2014) also proved that when the model is excluding important variable, it become an improper regression model and thus affect the estimators as well as the result.

There are some methods can use to detect autocorrelation problem, such as graphical method, Durbin-Watson Statistic test and Breush-Godfrey LM test. Akter (2014) stated that the Durbin-Watson test is the test that is most common and widely used for the detection of autocorrelation problem. The test would be carry in this study is Durbin-Watson Statistic test.

H_0: There is no autocorrelation problem
H_1: There is autocorrelation problem
Decision Rule: Reject H_0 if the p-value is less than significance level of 0.05. Otherwise, do not reject H_0.

3.4.2.3 Normality Test (Jarque-Bera Test)

Normality test is used to identify whether the error terms in the model is normally distributed. According to the assumptions in Classical Linear Regression Models (CLRM), it stated that error terms must in normal distributed. If the error term in model does not have normal distribution, it is failed to fulfil the assumption of CLRM. Hence, it will lead to many problems such as the result being inaccurate. This statement also proved by Razali and Yap (2011), Das and Imon (2016), Islam (2011) and Stephanie (2016). All of these authors stated that if the error terms fail to be normally distributed, the result will not be the best and imperfect. Hence, normality test is important to determine whether or not the error terms are normally distributed in model (Singh & Masuku, 2014; Yap & Sim, 2011; Das & Imon, 2016).

There have few tests to examine the error terms whether is normally distributed. Based on Das and Imon (2016), Stephanie (2016), Yap and Sim (2011), Razali and Yap (2011) and Singh and Masuku (2014) pointed out that the tests that can be used to test the normality are Jarque–Bera test, D'Agostino's or D Normality test, Kolmogorov–Smirnov test, Anderson–Darling Test, Shapiro-Wilk test, Omnibus K2 statistic, Lilliefors (LF) and chi-squared test.

In this study, Jarque-Bera Test will be chosen because this test is commonly to be used and straightforward. However, based on Central Limit Theorem, it stated that the sample mean will assume to be normally distributed when the sample size increase (Gordon, 2006; Mordkoff, 2000). As the sample size is greater than 100, than the distribution of sample means will become normal distributed.

H_0: Error terms are normally distributed

H_1: Error terms are not normally distributed

Decision Rule: Reject H_0 if the p-value is less than significance level of 0.05. Otherwise, do not reject H_0.

3.5 Conclusion

In short, this chapter discussed how to conduct research in data processing, research design, data collection methods, data analysis, measurement of variable specification and econometric diagnosis testing. Further discussion on the research model and results of data analysis will be provided in the following Chapter 4.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

This chapter will mainly focus on the empirical data analysis results and interpretation of the study on the factors affecting bank profitability of commercial banks in Malaysia. Many tests were determined and used, such as OLS method and Pooled Least Square method, in order to ensure the trustworthiness and precisely of the data. The E-views result included normality of error term, multicollinearity, autocorrelation, pooled least square, adjusted R-squared, and other information. The 5% significant level will be used in this research.

4.1 Descriptive Analysis

Table 4.1: Descriptive Statistics Result

	Mean	Median	Maximum	Minimum	Standard Deviation
ROA	0.009182	0.009865	0.015939	-0.021189	0.004699
DR	0.044831	0.031463	0.173544	0.009340	0.033403
TETA	0.082458	0.083419	0.134215	0.040565	0.018355
CLA	0.023952	0.023766	0.041866	0.010485	0.006228
BS	11.01470	11.00254	11.86685	10.23604	0.383969

Descriptive statistics are used to determine the characteristic of a data set. Table 4.1 shows the summary of descriptive statistics for all dependent and independent variables for commercial banks in Malaysia that used in this research from year

2001 to 2016. The variables include return on asset (ROA), default rate (DR) ratio, total equity to total assets (TETA) ratio, cost per loan asset (CLA), and bank size (BS). The mean value in the table implied the average values of each variable of commercial banks in Malaysia from year 2001 to 2016. On the other hand, the differences of profitability among the commercial banks are referred to the minimum and maximum values that shown in the table.

4.2 Panel Data Analysis

4.2.1 Poolability Hypothesis Test

Poolability hypothesis test is used to determine whether the model is Pooled Ordinary Least Square (POLS) or Fixed Effect Model (FEM).

Table 4.2: Poolability Hypothesis Test Result

Redundant Fixed Effect Likelihood Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	6.617455	(7, 116)	0.0000
Cross-section Chi-square	43.007098	7	0.0000

Hypothesis Statement:

H_0: There is common intercept on all Malaysia's commercial banks' profitability (Pooled Ordinary Least Square preferred).

H_1: There is no common intercept on all Malaysia's commercial banks' profitability (Fixed Effect Model preferred).

Decision rule: Reject H_0 if p-value is lower than 5% significance level. Otherwise, do not reject H_0.

Decision: Reject H_0 since the probability value, 0.00000 is lower than 5% significance level as referring to the result shown in table 4.2.

Conclusion: There is sufficient evidence to conclude that no common intercept on all Malaysia's commercial banks' profitability. Therefore, Fixed Effect Model preferred at 5% significance level.

4.2.2 Breusch and Pagan Lagrange Multiplier (BPLM) Test

Breush and Pagan Lagrange Multiplier test is used to the model whether is preferred in the Pooled Ordinary Lease Square (POLS) or the Random Effects Model (REM).

Table 4.3: BPLM Test Result

	Cross-section	**Test Hypothesis Time**	**Both**
Breush-Pagan	13.68014	0.019827	13.69997
	(0.0002)	(0.8880)	(0.0002)

Hypothesis Statement:

H_0: There is common intercept on all Malaysia's commercial banks' profitability (Pooled Ordinary Least Square preferred).

H_1: There is no common intercept on all Malaysia's commercial banks' profitability (Random Effect Model preferred).

Decision rule: Reject H_0 if p-value is lower than 5% significance level. Otherwise, do not reject H_0.

Decision: Reject H_0 since the probability value, 0.0002 is lower than 5% significance level as referring to the result that shown in table 4.3.

Conclusion: There is enough evidence to conclude that no common intercept on all Malaysia's commercial banks' profitability. Therefore, Random Effect Model preferred at 5% significance level.

4.2.3 Hausman Test

Hausman test is usually carried out when determining whether the model is preferred in the Random Effect Model (REM) or the Fixed Effect Model (FEM).

Table 4.4: Hausman Test Result

	Chi-Sq. Statistic	**Chi-Sq. d.f.**	**Prob.**
Hausman Test	12.956352	4	0.0115

Hypothesis Statement:

H_0: There is common intercept on all Malaysia's commercial banks' profitability (Random Effect Model preferred).

H_1: There is no common intercept on all Malaysia's commercial banks' profitability (Fixed Effect Model preferred).

Decision rule: Reject H_0 if p-value is lower than 5% significance level. Otherwise, do not reject H_0.

Decision: Reject H_0 since the probability value, 0.0115 is lower than 5% significance level as referring to the result that shown in table 4.4.

Conclusion: There is enough evidence to conclude that no common intercept on all Malaysia's commercial banks' profitability. Therefore, Fixed Effect Model preferred at 5% significance level.

After testing the model, the result showed FEM model is more preferable and FEM model is choose to use in the following tests and analysis.

4.3 Diagnostic Checking

4.3.1 Multicollinearity Problem

Table 4.5: Correlation among Independent Variables Result

	ROA	DR	TETA	CLA	BS
ROA	1				
DR	-0.5650097	1			
TETA	0.32412511	-0.4504978	1		
CLA	-0.1779679	0.12302719	0.20575730	1	
BS	0.39209537	-0.5498799	0.00848219	-0.0864193	1

Pair-wise correlation is used to test that whether there have multicollinearity problem among the variables or not. Based on the result on the table, it shows that there is not have serious multicollinearity problem exists on the independent variables. This is because all the correlation of coefficient does not more than 0.80 or 80%. Thus, it can be concluded that all the independent variables do not have the problem of multicollinearity.

Lastly, the Variable Inflation Factor (VIF) test and Tolerance (TOL) factors also are used to determine the multicollinearity problem among the independent variables.

4.3.1.1 Variance Inflation Factor

Table 4.6: Variable Inflation Factor (VIF) Test Result

Variables	**R-square**	**VIF= 1/ (1 – R_2)**
DR	0.745445	3.928424
TETA	0.482085	1.930819
CLA	0.571652	2.334550
BS	0.888676	8.982789

Hypothesis Statement:

H_0: The model has no multicollinearity problem.

H_1: The model has multicollinearity problem.

Decision rule: Reject H_0 if VIF is more than 10. Otherwise do not reject H_0.

Decision: Do not reject H_0 since all the variables' VIF values are within the range of 10 as referring to the result that shown in table 4.6.

Conclusion: There is enough evidence to conclude that the model has no multicollinearity problem.

4.3.1.2 Tolerance (TOL) Factors

Table 4.7: TOL Results

Variables	R-square	VIF= 1/ (1– R_2)	TOL= 1/ VIF
DR	0.745445	3.928424	0.254555
TETA	0.482085	1.930819	0.517915
CLA	0.571652	2.334550	0.428348
BS	0.888676	8.982789	0.111324

The value of TOL is close to zero which means that there has a higher multicollinearity among the independent variables while it is close to one is has a lower multicollinearity. From the result, it shows that the TOL value of bank size, 0.111324 is close to zero and it can be defined as that there have a high collinearity with other variables. According to O' Brien (2007) mentioned that if TOL value is not less than 0.10 can be considered as not serious multicollinearity. Since all the TOL results of independent variables are not less than 0.10. Therefore, it can conclude that there is no multicollinearity problem in the model.

4.3.2 Autocorrelation Problem

Based on the diagnostic checking for Autocorrelation problem, Durbin-Watson Statistic test is used to detect the presence of autocorrelation problem in the model and the lag length for autocorrelation is 1.

Table 4.8: Meaning of Durbin-Watson Statistic in Different Range

D-W statistic between 1.5 – 2.5	No autocorrelation
D-W statistic> 2.5	Negative autocorrelation
D-W statistic< 1.5	Positive autocorrelation

Hypothesis Statement:

H_0: The model has no first order autocorrelation problem.

H_1: The model has first order autocorrelation problem.

Decision rule: Reject H_0 if Durbin-Watson value is lower than 1.5 or higher than 2.5. Otherwise, do not reject H_0.

Table 4.9: Durbin-Watson Test Result

Models	**Durbin-Watson Statistic**	**Decision**
Model	1.500277	No Autocorrelation

Decision: Do not reject H_0 since the Durbin-Watson statistic, 1.500277 falls between 1.5 and 2.5 as referring to the result that shown table 4.9.

Conclusion: There is enough evidence to conclude that the model has no first order autocorrelation problem.

4.3.3 Normality Test

Jarque-Bera (JB) test is used to determine for the normality of the error terms.

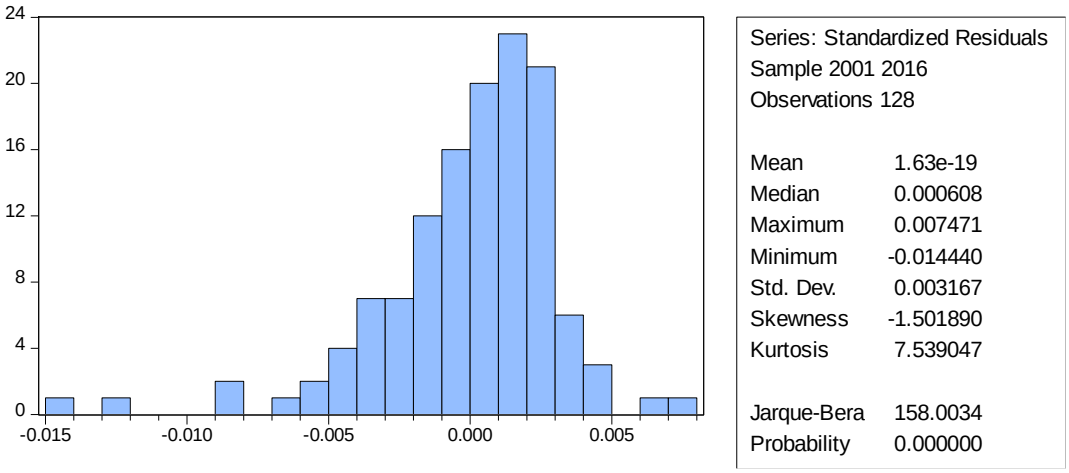
Hypothesis Statement:

H_0: The error terms are normally distributed.

H_1: The error terms are not normally distributed.

Decision rule: Reject H_0 if P-value is lower than 5% significance level. Otherwise, do not reject H_0.

Figure 4.1: Jarque-Bera Test Result



Decision: Reject H_0 since the probability value, 0.000000 is lower than 5% significance level as referring to the result that shows on Figure 4.1.

Conclusion: There is no enough evidence to conclude that the errors terms are normally distributed at 5% significance level.

Based on Central Limit Theorem, it stated that the distribution of sample means approaches a normal distribution as the sample size increases and this is regard to

the shape of the population distribution (Mordkoff, 2000; Gordon, 2006). On the other hand, normality parameters will become more restrictive when the sample size increases and caused the data becomes harder to be declared in normally disturbed and the normality test becomes less important for the largest data sets. Based on the study, the number of observations is 128 which is more than 100. Therefore, the model can be treated as normally distributed.

4.4 Inferential Analysis

4.4.1 Empirical Result

ROA= 0.072072 – 0.085538DR + 0.067510TETA – 0.083983CLA – 0.005684BS

Where,

Table 4.10: Regression Results of the Model

Variable	Coefficient	Standard Error	T-Statistic	P-value
C	0.072072	0.026824	2.686881	0.0083
DR	–0.085538	0.017451	-4.901736	0.0000
TETA	0.067510	0.022263	3.032392	0.0030
CLA	–0.083983	0.072147	-1.164044	0.2468
BS	–0.005684	0.002296	-2.476224	0.0147

Notes: C= Return on Assets, DR= Default Ratio, TETA=Total Equity to Total Assets, CLA= Cost per Loan Asset, BS= Bank Size

4.4.2 Hypothesis Testing (T-test)

Table 4.11: Result of F-statistic

Variable	Coefficient	Standard Error	T-Statistic	P-value
C	0.072072	0.026824	2.686881	0.0083
DR	–0.085538	0.017451	-4.901736	0.0000
TETA	0.067510	0.022263	3.032392	0.0030
CLA	–0.083983	0.072147	-1.164044	0.2468
BS	–0.005684	0.002296	-2.476224	0.0147
R-square= 0.545699				
P-value (F statistic)= 0.000000				

4.4.2.1 Default Rate (DR)

Hypothesis Statement:

H_0: $\beta_1 = 0$

H_1: $\beta_1 \neq 0$

Decision Rule: Reject H_0 if p-value is less than significance level. Otherwise, do not reject H_0.

Decision: Reject H_0 since p-value, 0.0000 is less than significance level of 0.05.

Conclusion: Default rate is significant in explaining return on assets.

4.4.2.2 Total Equity to Total Assets (TETA)

Hypothesis Statement:

H_0: $\beta_2 = 0$

H_1: $\beta_2 \neq 0$

Decision Rule: Reject H_0 if p-value is less than significance level. Otherwise, do not reject H_0.

Decision: Reject H_0 as p-value (0.0030) less than significance level of 0.05.

Conclusion: Total equity to total assets is significant in explaining return on assets.

4.4.2.3 Cost per Loan Asset (CLA)

Hypothesis Statement:

H_0: $\beta_3 = 0$

H_1: $\beta_3 \neq 0$

Decision Rule: Reject H_0 if p-value is less than significance level. Otherwise, do not reject H_0.

Decision: Do not reject H_0 since p-value, 0.2468 is less than significance level of 0.05.

Conclusion: Cost per loan asset is insignificant in explaining return on assets.

4.4.2.4 Bank Size (BS)

Hypothesis Statement:

H_0: $\beta_4 = 0$

H_1: $\beta_4 \neq 0$

Decision Rule: Reject H_0 if p-value is less than significance level. Otherwise, do not reject H_0.

Decision: Reject H_0 since p-value, 0.0147 is less than significance level of 0.05.

Conclusion: Bank size is significant in explaining return on assets.

4.4.2.5 Overall Significance of Model (F-test)

Hypothesis Statement:

H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$

H_1: At least one of the βi is not equal to zero, where i=1, 2, 3, 4

Where,

β_1 = Default Rate

β_2 = Total Equity to Total Assets

β_3 = Cost per Loan Asset

β_4 = Bank Size

Decision Rule: Reject H_0 if the p-value of F-statistic is lower than 5% significance level. Otherwise, do not reject H_0.

Decision: Reject H_0 since the p-value, 0.0000 is lower than 5% significance level as referring to the result that shown in table 4.11.

Conclusion: There is enough evidence to conclude that the model is significant at 5% significance level.

4.4.3 Interpretation of R-square and Adjusted R-square

Table 4.12: Results of R-square and adjusted R-square

R-square	0.545699
Adjusted R-square	0.502618

Based on the result, R-square, 0.545699is considered as high. This is because there has approximately of 54.5699% of the variation in profitability of commercial banks in Malaysia can be explained by the variation in independent variables which are default rate, total equity to total assets, cost per loan asset, and bank size.

On the other hand, adjusted R-square, 0.502618 also can be considered as high. The reason is there has approximately of 50.2618% of the variation in profitability of commercial banks in Malaysia can be explained by the variation in independence variables which are capital adequacy ratio, default rate, cost per loan asset, and bank size after taking the degree of freedom into the account.

4.5 Conclusion

In Chapter 4, the results of diagnostic checking have shown that the model is not normally distributed due to the sample size is too large. However, based on Central Limit Theorem, the number of observation in this study is 128, which is bigger than 100. Therefore, the model can be considered as normally distributed. In the results, the model does not have autocorrelation and multicollinearity problems. Furthermore, POLS results stated that there only one independent variable which is cost per loan asset shows insignificant to the dependent variable while other independent variables, total equity to total assets, default rate, and bank size are significant to dependent variable, return on assets. Besides, the output of overall F-test shows that the economic model is significant.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

In Chapter 5, the previous research carried had been summarized. It consists of the description on the entire descriptive and inferential analysis that was obtained from the result in chapter 4. It then followed by summary of findings and implications of study. The limitations had been pointed out and few recommendations had been created for overcoming the problem faced at the same time as reference for future research. This chapter end with a conclusion after completing this research.

5.1 Summary of Statistical Analysis

Table 5.1: Result of Statistical Analysis

Pooled OLS Model:	**p-value**	**Decision**	**Result**
DR	0.0000	Reject H_0	Negative significant
TETA	0.0030	Reject H_0	Positive significant
CLA	0.2468	Do not reject H_0	Negative insignificant
BS	0.0147	Reject H_0	Negative significant
Significant of Model: F Test	0.000000	Reject H_0	Model is Significant

Table 5.2: Result of Diagnostic Checking

Diagnostic Checking	Test	Decision	Result
Multicollinearity	High Pair-Wise Correlation	Do not reject H_0	No multicollinearity problem
Autocorrelation	Durbin-Watson Statistic Test	Do not reject H_0	No first autocorrelation problem
Normality of error term	Jarqua-Bera Test	Reject H_0	Error terms are not normally distributed

The primary purpose for this research is to investigate various variables, which are default rate, total equity to total assets, cost per loan asset, and bank size on credit risk management as it affects commercial banks' financial performance (ROA) in Malaysia for the periods of year 2001 to 2016. In this research, the Pooled OLS Model is used to determine the relationship between dependent variable and independent variable at 5% significance level. The results in Table 5.1 shown that there are three independent variables, which are capital adequacy ratio, default rate, and bank size, are significant in explaining the dependent variable, return of asset at 5% significance level. But, cost per loan asset is shown to be insignificant in explaining return of asset. Refer to the F-test, p-value is 0.000000, it mention that the model is significant at 5% significance level. The R-squared in this study indicates that there has approximately of 54.5699% of the variation in profitability of commercial banks in Malaysia can be explained by the variation in independent variables which are default rate, total equity to total assets, cost per loan asset, and bank size. In terms of diagnosis checking, the result in Table 5.2 shows that the error terms are not normally distributed and there is no autocorrelation, and also no multicollinearity problem. Based on the Central Limit Theorem, it stated that if the number of observations is 128 which is more than 100, the model can be considered as normally distributed. Therefore, the hypothesis testing in the research can be considered as valid and reliable since Classical Linear Regression Model is achieved in the model and all estimators can be proved to Best, Linear, Unbiased, and Efficient (BLUE).

5.2 Discussions on Major Findings

5.2.1 Default Rate (DR)

Based on the result in Chapter 4, there is a significant and negative relationship between default rate ratio and bank profitability. It indicates that for every one unit increase in default rate, the ROA will decrease by 0.085538 unit, ceteris paribus. The result is consistent with our previous expectation. The researchers such as Noman et al. (2015); Ndoka and Islami (2016); Poudel (2012); Kaaya and Pastory (2013); Bhattarai (2014); Teshome, Debela and Sultan (2018); and Gizaw, Kebede and Selvaraj (2015) also showed similar outcome.

Teshome et al. (2018) explained that when the amount of impaired loans increases, will lead to the decreasing amount of interest income that the banks receive from the loans, which then causing the ROA to decrease. Hence, this will give a negative impact to the banks in a way that affecting the ability of the banks to issue more loans to other borrowers which able to produce more income to banks.

Aballey (2009) also conducted a research and able to figure out main factors that causing a bad debt to happen. It including the delayed of loan approval, diversion of loan, as well as ineffective of evaluation of credit request and monitoring process. He also said that the increasing bad loans will become cost to banks which will create impacts towards the quality of banks' assets portfolio and profitability. The reason is that banks make provisions and charge for bad loans and thus, reduce their loan portfolio and income.

On the other hand, the results also indicating that there is a higher level of bad debts which will incur more losses to the banks and ultimately reduce the profits of the

banks (Noman et. al., 2015). This can be reflected in the news reported by Byron in 2017, the banks' operating profit has raised up 11% but the overall profit falls about 33%. It is due to the banks have to keep provision of losses from their operating profit. Subsequently, when the NPL increase, net profit will fall proportionately too. Therefore, a sound CRM is prerequisite and essential so that the profitability of the banks is ensured (Noman et. al., 2015).

5.2.2 Total Equity to Total Assets (TETA)

According to the result generated from regression tests, there is a positive significant relationship between total equity to asset ratio and bank profitability. It indicates that for every one unit increase in total equity to asset ratio, the ROA increases by 0.067510 unit, ceteris paribus. In our research, TETA is found to be the most critical determinants in the ROA model. In another words, it has a positive impact towards banks profitability.

The result is persistent with previous assumption. It is also supported by other researchers such as Staikouras and Wood (2004); Athanasoglou, Brissimis and Delis (2005); Ong and Teh (2013); Pasiouras and Kosmidou (2007); Messai, Gallali and Jouini (2015); and Dietrich and Wanzenried (2011).

Athanasoglou et al. (2005) explained that banks with sound capital position can seek for business chances more effectively and has extra time and flexibility to bargain problems originate from unpredicted losses and hence attaining improved profitability. In addition, Ong and Teh (2013) and Messai et al. (2015) agreed that when banks have a higher TETA, it proves that the banks are well-capitalized banks. These banks are able to cope with the financial risk, reduce the insolvency risk and cost for external funding therefore achieve higher profitability performance. This will imperceptibly build up the depositors' confidence level to continuously deposit

funds with the banks. While Kawshala and Panditharathna (2017) also said banks that are well-capitalized will encounter lower costs of external financing. This will benefit the bank by translating into higher profitability.

5.2.3 Cost per Loan Asset (CLA)

Referring to the output generated in Chapter 4, there is a negative and insignificant relationship between cost per loan asset ratio and bank profitability. It is explained that for every one unit increased in CLA ratio, the ROA will decrease by 0.083983, ceteris paribus. The result is different from our previous expectation. However, the outcome is agreed by the researchers such as Poudel (2012); Kishori and Sheeba (2017); and Ajayi (2017).

Ajayi (2017) claimed that an increasing administrative cost will reduce the profits. The researchers also further explained that the insignificancy suggests that the high interest imposed on loans and advances by banks rendered the variable to be insignificant to their profits. While Poudel (2012) stated that the negative and insignificant relationship between the two variables showed no any relationship between cost per loan assets and profitability of the bank. In another words, in our research, CLA is not a strong determinant to prove its relationship with the profitability of the Malaysia domestic commercial banks. It is not a significant predictor in determining the banks' profitability.

5.2.4 Bank Size (BS)

According to the regression test conducted in Chapter 4, it shows a negative and significant relationship between bank size and profitability of banks. It indicates

that for every one unit increase in the size of bank, the ROA will decrease by 0.005684 unit. The outcome is constant with the researchers' findings such as Aladwan (2015), Dietrich and Wanzenried (2010), Haan and Poghosyan (2011), and Vander (1998) which indicates that large bank size will have negative and significant relationship with profitability and smaller bank size will have positive and significant relationship with profitability.

Staikouras and Wood (2004) pointed that size variable will has negative impact towards the large banks but has positive impact on the smaller banks. This is due to the diseconomies of scale that exist after certain level of size upwards. Besides, the profits of growing banks might fall when size increased as a result of facing diminishing marginal returns.

Aladwan (2015) also has a same point of view with Staikouras and Wood. He expressed that larger banks required a huge start-up costs in terms of high costs in the information-technology area. For an example, the expensive software costs used in the computer mainframes which will reduce the banks' profits. Aladwan also further added that costs used in research and development and political area also could drive up the overall costs of the banks. While Dietrich and Wanzenried (2010) also revealed that the agency costs, overhead of bureaucratic processes might causing the larger banks to have decreasing profitability.

5.3 Implications of the Study

According to last chapter, it provides the results and findings on the effect of CRM on profitability of commercial banks in Malaysia. Based on the outcomes of this study, this section will propose the implications for bank's management and policy makers in order to recommend some relevant and useful strategies or policies for the improvement of bank's profitability.

5.3.1 Public

CRM is important for public such as investors, depositors and businessmen in order to have better understanding on bank's performance and thus can helps in their decision making. Before making a decision, publics should have a deep understanding on the banks' performance in order to maintain their benefits. Due to the outcomes in this study, publics should more concern on the bank's performance and stability before making their decisions.

This study is useful to public investors include foreign and local investors. By maintaining investors' benefits, investors should make their investment after the evaluation among the banks. By evaluating the performance of banks among the banks, investors can get a better insight towards each of the banks. For example, the investors can check and analyze the bank's financial position by calculating the financial ratios in order to make a correct decision (Kennon, 2017). In addition, investors can concern on bank's news from bank's official websites, Bursa Malaysia website as well as the Central Bank website to obtain more information and understandings. In addition, investors should create the awareness to encourage them to study and forecast the future potential investment. For instance, investors can grab the opportunity when there is a high interest return rate or low risk projects offers by banks.

Furthermore, this result also beneficial for businessmen during their decision making as well as maintain their own welfares. Businessmen should maintain a good relationship with credit bureau that is responsible to provides personal information to banks ("What is a Credit Bureau - or rather, what should it be?", 2012). If the businessmen are having a bad relationship with credit bureau, credit bureau might prejudice on the businessmen and affect the credit worthiness of the businessmen. This will cause the businessmen hard to get the advance opportunity in borrowing the loan from banks. In addition, businessmen should concern about the borrowing interest rate which can lower the burden of debts ("How do Central

Banks Impact Interest Rates in the Economy?", 2018). Therefore, interest borrowing rate also become a factor that the businessmen should take in account before decide making a loan from banks.

Besides, depositors also become one of the parties that can enjoy benefits form this study. Depositors who are having experiences on the information and facilities of the banks will have higher chances to maintain their own returns. From this statement, it showed that lack of information is one of the factors that influence the depositors in making their decision. So, these depositors should shares their experiences and knowledge with other depositors (Agnihotri & Bhavani, 2015). The shared information will become a reference for the depositors with lack of information towards the banks. This can encourage the new or potential depositors to study more on the banks before making their decision to deposit money. Thus, the references sharing by knowledgeable depositors are essential in helping others to know well about the performance and financial positions of the banks.

In conclusion, there is necessary for publics to have a deep clear and understanding about the management of the banks which can helps them in making a good decision to satisfy their needs and returns in now or future.

5.3.2 Banking Institutions

The CRM can enhance the bank's financial stability by conducting the management system efficiency and effectively in order to generate more income and profit in future. Referring to the results, there have many factors can significantly affect the performance of bank such as default rate and capital adequacy.

Bank should develop or strengthen the banks' CRM system, so that can identify and screening the characteristic of borrowers especially for those who own a bad record in order to reduce the non-performing loan probability. Also, banks should improve the system in order to increase the effectiveness in monitoring the loan repayment of borrowers. The Ntiamoah, Oteng and Siaw (2014), Aballey (2009), Kurawa (2014) and Kohansal and Mansoori (2009) proved that the credit evaluation and performance monitoring are important for banks to reduce the default rate and take an action when it is necessary to keep profitability of bank.

Besides, banks should concern about the development of equity market. This is because as the equity market is strong, it can boost up the stock's performance and bank's profitability (Bennaceur & Goaied, 2008). Moreover, bank can offer the new or additional shares in order to encourage the investors, shareholders, and customers to make investment in the bank. Therefore, the probability of credit risk that faced by bank will reduce since it has more equity to meet its obligation and maintain its operation (Borad, 2018).

From the theory of diseconomies scale, bank should not over expanding its bank size which is total assets in order to maintain the profits. Hence, it suggests that banks reduce its trading activities and invest in low profitable investments to maintain the level of bank size. When the bank size increases until a certain level, the bank's profitability will decrease (Staikouras & Wood, 2004; Almazari, 2013; Aladwan, 2015). Also, Aladwan (2015) has pointed that the bank's profits reduce when high cost incurred in banks. So, banks can reduce the costs through leasing assets form others company. Thus, banks can avoid buying advanced technology mechanism for new technology functions purposes. From this, the bank can save the money from costs and thus maintain the profits.

In a nutshell, an efficiency and effectively CRM system implemented by banks can improve the banks' performance, financial position and stability. Also, a well CRM

system also can increases the opportunities and chances for banks to grab to earn more profits.

5.3.3 Policy Makers

CRM can provide assistances to policy makers to gain sufficient information when undergoing the making decision process which will lead to greater impact to bank's performance. Policy makers can play its role in conducting some intervention that can affect the banks' performance.

Central Bank should frequently awareness on the economics' performance and take action accordingly to maintain the financial stability of banks. For example, Central Bank can lower the discount rate when it is in bad economy condition. As the low of discount rate, banks able to borrow loan from Central Bank with lower interest rate and then banks have ability to offer low interest borrowing rate to borrowers. This can decrease the burden for borrowers and reduce the non-performing loan as well as maintain the profitability of bank ("How Do Central Banks Impact Interest Rates in the Economy?", 2018).

Moreover, Central Bank might increase the required reserve ratio of banks. As the required reserve ratio increase, banks required to put more reserves with Central Bank ("What are minimum reserve requirements?", 2016). This will lead to limit funds with banks and thus can discourage the banks to take too much risky investments. In addition, the Central Bank should restrict the capital adequacy requirement for banks. As the requirement of capital adequacy increase, it can restrict the expansion of bank size which will lead to lower profitability of banks. Central Bank should also encourage the banks to maintain a lower liquidity risk in order to maintain its operations when deal with uncertainty risks.

In short, Central Bank is compulsory to have a better understanding on CRM and the effectiveness of intervention policies by Central Bank can bring a lot of benefits such as enhance the opportunities for banks to improve banks' financial position as well as publics to meet their goals.

5.4 Limitations of Study

Along the progress undertaking this study, there are some limitations which may cause the results to be less accurate throughout the whole research.

Firstly, there was difficulty in deciding which variable to be set as the independent variables. There are only three independent variables being discussed in this study that can affect the profitability of commercial banks, these include DR, TETA and CLA ratio. Initially, there were five independent variables which include the additional variables of capital adequacy ratio (capital funds/ risk-weighted assets) and leverage ratio (total debt/ total equity). Nonetheless, capital adequacy ratio was dropped from the independent variables because the figure for risk-weighted assets was mixed with group and bank, while the figure to be taken should be only from the group column, thus this variable was dropped to prevent inaccuracy of data. Also, leverage ratio was taken out as well as there was a multicollinearity problem with the existing determinant, which is TETA ratio.

The second limitation was it was challenging and difficult during the data collection process. This study only focused on the local commercial banks and ignored those foreign commercial banks in Malaysia. This findings might not reflect the real condition of all banking industries in Malaysia. This was due to the incomplete annual reports of certain banks where there were missing period on the annual report. The eight local commercial banks have published completed annual report of 16 years consecutively from 2001 to 2016, but some of the foreign commercial banks

did not provide financial statement for so many years. One of the examples include for the issue of The Bank of Nova Scotia Berhad, there were only four years of yearly financial statement starting from 2013 to 2016 could be obtained from its official website. Hence, this study in Malaysia commercial banks only taken into account the eight local commercial banks.

Lastly, this study only select ROA as the dependent variable to indicate the commercial banks' profitability. In fact, there are other ratio indicators of a bank's profitability such as return on equity (ROE) and return on capital employed (ROCE). Thus, it might not be comprehensive to assess every single performance of local commercial banks by using only ROA as the ratio indicator of profitability.

5.5 Recommendations for Future Research

There are some suggestions for those researchers who are interested in conducting the similar research area of this study in future. Firstly, it is suggested for the researchers to improve the existing model by adding more important variables. Despite the bank-specific determinants that were included in this study as the independent variables, the macroeconomic determinants such as inflation and gross domestic products can be considered as well. According to the study done by Jamal, Hamidi and Karim (2012), there is a positive effect of inflation and gross domestic product on the performance of banks. It is believed that with more important variables to be included, the accuracy of the research model can be improved and thereby, enhancing the results to be obtained from the study.

Furthermore, it is recommended to include the foreign commercial banks in Malaysia. This is because for different ownership of banks in Malaysia, the effect of variables on them might get different result as well. Both local and foreign commercial banks are advisable to be included in future research to figure out

whether or not the effect of variables will change based on different bank's ownership. As mentioned in the limitation part previously that there are missing annual reports for certain years, the researchers in future can shorten the financial period by taking only four or five years while enlarging the number of banks to be taken into account.

Last but not least, the future research is suggested to consider other aspects of financial performance. In this study, the dependent variable is profitability of commercial banks, indicated by ROA to evaluate the financial performance of commercial banks in Malaysia. Nonetheless, profitability is just one of the aspects of financial performance in banks. In order to extend the research, it is recommended to identify and explore the other aspects of financial performance.

5.6 Conclusion

This research focused on the effect of CRM to the profitability of commercial banks in Malaysia. The dependent variable is represented by the ratio of return on asset while independent variables represented by default rate ratio, total equity to total assets ratio, cost per loan asset ratio and bank size. The eight Malaysia commercial banks have been involved. The data is collected from year 2001 to year 2016 with total sample size of 128. Only the secondary data has been used for research purpose and all the data is resourced from the financial statement of annual report of every single commercial bank. The total equity to total assets ratio and cost per loan ratio are expected to have positive relationship with return on asset while default rate ratio and bank size are assumed to be negative in this study. Also, this study has carried out few tests to choose for the suitable model between POLS, FEM and REM. The tests involved include poolability test, BPLM test and Hausman test. After completed all the tests, the outcomes shown that FEM is a preferable model in this study. Besides, this study has included some relevant tests for diagnostic

testing purpose. For example, high R-squared with low t-statistic and high pair-wide correlation among the independent variables, VIF and TOL which were used to test for multicollinearity problem, Durbin-Watson statistic test for testing autocorrelation problem and Jarque-Bera test for testing the normality of error terms. After the diagnostic testing, the model in this study did not consist the problems as mentioned above.

From hypothesis testing of t-test, the default rate ratio, total equity to total assets ratio and bank size proved to have a significant relationship with return on assets while cost per loan asset ratio showed insignificant relationship with the dependent variable. Except total equity to total assets ratio which is positively related with return on assets, the other three variables have a negative relationship with the dependent variable. In addition, the overall significance of model has been carried out by using F-test and the result showed this model is significant at 5% significance level.

During the research, the problems faced include decision to select the suitable independent variables. Some of the variables were forced to drop in order to continue the project. It was also challenging in collecting data as some of the annual reports provided by certain banks in Malaysia is incomplete and some years are missing. Also, the dependent variable involved in this research might not comprehensive enough to measure the profitability of every single commercial banks. The recommendation for researchers who are interested in doing this topic area is suggested to include more important variables to improve the existing model. The researcher also being advised to take foreign commercial bank in Malaysia into consideration in their future research due to different ownership might get different result on the effect of variables. Lastly, other aspects of financial performance also suggested to consider for research purpose.

In short, this study shown that CRM indicated by the independent variables have individual and uniting effect on profitability of banks. To enhance the performance

of commercial banks, banks should have a low DR ratio and CLA ratio and also a high TETA ratio. Meanwhile, the bank size can be increased but avoid over expanded it up to a certain level to prevent diseconomies of scale. To further emphasize, this study proved that an effective CRM is crucial to lead to a better bank performance in term of profitability.

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APPENDICES

Appendix 1.1: Raw Data for Dependent and Independent Variables for Eight Local Commercial Banks in Malaysia during 2001-2016

BANKS	YEAR	ROA	DR	TETA	BS	CLA
AFFIN	2001	-0.021189	0.173544	0.060899	10.495617	0.026678
	2002	0.003074	0.108503	0.063448	10.519409	0.028565
	2003	0.003600	0.082467	0.067712	10.548518	0.029954
	2004	0.007008	0.070200	0.081070	10.516536	0.029301
	2005	0.007556	0.050036	0.102808	10.493994	0.029056
	2006	0.006395	0.050945	0.097983	10.550032	0.027543
	2007	0.006839	0.043012	0.115093	10.566006	0.031200
	2008	0.007948	0.033200	0.119754	10.566278	0.028267
	2009	0.009307	0.033644	0.118518	10.601562	0.026058
	2010	0.010395	0.025382	0.110651	10.672134	0.023566
	2011	0.009454	0.017229	0.104068	10.730266	0.021196
	2012	0.011264	0.016087	0.108258	10.746901	0.020168
	2013	0.010842	0.011549	0.106365	10.777800	0.019130
	2014	0.009185	0.013228	0.119750	10.823928	0.023941
	2015	0.005670	0.020622	0.123544	10.828673	0.024743
	2016	0.008417	0.015393	0.126745	10.838133	0.025885
ALLIANCE	2001	-0.000800	0.091504	0.041725	10.236044	0.010485
	2002	0.002756	0.125219	0.040565	10.280224	0.020575
	2003	0.008052	0.071332	0.077198	10.305441	0.022194
	2004	0.008671	0.071768	0.075513	10.367594	0.019939
	2005	0.009095	0.052557	0.082128	10.373755	0.022986
	2006	-0.008558	0.087384	0.073885	10.372566	0.029633
	2007	0.004067	0.106371	0.073590	10.421592	0.034365
	2008	0.013731	0.046105	0.093541	10.442204	0.028413
	2009	0.007185	0.039603	0.086703	10.503170	0.028812
	2010	0.009522	0.031299	0.093077	10.500560	0.025905
	2011	0.011343	0.025162	0.092929	10.557169	0.024283
	2012	0.012116	0.017669	0.092679	10.597733	0.023687
	2013	0.012316	0.018566	0.092246	10.640402	0.022649
	2014	0.011722	0.017249	0.086657	10.681917	0.019508
	2015	0.009988	0.018649	0.084587	10.725434	0.017521
	2016	0.009385	0.017767	0.087044	10.745286	0.017780
AMBANK	2001	0.008515	0.129138	0.055141	10.610674	0.024344

	2002	0.003631	0.088069	0.045031	10.742385	0.020818
	2003	0.004492	0.067440	0.057035	10.767555	0.026304
	2004	0.003699	0.062012	0.067916	10.781602	0.032984
	2005	0.003263	0.031060	0.077308	10.791585	0.035949
	2006	0.005058	0.050541	0.084941	10.858902	0.030780
	2007	-0.000639	0.031626	0.062006	10.895548	0.027730
	2008	0.009746	0.024044	0.086182	10.920080	0.028286
	2009	0.009770	0.019837	0.086059	10.953725	0.027432
	2010	0.010806	0.015544	0.099893	10.984439	0.022651
	2011	0.012853	0.018239	0.095245	11.034373	0.021728
	2012	0.014002	0.022024	0.099778	11.048657	0.022267
	2013	0.013333	0.014789	0.094754	11.103781	0.023666
	2014	0.014137	0.019294	0.099302	11.121735	0.023762
	2015	0.015280	0.022656	0.108032	11.126469	0.023792
	2016	0.010462	0.016130	0.113397	11.126339	0.024767
CIMB	2001	0.004600	0.127573	0.074024	10.871400	0.028079
	2002	0.006125	0.081867	0.075541	10.959927	0.024667
	2003	0.007988	0.064724	0.080662	10.990933	0.029609
	2004	0.006718	0.076761	0.078483	11.049104	0.029581
	2005	0.007283	0.058549	0.084892	11.055095	0.031389
	2006	0.010080	0.044790	0.074455	11.203053	0.035268
	2007	0.015939	0.043507	0.085926	11.262051	0.041866
	2008	0.009735	0.030260	0.082540	11.315415	0.033637
	2009	0.012697	0.029628	0.084777	11.380182	0.038398
	2010	0.013699	0.032442	0.086240	11.430342	0.038965
	2011	0.013572	0.020762	0.086397	11.477415	0.034640
	2012	0.013045	0.014934	0.084190	11.527703	0.036536
	2013	0.012426	0.014716	0.081612	11.569272	0.036059
	2014	0.007665	0.017655	0.090209	11.617164	0.031333
	2015	0.006274	0.017422	0.088936	11.664244	0.031055
	2016	0.007479	0.020516	0.093271	11.686428	0.026726
HONG LEONG	2001	0.009970	0.102545	0.073397	10.597076	0.019759
	2002	0.011713	0.091432	0.078946	10.632886	0.020033
	2003	0.013331	0.104907	0.089687	10.639174	0.019369
	2004	0.007786	0.108166	0.090205	10.690731	0.020046
	2005	0.009019	0.103527	0.076373	10.760601	0.021445
	2006	0.009075	0.110126	0.072297	10.782446	0.020579
	2007	0.008673	0.092524	0.065226	10.853843	0.023004
	2008	0.009577	0.073204	0.066269	10.889084	0.023948
	2009	0.011393	0.078477	0.072752	10.899845	0.024624
	2010	0.011664	0.075477	0.075839	10.927912	0.023770
	2011	0.007804	0.010498	0.051334	11.162638	0.014323
	2012	0.010445	0.022948	0.072372	11.198072	0.021253

	2013	0.011347	0.019049	0.079693	11.213745	0.019001
	2014	0.012341	0.016372	0.085296	11.231344	0.017205
	2015	0.012136	0.013449	0.091238	11.264864	0.015993
	2016	0.010027	0.013036	0.111243	11.278361	0.017303
MAYBANK	2001	0.005959	0.094343	0.071260	11.148903	0.020453
	2002	0.011009	0.074296	0.077957	11.175117	0.020741
	2003	0.012404	0.060617	0.086267	11.206706	0.020784
	2004	0.013506	0.058897	0.083912	11.254082	0.021922
	2005	0.013041	0.058215	0.087827	11.283064	0.022054
	2006	0.012505	0.039857	0.077939	11.350646	0.023333
	2007	0.012673	0.030554	0.077408	11.409371	0.025687
	2008	0.011157	0.022744	0.074497	11.429915	0.024852
	2009	0.002416	0.023375	0.082925	11.492396	0.028750
	2010	0.011786	0.021675	0.085135	11.527243	0.030067
	2011	0.005930	0.009340	0.077037	11.654455	0.014007
	2012	0.011957	0.013074	0.088821	11.694488	0.025671
	2013	0.012082	0.012413	0.085187	11.748532	0.024705
	2014	0.010793	0.011785	0.085493	11.806383	0.022251
	2015	0.009863	0.017649	0.089665	11.850245	0.022376
	2016	0.009462	0.019129	0.095760	11.866852	0.021776
PUBLIC	2001	0.013471	0.048645	0.118122	10.726257	0.030759
	2002	0.012470	0.022580	0.110612	10.790747	0.028193
	2003	0.015519	0.022050	0.134215	10.810504	0.024964
	2004	0.013759	0.033635	0.093072	10.964200	0.022965
	2005	0.012995	0.035268	0.075995	11.047689	0.020543
	2006	0.012147	0.030107	0.061127	11.169644	0.018158
	2007	0.012643	0.025579	0.053643	11.240936	0.016769
	2008	0.013370	0.019233	0.048616	11.292617	0.014886
	2009	0.011751	0.018048	0.050766	11.336732	0.015333
	2010	0.013693	0.019206	0.057584	11.354740	0.013416
	2011	0.014129	0.014707	0.059593	11.396916	0.012430
	2012	0.014244	0.013024	0.065340	11.438740	0.011937
	2013	0.013429	0.013289	0.066804	11.485332	0.011320
	2014	0.013199	0.011203	0.081061	11.538727	0.010634
	2015	0.014079	0.010283	0.085857	11.560813	0.010661
	2016	0.013860	0.010153	0.090023	11.579844	0.010925
RHB	2001	0.004607	0.080131	0.060707	10.756420	0.021460
	2002	0.002958	0.108835	0.062959	10.758239	0.020650
	2003	0.003606	0.059205	0.055756	10.841895	0.020525
	2004	0.005567	0.081689	0.051348	10.914493	0.033909
	2005	0.003512	0.049464	0.049970	10.953782	0.024396
	2006	0.005768	0.072711	0.058578	11.014142	0.024138
	2007	0.007818	0.061032	0.067272	11.021827	0.026502

	2008	0.010042	0.050768	0.075009	11.019252	0.023955
	2009	0.010514	0.055593	0.076034	11.060514	0.022486
	2010	0.011046	0.046365	0.077115	11.111684	0.019587
	2011	0.009867	0.038147	0.075136	11.182967	0.019562
	2012	0.009466	0.034994	0.081133	11.276640	0.020576
	2013	0.009647	0.033862	0.088664	11.281238	0.025068
	2014	0.009407	0.026002	0.086135	11.341146	0.023940
	2015	0.006606	0.026886	0.100163	11.363081	0.025056
	2016	0.007130	0.030177	0.091998	11.374159	0.020060

Appendix 1.2: Result of Descriptive Analysis

	ROA	DR	TETA	CLA	BS
Mean	0.009182	0.044831	0.082458	0.023952	11.01470
Median	0.009865	0.031463	0.083419	0.023766	11.00254
Maximum	0.015939	0.173544	0.134215	0.041866	11.86685
Minimum	-0.021189	0.009340	0.040565	0.010485	10.23604
Std. Dev.	0.004699	0.033403	0.018355	0.006228	0.383969
Skewness	-2.682676	1.169887	0.207641	0.189539	0.141015
Kurtosis	16.28356	3.887145	3.157332	3.217300	2.228396
Jarque-Bera	1094.613	33.39503	1.051802	1.018237	3.599537
Probability	0.000000	0.000000	0.591023	0.601025	0.165337
Sum	1.175252	5.738365	10.55457	3.065901	1409.881
Sum Sq. Dev.	0.002805	0.141698	0.042789	0.004926	18.72389
Observations	128	128	128	128	128

Appendix 1.3: Result of Poolability Hypothesis Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	6.617455	(7,116)	0.0000
Cross-section Chi-square	43.007098	7	0.0000

Cross-section fixed effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 04/04/18 Time: 00:46
Sample: 2001 2016
Periods included: 16
Cross-sections included: 8
Total panel (balanced) observations: 128

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DR	-0.050744	0.014764	-3.436926	0.0008
TETA	0.049307	0.022845	2.158267	0.0328
CLA	-0.119061	0.057383	-2.074848	0.0401
BS	0.002185	0.001116	1.957882	0.0525
C	-0.013819	0.013375	-1.033175	0.3035

R-squared	0.364283	Mean dependent var	0.009182
Adjusted R-squared	0.343609	S.D. dependent var	0.004699
S.E. of regression	0.003807	Akaike info criterion	-8.265509
Sum squared resid	0.001783	Schwarz criterion	-8.154102
Log likelihood	533.9926	Hannan-Quinn criter.	-8.220244
F-statistic	17.62056	Durbin-Watson stat	1.120436
Prob(F-statistic)	0.000000		

Appendix 1.4: Result of Breusch and Pagan Lagrange Multiplier (BPLM) Test

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	13.68014 (0.0002)	0.019827 (0.8880)	13.69997 (0.0002)
Honda	3.698667 (0.0001)	0.140810 (0.4440)	2.714920 (0.0033)
King-Wu	3.698667 (0.0001)	0.140810 (0.4440)	3.133502 (0.0009)
Standardized Honda	5.417863 (0.0000)	0.434028 (0.3321)	-0.290895 (0.6144)
Standardized King-Wu	5.417863 (0.0000)	0.434028 (0.3321)	0.473863 (0.3178)
Gourieroux, et al.*	--	--	13.69997 (0.0004)

Appendix 1.5: Result of Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	12.956352	4	0.0115

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
DR	-0.085538	-0.063314	0.000072	0.0088
TETA	0.067510	0.065369	0.000024	0.6623
CLA	-0.083983	-0.068374	0.001055	0.6309
BS	-0.005684	-0.001042	0.000003	0.0038

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 04/04/18 Time: 00:50
Sample: 2001 2016
Periods included: 16
Cross-sections included: 8
Total panel (balanced) observations: 128

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.072072	0.026824	2.686881	0.0083
DR	-0.085538	0.017451	-4.901736	0.0000
TETA	0.067510	0.022263	3.032392	0.0030
CLA	-0.083983	0.072147	-1.164044	0.2468
BS	-0.005684	0.002296	-2.476224	0.0147

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.545699	Mean dependent var	0.009182
Adjusted R-squared	0.502618	S.D. dependent var	0.004699
S.E. of regression	0.003314	Akaike info criterion	-8.492127
Sum squared resid	0.001274	Schwarz criterion	-8.224749
Log likelihood	555.4961	Hannan-Quinn criter.	-8.383490
F-statistic	12.66701	Durbin-Watson stat	1.500277
Prob(F-statistic)	0.000000		

Appendix 1.6: Result of Correlation among Independent Variables Result

	ROA	DR	TETA	CLA	BS
ROA	1	-0.5650097...	0.32412511...	-0.1779679...	0.39209537...
DR	-0.5650097...	1	-0.4504978...	0.12302719...	-0.5498799...
TETA	0.32412511...	-0.4504978...	1	0.20575730...	0.00848219...
CLA	-0.1779679...	0.12302719...	0.20575730...	1	-0.0864193...
BS	0.39209537...	-0.5498799...	0.00848219...	-0.0864193...	1

Appendix 1.7: Results of Fixed Effect Model for Default Rate

Dependent Variable: DR
Method: Panel Least Squares
Date: 04/04/18 Time: 02:32
Sample: 2001 2016
Periods included: 16
Cross-sections included: 8
Total panel (balanced) observations: 128

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TETA	-0.667999	0.100486	-6.647698	0.0000
CLA	-0.145500	0.381988	-0.380902	0.7040
BS	-0.098935	0.008015	-12.34338	0.0000
C	1.193132	0.089596	13.31681	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.745445	Mean dependent var	0.044831
Adjusted R-squared	0.723689	S.D. dependent var	0.033403
S.E. of regression	0.017558	Akaike info criterion	-5.164576
Sum squared resid	0.036070	Schwarz criterion	-4.919480
Log likelihood	341.5329	Hannan-Quinn criter.	-5.064992
F-statistic	34.26263	Durbin-Watson stat	0.966383
Prob(F-statistic)	0.000000		

Appendix 1.8: Results of Fixed Effect Model for Total Equity to Total Assets

Dependent Variable: TETA
Method: Panel Least Squares
Date: 04/04/18 Time: 02:27
Sample: 2001 2016
Periods included: 16
Cross-sections included: 8
Total panel (balanced) observations: 128

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DR	-0.410415	0.061738	-6.647698	0.0000
CLA	0.605138	0.294331	2.055981	0.0420
BS	-0.022627	0.009300	-2.432963	0.0165
C	0.335593	0.106981	3.136946	0.0022

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.482085	Mean dependent var	0.082458
Adjusted R-squared	0.437819	S.D. dependent var	0.018355
S.E. of regression	0.013763	Akaike info criterion	-5.651693
Sum squared resid	0.022161	Schwarz criterion	-5.406597
Log likelihood	372.7083	Hannan-Quinn criter.	-5.552109
F-statistic	10.89058	Durbin-Watson stat	0.656951
Prob(F-statistic)	0.000000		

Appendix 1.9: Results of Fixed Effect Model for Cost per Loan Asset

Dependent Variable: CLA
Method: Panel Least Squares
Date: 04/04/18 Time: 02:33
Sample: 2001 2016
Periods included: 16
Cross-sections included: 8
Total panel (balanced) observations: 128

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DR	-0.008512	0.022347	-0.380902	0.7040
TETA	0.057621	0.028026	2.055981	0.0420
BS	-0.008226	0.002842	-2.895077	0.0045
C	0.110194	0.032828	3.356745	0.0011

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.571652	Mean dependent var	0.023952
Adjusted R-squared	0.535041	S.D. dependent var	0.006228
S.E. of regression	0.004247	Akaike info criterion	-8.003255
Sum squared resid	0.002110	Schwarz criterion	-7.758158
Log likelihood	523.2083	Hannan-Quinn criter.	-7.903671
F-statistic	15.61426	Durbin-Watson stat	0.817100
Prob(F-statistic)	0.000000		

Appendix 1.10: Results of Fixed Effect Model for Bank Size

Dependent Variable: BS
Method: Panel Least Squares
Date: 04/04/18 Time: 02:35
Sample: 2001 2016
Periods included: 16
Cross-sections included: 8
Total panel (balanced) observations: 128

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DR	-5.717266	0.463185	-12.34338	0.0000
TETA	-2.128245	0.874754	-2.432963	0.0165
CLA	-8.125962	2.806821	-2.895077	0.0045
C	11.64113	0.093592	124.3815	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.888676	Mean dependent var	11.01470
Adjusted R-squared	0.879161	S.D. dependent var	0.383969
S.E. of regression	0.133475	Akaike info criterion	-1.107789
Sum squared resid	2.084417	Schwarz criterion	-0.862693
Log likelihood	81.89849	Hannan-Quinn criter.	-1.008205
F-statistic	93.39867	Durbin-Watson stat	0.651387
Prob(F-statistic)	0.000000		

Appendix 1.11: Results of Fixed Effect Model for Return on Assets

Dependent Variable: ROA
Method: Panel Least Squares
Date: 04/04/18 Time: 00:57
Sample: 2001 2016
Periods included: 16
Cross-sections included: 8
Total panel (balanced) observations: 128

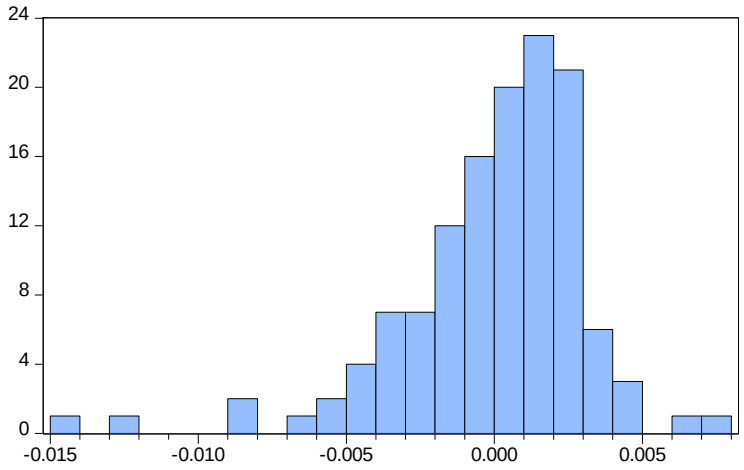
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DR	-0.085538	0.017451	-4.901736	0.0000
TETA	0.067510	0.022263	3.032392	0.0030
CLA	-0.083983	0.072147	-1.164044	0.2468
BS	-0.005684	0.002296	-2.476224	0.0147
C	0.072072	0.026824	2.686881	0.0083

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.545699	Mean dependent var	0.009182
Adjusted R-squared	0.502618	S.D. dependent var	0.004699
S.E. of regression	0.003314	Akaike info criterion	-8.492127
Sum squared resid	0.001274	Schwarz criterion	-8.224749
Log likelihood	555.4961	Hannan-Quinn criter.	-8.383490
F-statistic	12.66701	Durbin-Watson stat	1.500277
Prob(F-statistic)	0.000000		

Appendix 1.12: Result of Normality Test



Series: Standardized Residuals	
Sample 2001 2016	
Observations 128	
Mean	1.63e-19
Median	0.000608
Maximum	0.007471
Minimum	-0.014440
Std. Dev.	0.003167
Skewness	-1.501890
Kurtosis	7.539047
Jarque-Bera	158.0034
Probability	0.000000