Group B05

THE BANK-SPECIFIC AND MACROECONOMIC FACTORS THAT AFFECT DOMESTIC COMMERCIAL BANKS PERFORMANCE IN MALAYSIA

HWANG MIN YEE
KO LEE WOON
LEE YUET JIA
ONG ANGIE
WAN KOK SING

BACHELOR OF BUSINESS ADMINISTRATION
(HONS) BANKING AND FINANCE

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF BUSINESS AND FINANCE
DEPARTMENT OF FINANCE

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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 12,370 words.

Name of Student:	Student ID:	Signature:
1. Hwang Min Yee	12ABB03023	
2. Ko Lee Woon	12ABB00290	
3. Lee Yuet Jia	12ABB03159	
4. Ong Angie	12ABB03055	
5. Wan Kok Sing	12ABB04932	

Date: 18 April 2016

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DEDICATION

This dissertation is dedicated to our supervisor, Mr. Tan Kock Lim for all his advices and guidance to assist us in completing this thesis.

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LIST OF ABBREVIATIONS

ARDL	Autoregressive Distributed Lag
BLUE	Best Linear Unbiased Estimator
BNM	Bank Negara Malaysia
CA	Capital Adequacy
CLRM	Classical Linear Regression Model
ECM=	Error Correction Model
Et al	And Others
FEM	Fixed Effect Model
FRA	Financial Ratio Analysis
GDP	Gross Domestic Products
GMM	Generalized Method of Moments
LEV	Leverage
NEER	Nominal Effective Exchange Rate
NII	Net Interest Income
NIM	Net Interest Margin
Pooled OLS	Pooled Ordinary Least Square
REER	Real Effective Exchange Rate
REM	Random Effect Model
RIR	Real Interest Rate
ROA	Return On Assets
ROE	Return On Equity
VIF	Variance Inflation Factor

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PREFACE

Nowadays, domestic commercial banks pay attention not only bank's profitability but the efficiency and effectiveness of banking institutions. Well-capitalized commercial banks can enhance the bank performance. The factors that affect the banks' performance have become crucial for banks' success. In this research, the factors that influence the banks' performance will be examined by using STATA. The research data are retrieved from 2005 to 2014. The purpose is to include the financial crisis which occurred in within the year of 2007 and 2008.

In this research, return on assets (ROA) is used to represent the measurement for bank performance. ROA is the best indicator to measure how fully utilized the bank use its assets to generate profit. Besides that, ROA is computed by total net income over total asset. The higher the ROA ratio, the higher the bank profitability is.
The determinations of bank's profitability are categorized into bank-specific (internal factors) and macroeconomic factors (external factors). The bank-specific factors are capital adequacy and leverage while macroeconomic factors are exchange rate and interest rate.

The process of conducting the research is uneasy. The guidance from supervisor and the contribution of every group mates are much appreciated. Teamwork is very important in doing the research. We make discussion and solve the problem that we faced together. We believe that the effort that we put in will not be wasted and wish that the research can help other researchers in their study.

ABSTRACT

The purpose of this study is to investigate the impact of bank-specific and macroeconomic factors on the domestic commercial bank's financial performance during 2005 - 2014. Our study is based on eight domestic commercial banks in Malaysia which are Affin Bank Berhad, Alliance Bank Malaysia Berhad, Ambank (M) Berhad, CIMB Bank Berhad, Hong Leong Bank Berhad, Malayan Bank Berhad, Public Bank Berhad and RHB Bank Berhad. The Panel Data Regression Model is used to regress the balanced panel data. The results shows that, capital adequacy, leverage, and exchange rate contributes significant relationship on banks' performance, however, real interest rate is found to be insignificant with the banks' performance.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

There are 8 sections to be discussed in this chapter and all the sections can be entitled as the research overview. Those sections are background of this research paper, problem statement, targeted research objectives and questions, hypothesis and implications of the research, outline of the chapters and conclusion. In the first place, background and performance of the banking sector in Malaysia will be briefly explained and discussed in order to deliver the context of this research. Following by the problem statement, the core research problem and research objective will briefly discuss to address the purpose of this study. Thus, research questions and hypotheses to be identified or proposed as a guidance to carry out this research. Moreover, the significance of this study was constructed to identify the involvement of this study. Chapter layout will outline the entire 5 chapters in this research. Lastly, conclusion to be made as a summary of Chapter 1 and provide a linkage to Chapter 2.

1.1 Research Background

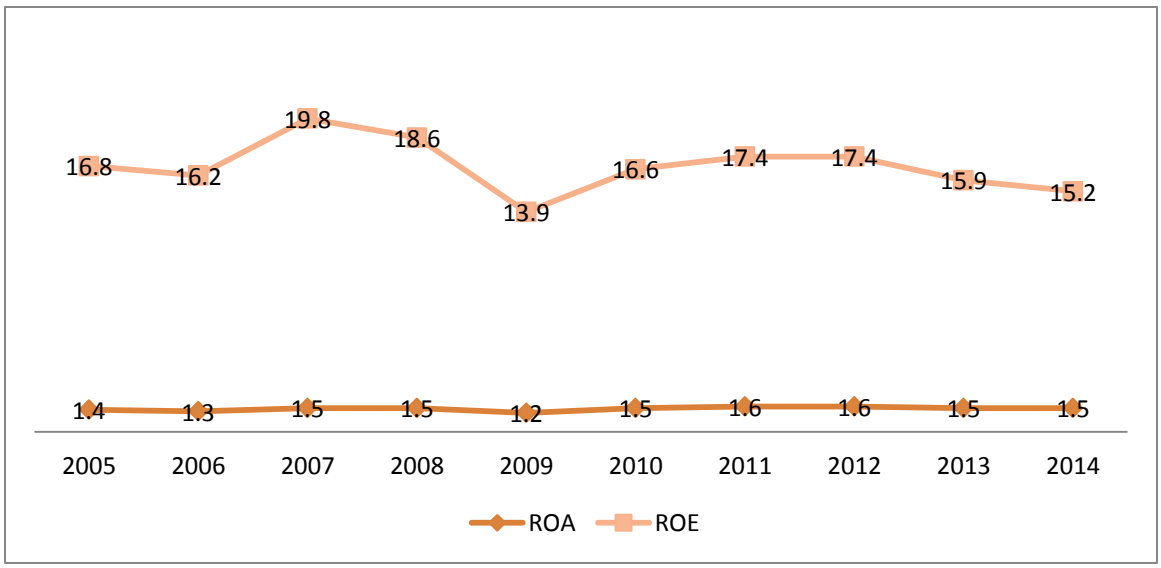
In previous 30 years, Malaysia's banking sectors experienced massive structural changes especially the financial crisis had been fallen in 1986, 1998 and 2008. This story has shaped the trend like consolidating or merging thus high proportion of the banks and other institutions in the banking sector have vigorously involved or participated in mergers and acquisitions so as to fortify their capitals and assets base.

Banking sector act as a backbone for the economy of country since the banks' performance can gain influences from dissimilar sectors. The banking sector included the commercial banks that conducting the banking businesses and non-financial institutions that involved financial nature business which both are licensed. Banks have represented as an intermediary role in order to smooth and simplify the flow of loanable funds between the depositors and borrowers. The banks also have substantial effect in modeling the progression of the economy and hence banks have been extensively known as the most critical agencies in the financial system. According to Kosmidou, Tanna and Pasiouras (n.d.), the effectiveness of financial intermediation is the main factor that affected the country's economic growth meanwhile bank liquidations enable to generate the systemic crises that opposing after effect for the economy as a whole. Referring to the journal that wrote by Abdul Jamal, Abdul Karim and Hamidi in 2012, they have pointed that a bank which holding those specific characteristics like profitable and well-managed encourage the economic growth and it also has the capability to withstand during the period of economic downturn. Hence, banking institution should keep higher level of profit in ensuring soundness and safety of the financial system.

Thus, a banking sector with steady level represent the bank is operating in a stable profitability. This enables an extensive growth of current companies and inspires the instituting of new branches or businesses by permitting the lending of loans and capitals. Furthermore, banks have the ability to create or form the public confidence to potential depositors, shareholders and stakeholders and to stay competitive in financial market by maintaining a good profit figures. Consequently, profitability in a bank has become a substantial issue. Hence, this is important to investigate the determinants of banks' profitability by capturing the interests from the parties like government, bankers and also the investors. Movement of profitability in Malaysian banking system illustrates as below:

Table 1.1 Profitability Trend of Banking System in Malaysia (%)

It shows the banks' profitability which measured by ROA and ROE appeared to be constant during 2005 to 2014.



Source: The World Bank

- Return on Assets = Net Income / Total Assets;
- Return on Equity = Net Income / Shareholder's Equity

The banking system in Malaysia covers of Bank Negara Malaysia (BNM), Islamic banks, commercial banks, investment banks and foreign banks. Following, all the banks are listed as below.

Table 1.2 Lists of banks (in Malaysia)

No.	List of Malaysian banks (domestic commercial banks)
1.	Affin Bank Berhad
2.	Alliance Bank Malaysia Berhad
3.	AmBank (M) Berhad
4.	CIMB Bank Berhad
5.	Hong Leong Bank Berhad

6.	Malayan Banking Berhad
7.	Public Bank Berhad
8.	RHB Bank Berhad

No.	List of foreign commercial banks
1.	BNP Paribas Malaysia Berhad
2.	Bangkok Bank Berhad
3.	Bank of America Malaysia Berhad
4.	Bank of China (Malaysia) Berhad
5.	Bank of Tokyo-Mitsubishi UFJ (Malaysia) Berhad
6.	Citibank Berhad
7.	Deutsche Bank (Malaysia) Berhad
8.	HSBC Bank Malaysia Berhad
9.	India International Bank (Malaysia) Berhad
10.	Industrial and Commercial Bank of China (Malaysia) Berhad
11.	J.P. Morgan Chase Bank Berhad
12.	Mizuho Bank (Malaysia) Berhad
13.	National Bank of Abu Dhabi Malaysia Berhad
14.	OCBC Bank (Malaysia) Berhad
15.	Standard Chartered Bank Malaysia Berhad
16.	Sumitomo Mitsui Banking Corporation Malaysia Berhad
17.	The Bank of Nova Scotia Berhad
18.	The Royal Bank of Scotland Berhad
19.	United Overseas Bank (Malaysia) Berhad

Source: Bank Negara Malaysia

A well understanding of the determinants can help banks to have a clearer image for the current position of the Malaysia banking industry on contributing and improving the consideration in the decision makings.

This research investigates on a framework that involved a structured equation, the effect of bank-specific and macroeconomic factors on commercial banks' profitability; it also known as the financial performance. The factors of bank-specific involves capital adequacy and leverage. While the exchange rates and real interest rates are included in measuring banks' performance which categories under macroeconomic factors. This research paper is main focus on the performances of the banks which listed at the List of Malaysian banks with a targeted of period which from year 2005 to 2014.

The macroeconomic has act as one of the best known study areas within the branches of economics. The economics studies how the people and organizations (eg: individuals, firms, governments and nations) allocate the scarce resources to satisfy their unlimited needs. Other than that, it also has many other branches such as development economics, international economics and public finances (Krishna, n.d.).

Bank-specific act as the internal factor that concern on the effect of households and corporations, and understanding of the relationship between the supply and demand on a specific product is required. Other than that, the effect of regulations on a business is involved in the study. While, macroeconomic is more concentrates on the subjects that alter the economy as a whole such as the GDP of an economy, the unemployment rates and the impacts of exports and imports (Gibson, 2014).

This research has selected Malaysia as the field of study due to the competition in banking sector is raising and increasing tremendously. After the financial crisis in

1997, Malaysia managed to reform their banking sectors in a prosperously way through merging and reorganizing industry of banking. Despite, with the stability of banking sectors in Malaysia still unable to hold the stress from Subprime crisis that out broke in 2008 with their better risk hedging tools and steady structure of governance (Ibrahim, n.d.).

Hence, this research has targeted the period of study from 2005 to 2014 in order to analysis the relationship between the bank-specific and macroeconomic factors that affect domestic commercial banks' performance. Meanwhile, there are also studies the ways to improve the performance of banks. After the analyses and studies are done, few recommendations will be proposed to the respected role.

1.2 Problem Statement

According to the paper that wrote by Khong, Tee, Tan, Low and Lim in 2015, the global financial crisis occurs in year 2008 has created a large impact on Malaysia's financial economic. Financial crisis has influenced economic cycle and lead Malaysian banking system entered into Asian Financial Crisis. Mirzaei (2013) claimed that the performance of most banking sectors around the world has adversely affected by this global financial crisis. These problems of economic sequentially direct to public worry and qualm about the capability of domestic commercial banks to withstand the country's banking activities during the period of financial crisis. The financial crisis increases the uncertainty of future gains and reduces the confident level of investors. Consequently, most of bank institutions suffered from poor banking performance such as massive decline in banks' profitability and accumulated huge amount of non-performing loans. Poor banking performances may bring the consequence of banking failures or crisis which has negative impact on the economic growth.

In order to solve banking failure, banking institutions have to strengthen their banking performance by increasing the bank's stability and profitability. Banks who achieve greater banking performance will perform better and become more capable to withstand negative shocks (Mirzaei, 2013). Moreover, banks who have greater banking performance have lower risk of banking insolvency when the country's economy has been badly hit by financial crisis.

Nowadays, domestic commercial banks focus not only on banks' profitability but efficiency and effectiveness of banking institutions. The rise of banking performance awareness among banks faced some issues: How bank-specific and macroeconomic factors affect the banking performance? This research sets up a theoretical framework of domestic commercial banks' performance to determine which banks–specific macroeconomic variables should be included in the models. Hence, this paper scrutinized the effect of bank-specific and macroeconomic factors on the financial performance of domestic commercial banks. It analyses the relationship between the performance of local commercial banks and two bank-specific variables which include capital adequacy and leverage as well as the two macroeconomic factors which are the exchange rate and real interest rate. The research data are taken from year 2005 to year 2014 because of global financial crisis are occurs in the year of 2008. Therefore, the effect of banking performance on domestic commercial banks can also be analysed in this research. In this research, all the eight domestic commercial banks in Malaysia that have been mentioned in Table 1.2 are included.

1.3 Research Objective

Research objective interpret as the aims in carry out this study. The listed objective should be reached at the end of the research. There are two categories under the

research objective which are general and specific objectives. In this study, it involves a general objective and a few specific purposes.

1.3.1 General Objective

The general objective is to investigate the impact of bank-specific and macroeconomic factors on the domestic commercial banks' financial performance. The investigation is carried out based on the study of eight domestic commercial banks in Malaysia with the time period from 2005 to 2014 which including financial crisis that occurred in 2008.

1.3.2 Specific Objectives

i. To investigate the relationship between capital adequacy and banks' profitability.
ii. To investigate the relationship between leverage ratios and banks' profitability.
iii. To investigate the relationship between exchange rate and banks' profitability.
iv. To investigate the relationship between real interest rate and banks' profitability.
v. To investigate the effect on the banks' profitability from the period of years 2005 to years 2014.

1.4 Research Questions

The aim of carried out this research is to identify the factors that affecting the profitability of domestic commercial banks in Malaysia. This study is focusing on assessing the eight commercial banks' profitability in Malaysia.

i. Is there any relationship between capital adequacy and banks' profitability?
ii. Is there any relationship between leverage ratio and banks' profitability?
iii. Is there any relationship between exchange rate and banks' profitability?
iv. Is there any relationship between real interest rate and banks' profitability?

1.5 Hypothesis of Study

Bank-specific Factors

1.5.1 Capital Adequacy

H_0 : There is no significant relationship between capital adequacy and banks' profitability.

H_1 : There is significant relationship between capital adequacy and banks' profitability.

1.5.2 Leverage Ratio

H_0 : There is no significant relationship between leverage and banks' profitability.

H_1 : There is significant relationship between leverage and banks' profitability.

Macroeconomic Factors

1.5.3 Exchange Rate

H_0 : There is no significant relationship between exchange rate and banks' profitability.

H_1 : There is significant relationship between exchange rate and banks' profitability.

1.5.4 Real Interest Rate

H_0 : There is no significant relationship between real interest rate and banks' profitability.

H_1 : There is significant relationship between real interest rate and banks' profitability.

1.6 Significance of Study

In this paper, the objective is to analyse the determinants of bank-specific and macroeconomic factors that affecting the commercial banks' financial performance in

Malaysia by using the variables that have been discussed in the previous part. The dependent variable using in this paper is return on asset (ROA) while the independent variables are capital adequacy, leverage, exchange rate and real interest rate. Particular formulas are used in calculating each of the variables in order to get more accurate and valid figures.

This research helps in developing a common understanding in banking sectors for investors and shareholders who are engaging in the financial activities with the banks, and for government to implement a new policy and make some improvement on the existing policy. It is very vital for investors to know the banks' performance and its return to capital before making any decision. In other degree, right decision can bring them desirable return by accessing the banks' performance.

It is also helpful for the banks to have a better understanding on the factors that affecting their financial performance because of banks can generate more profit by knowing well on the changing variables.

1.7 Chapter Layout

The structure and content of this research paper are listed as follows:

Chapter one gives a brief introduction about the background and purposes of this study. This chapter is starting with the introduction of the paper, background of the research, problem statement, objective of the study and also the hypothesis and

questions of the research. It is then followed by the implication of the research, layout of all the chapters with a summary for ending.

Chapter two presents a literature review of all the chosen variables. These reviews instigate the researchers' interest and concern on what bank-specific and macroeconomic factors have the impacts on the financial performance of the Malaysia's domestic commercial banks. It consists of a simple introduction of the chapter, inspection of the literatures, inspection of the models, suggested theoretical or conceptual framework, developing hypotheses and conclusion.

Chapter three presents the methodology and data that used in the research paper. This chapter begins with the introduction, processing of data, design of the research, methods of collecting the data, variables specifications of measurements, analysis of data and ends with econometric diagnosis tests follow with a conclusion.

Chapter four involved the finding and analysis of the results. It involved the investigation on the significant and insignificant effect between the bank-specific and macroeconomic factors on the banks' performance. This chapter consists of introduction, description analysis, inferential analysis and conclusion.

For chapter five will be concluding all results from chapter one to four. It also presents the implications as well as limitations and recommendation to be proposed for future studies.

1.8 Conclusion

The objective of this research is examining the effects of bank-specific and macroeconomic determinants on the financial performance of eight domestic commercial banks in Malaysia. It focuses on the relationship among the variables that can benefits the specific area especially the banking sector. The completed review of previous objectives and findings will be presented in the coming parts.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

In this chapter, the aim is to cover the literature review, relevant theoretical models review, proposed framework and hypotheses development. In this research has included the variables which are the return on assets, capital adequacy, leverage, exchange rate and real interest rate.

2.1 Review of Literature

Dependent Variable

2.1.1 Return on assets

This study has carry out an investigation on the return on assets (ROA) by using both bank-specific and macroeconomic factors. The formula of ROA is the total net income over total asset and it is a useful statistic in comparing the profitability of banks. ROA is widely used in measuring the banks' performance and the financial

regulators have adopted this variable to measure the banks' performance and forecast the trend of market structure. In addition, ROA also can be used to measure the works and performance of the managers in order to indicate how efficiency and effectively those managers manage and use the banks' assets.

In the earlier studies, Kupiec and Lee (2012) stated that return on assets is an important role in measuring the bank performance. According to the studies that done by Obamuyi (2013) and Javaid, Anwar, Zaman and Gafoor (2011), they found out that ROA is more useful than the return on equity (ROE) due to return on equity (ROE) has overlooked the financial leverage. They explained that the differences in financial leverage and complication in the tax laws could subsequently bring an effect of distortions but somehow eliminated by ROA, which showing the unit of each asset reflects the ability of using the financial and physical assets in generating profits.

There are some problems occur when using the ROE to measure the banks' performance (Brigham & Ehrhardt, 2002). ROE is calculated the net profit to equity while ROA calculated the net profit to total assets of the bank (Petria, Capraru & Ihnatov, 2015). ROE does not consider the risks that derived from the leverage while ROA does. Next, ROE act as a tool to measure the performance and as a reference in determining managers' reward, it encourage them to invest the projects with a higher expected ROE, although it might be very risky. Hence, it may have any fundamental errors when using the ROE in measuring the profitability. For example, managers will be reluctant to accept the low risk project due to the reducing of banks' overall financial ROE and it would lower their bonuses even that are a very profitable project. Gadoiu (2014) recommended performing ROE in parallel with a study of risks regarding the ROA in order to optimize the financial analysis.

Independent Variables

Bank-specific Factors

2.1.2 Capital adequacy

Capital Adequacy (CA) is commonly used to measure the ability of bank to meet the obligations toward the exposure risk. Bank capital has been widely used to analyse the strength of its financial position. In addition, national regulator has been set the capital adequacy standard at minimum rate of six per cent of the banks' assets to ensure that bank able to fulfil the requirement of the depositor. Besides that, it used to indicates that safety and soundness of a bank. Apart from that, the minimum capital requirement acts as a protection from bank insolvency. Bank Negara Malaysia monitors the performance of commercial bank by observing the bank's capital adequacy ratio which representing the ability of banks to cover losses to a reasonable level, such as the loss of non-performing loans. Moreover, banks used the capital adequacy as a cushion to against unexpected losses from investment and absorb risks until bank are able to generate profit.

According to the Olalekan and Adeyinka (2013), they found that capital adequacy has direct relationship to the profitability of the bank. Besides that, many researchers had stated that there is a positive relationship between returns and capital. Next, Onoh (2002) stated that it is considered adequate when capital enough to cover operating costs in order to meet customers' needs and protect deposits in the case of liquidation or losses suffered by the bank. Banks will have the chance to lure more customers and

enhance the confidence in the system if they are able to generate more than the capital requirement.

Ajekigbe (2009) claimed that the failure of banks between 1977 and 2000 was caused by poor asset quality, inexperienced personnel, under capitalization, illiquidity, inconsistent regulatory policies and supervision. Naceur (2003) and Abreu and Mendes (2002) stated that well capitalized banks can reduce the need of external funding, lower the cost of financing and lower the risk of bankruptcy which can lead the advantages translates into profitability.

2.1.3 Leverage

Financial leverage is referring to the use of debt to increase the production volume and profit. The higher the amount of debt, the higher the level of financial leverage. In banking sector, deposit represents liability owed by the bank to the depositor. Besides that, a deposit is debt that had been loaned by other person and must return back after certain period.

According to Miles, Yang, and Marcheggiano (2013), the relationship between leverage and banks' performance of UK banks is strongly positive. This show that fall in bank leverage would decrease the required return on bank assets. Other than that, the banks can raise their internal capital by using the debt to generate more income such as loan making to other customers and receive lending interest from customer.

This result also proved by Javed, Akthar, Sadia and Maryam in 2012 that show financial leverage has positively related to the financial performance of the banks.

Based on the studies of Qudah and Jaradat (2013), leverage measured by total deposit to total assets has a negative significant influence on ROA. There have included creditors and investors in the market. However, some creditors are looking for low-risk investment while some investors are looking for profitable investment. Creditors will receive the fixed interest rate when they deposit money into saving account and banks are willing to give more interest rate because there have some restrictions in the account of money market funds, such as minimum deposits and limit withdrawals frequency. On the other hand, investors who buy and hold bonds, are desire to receive a high interest rate and return of the bond on a future date. Leverage acts as a measurement tool to examine the possibility of borrowers who unable to repay the debt especially in long term period. In the case of financial leverage increases, it will increase the likelihood of exposure to the risk of solvency and bankruptcy of enterprises. This may cause the bank exposure more vulnerable to credit risk and bring to further decline in profitability. Consequently, the higher the leverage, the lower profitability of banks.

Macroeconomic Factors

2.1.4 Exchange Rate

Changes in exchange rate can influence the decision making and profitability of financial and non-financial firms, unless the change is expected. Exchange rate has been clearly defined as the price quoted in currency of two countries. It also known as foreign exchange rate and can be simplified as the value of a country's currency

exchange to other country's currency value. When exchange rate is high in a country, it has more money to exchange when trading in another country. Large exchange losses can lead to the worst case which is bank failures. Measuring of banks' foreign exchange exposure has become important core tasks by central bank, professionals and academics.

The exchange rate matter is not a new arising issue in Malaysia. The Central Bank of Malaysia (BNM) has pegged Ringgit Malaysia at RM3.80 to $1 during the financial crisis in 1998. This incident made a huge survival in Malaysia economics while most of the neighbouring country suffered from the global financial crisis in the year of 1997 and 2008. Hence, the fluctuation of exchange rate became one of the critical sources of risk in banking sectors.

According to the study of Wong, Wong and Leung (2008), they examined the relationship of exchange rate and bank performance of l4 listed Chinese banks by using equity data as well as Capital Market Approach. They found out that negative relationship in foreign exchange exposure is more common for bigger bank size in the banks of China. The empirical results conducted by them have suggested the appreciation of renminbi has brought negative impact on banks' profitability.

Aymed (2015) investigated the effect of variations in exchange rate affects banking performance of listed Kenya commercial banks in Nairobi Stock Exchange. The variations involved are interest rate, foreign exchange exposure and inflation. However, the author overall research is to study the impact of foreign exchange exposure of commercial bank. The research has been conducted by using primary and secondary data. The result revealed that foreign exchange exposure has significantly negative relationship to the banks' performance.

Sayedi (2014) found that there is an insignificant and weak positively relationship between exchange rate and return on assets (ROA) of Nigeria banks. The author designed his scope of research on 15 deposit money banks in the Nigerian Stock Exchange from 2006 to 2011 by using Linear Regression model. He revealed that exchange rate increase ROA insignificantly. Thus, insignificant increase in exchange rate affects ROA positively.

On the other hand, based on the research of Acaravci and Calim (2013), the purpose of their paper is to investigate bank specific and macroeconomic factors that affect banks' performance (stated-owned, foreign and privately-owned bank) in Turkish from 1998 to 2011. The results revealed that exchange rate has been positively and significantly affect banks' performance.

2.1.5 Real interest rate

There are three principal ways which interest rate can affect bank profitability. Primarily, banking is a spread business. The gap between the interest rate that the bank received and paid is the source of bank profitability. Higher charges of interest on loan can boost the bank revenues up. Furthermore, banks are mainly held the bonds and loans as the fixed income instruments and once the interest rates increase the present discounted value of their assets will decrease. Thirdly, rising in interest rate is a good sign for strong economic growth. The strong economic growth benefits banks' earnings. For instances, good economic growth signal reduces the default risk of borrowers, hence increase the value of bank assets.

Besides, people also tend to borrow more when in good economic condition. This directly increases the volume of bank lending business. In addition, interest rate affects banks' earnings through net interest margin over net interest income (NIM/NII). Banks' revenues consist of around 60 to 65 per cent from net interest margin (Hayes, 2013). When the interest rate increase, the banks' NIM/NII also will decrease.

According to Molyneux and Thornton (1992), this paper investigated the bank's performance of 18 European countries from 1986 to 1989. The result shows there is a positive impact between interest rate and banks' performance. Samuelson (1945) also has investigated the relationship between real interest rate and banks' performance. He said real interest rate is affecting banks' performance significantly. The banks' revenues increase when there is rising of interest rate.

The research of Deger and Adem (2011) also did the same study. The researchers studied the effect of bank-specific and macroeconomic factors on the performance of banks in Turkey from 2002 to 2010 by using balanced panel dataset. Real interest rate has shown positively relationship with banks' profitability. Dietrich and Wanzenried (2011) analyse 372 Switzerland commercial banks' performance in pre-crisis period, 1999-2006, and crisis year, 2007-2009 by using GMM estimator technique. The results conducted have clearly indicated that the interest rate has positively affected the performance of Switzerland banks.

2.2 Review of Theoretical Models

Relevant theoretical models refer to the theories that can describe philosophy related to the research and it helps to form link between theoretical aspects and practical applications. This section will explain theorized relationship between variables and helps to make logical sense of relationship between variables, so that it can provide a base to establish the proposed theoretical.

2.2.1 Panel data regression model

This model has widely used to study the factors of banks' profitability. Commonly, this model is used to examine the behaviour of entities such as countries, states, companies, individuals. The entities are observed across time. Fixed Effects Model (FEM) and Random Effects Model (REM) as well as Pooled Ordinary Least Squares (Pooled OLS) model are types of panel data regression models.

There are some researchers employed FEM to conduct their study. According to Kosmidou, Pasiouras, and Tsaklanganos (2007), the researchers examined the performance of 19 Greek bank subsidiaries operating in 11 nations by using panel data regression model. In addition, Dawood (2014) employed panel data regression model in evaluating the relationship between the determinants affect the performance of 23 commercial banks of Pakistan operating over 4 years.

The second type of panel data regression are REM. REM also called hierarchical linear model is used when the dataset consists of a hierarchy of different populations

whose different relates to the hierarchy. It is mainly used in education, epidemiology and geography. Hausman test is commonly used in the empirical analysis in order to differentiate whether to use FEM or REM.

Hausman (1978) suggested that the random effects estimators should be compared with the fixed effects estimators to examine if significant differences occur before employing this method in the empirical analysis. The differences between FEM and REM is individual-specific effect in a random variable that can allow to be correlated with the explanatory variables in FEM while is uncorrelated in REM. Method suggested by Hausman are used by Akbar, Imadadullah, Ullah and Aslam (2011), Pasiouras and Kosmidou (2007), Masood, Ashraf and Turen (2015).

The last type of panel regression model is Pooled OLS. It can be explained in a simple way as all the data are linked together without taking cross section and time series into the consideration. Ordinary least squares are normally used to test pooled data. The method employed by Javaid, Anwar, Zaman, and Gafoor (2011) in examining the factors of profitability in Pakistan Islamic banks.

2.2.2 Financial Ratio Analysis (FRA)

Ratio is one of the most popular financial analysis tools. Financial ratios include profitability sustainability, liquidity, operational efficiency, and leverage commonly used to have better understanding about financial performance and trends over period of time. These ratios can use as a comparison with other organizations in a similar

sectors and a comparison for the organization itself from period to period to overview the performance. In addition, these ratios are interrelated and therefore they should be computed together rather than independently. Kumbirai and Webb (2010) employed financial ratio analysis to measure South Africa commercial bank performance from 2005 to 2009. Islam (2013) conducted his study on the performance of National Bank Limited in Bangladesh by using FRA as the tools to measure the results in terms of the liquidity, credit performance and profitability.

2.2.3 Fisher Effect Hypothesis

Fisher effect hypothesis is the equation discovered by Irving Fisher. The equation of Fisher effect is real interest rate equals nominal interest rate minus expected inflation rate. There is distinction between nominal interest rate and real interest rate. Nominal interest rate does not consider inflation into components while real interest rate is the rate after the adjustment of removing inflation. The purpose is to reveal exact cost of funds of a borrower and exact rate of a bank (Investopedia, n.d.). This equation has been employed in the study of Samuelson (1945) in examining whether the changes of real interest rate affect bank's performance. Samuelson in 1945 claimed that real interest rate is affecting bank performance significantly. Thus, the bank revenues increase when there is rising of interest rate.

2.2.4 Regulatory Theory (1887)

Regulatory theory refers to the negative relationship of capital adequacy on banks' performance. Based on the Basel Accords, Central Bank requires banks to reserve

minimum level of capital adequacy ratio to protect the banks are operating in a safe and sounds condition. According to Adeusi, Kolapo and Aluko (2014), the more of capital a bank hold, the less a bank's profitability is. This is because the regulation restricts the bank in risk taking hence constraining the bank to use the capital to generate profit.

2.2.5 Efficient Structure Theory (2008)

Siudek (2008) stated that banks that are efficient may lead to increase in banks' profitability. Banks that are able to manage their capital and debt wisely can enhance their performance in banking sectors. The bank can earn higher profits than competitors when they are more effective and efficient in allocating their capitals. This theory similar with the theory which known as allocative efficiency that refers to optimal allocation of the resources. A few parties may concern on the capital structure of banks such as government, owner of banks, managers, and customers.

2.2.6 Monetary Policy

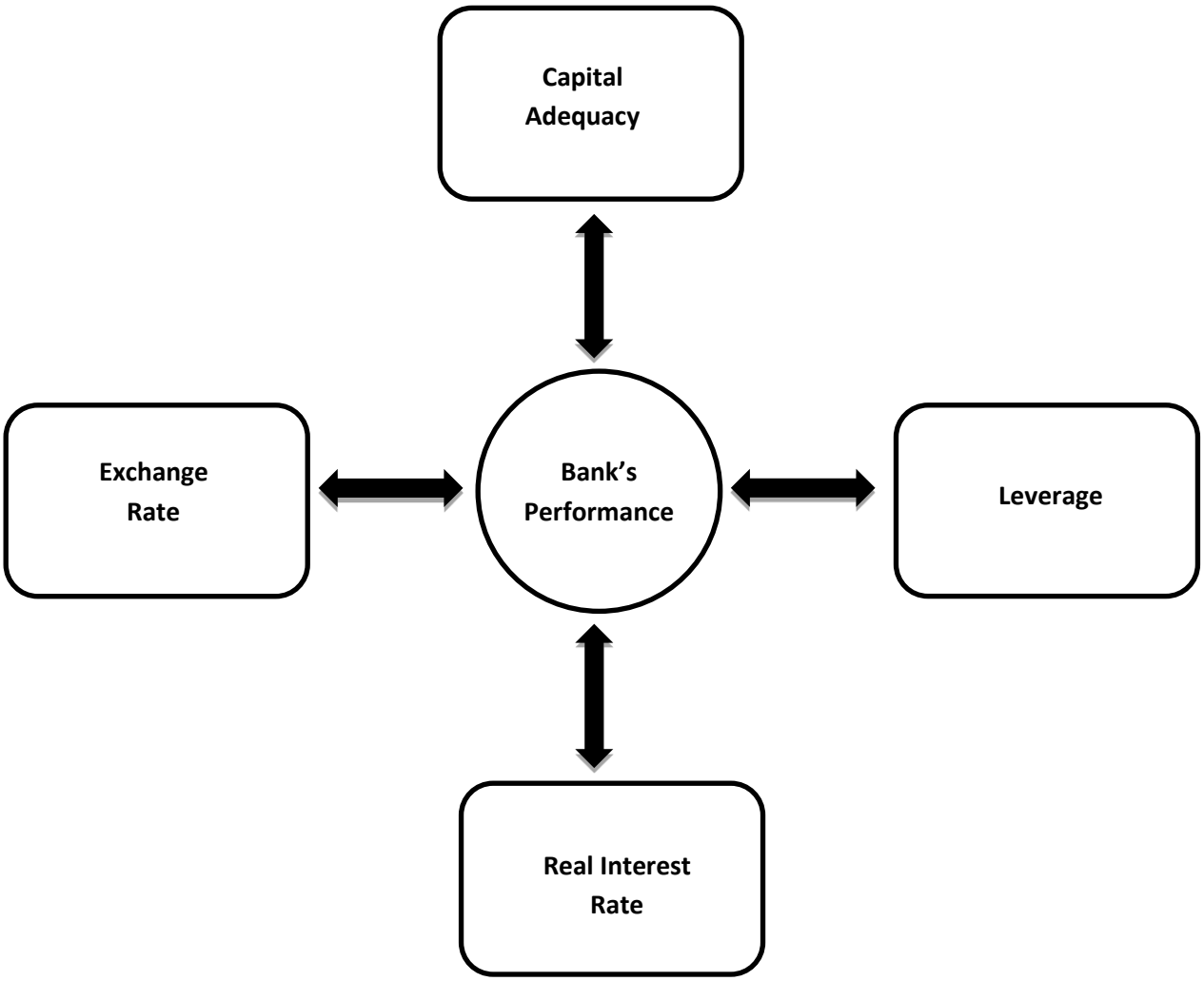
The Central Bank use monetary policy tools to adjust the money supply in the market. The effect of implementation an expansionary monetary policy can lower the exchange rate. When the exchange rate falls, it can affect financial account to become weaken but current account to become strengthen while for restrictive monetary policy, it brings the adverse effects. The raise of exchange rate may attract more foreigners to invest in the country. The more the foreigners invest, the greater the

economic growth of a country. This policy brings the same concept as "Good Market Theory". The theory explained that the fluctuation of exchange rate can influence profitability of a bank.

2.3 Proposed Theoretical/ Conceptual Framework Diagram

This section displays the relationships among the important variables. This framework developed according to the research objective which to investigate the relationship among the economic factors (capital adequacy, leverage, exchange rate and real interest rate) will affect the profitability (ROA) of Malaysia local commercial banks.

Diagram 2.1 Conceptual Framework



The introduced conceptual framework for this research paper is shown above and that reformed partly from Noman, Chowdhury, Chowdhury, Kabir and Pervin (2015) which excluding credit risk, liquidity, real GDP growth rate and including leverage and exchange rate.

2.4 Hypothesis Development

H_0 described the independent variable has no significant relationship with the dependent variable and H_1 described that the independent variable and dependent variable is significantly related to each other. Assumed that H_0 is not true, we rejected the H_0 indicating that there is a significant relationship between independent variable and dependent variable.

Bank-specific Factors

2.4.1 Capital Adequacy

H_0 *: There is no significant relationship between the capital adequacy and the bank's profitability.*

H_1 *: There is a significant relationship between the capital adequacy and the bank's profitability.*

2.4.2 Leverage

H_0 *: There is no significant relationship between the leverage and the bank's profitability.*

H_1 *: There is a significant relationship between the leverage and the bank's profitability.*

Macroeconomic Factors

2.4.3 Exchange Rate

H_0 *: There is no significant relationship between the exchange rate and the bank's profitability.*

H_1 *: There is a significant relationship between the exchange rate and the bank's profitability.*

2.4.4 Real Interest Rate

H_0 *: There is no significant relationship between the real interest rate and the bank's profitability.*

H_1 *: There is a significant relationship between the real interest rate and the bank's profitability.*

2.5 Conclusion

In the nutshell, chapter 2 reviews previous study and the theoretical models which have been employed by previous researchers to investigate the determinants of bank performance. The dependent variable and four economic factors are discussed respectively. Next, the proposed diagram illustrates the relationship between the variables and then followed by the hypothesis development. The empirical model that use in this research will be introduced in next chapter to test whether the hypothesis is correctly stated.

CHAPTER 3: METHODOLOGY

3.0 Introduction

In this chapter, research methodology will further explained in details. The framework for this research, descriptions of data, data collection methods, data analyses techniques and the treatment of econometric problems will be explained in

details. There are two bank- specific factors involved in this study which are capital adequacy and leverage meanwhile real effective exchange rate and real interest rate are employed in this study as macroeconomic factors .There are eight domestic commercial banks involved in this study which are Affin Bank, Alliance Bank, AmBank, CIMB Bank, Hong Leong Bank, Maybank, Public Bank and RHB Bank during the research period from year 2005- 2014.

3.1 Research Design

The objective of this research is to investigate the relationship of bank-specific variable and macroeconomic variables on the banks' performance of domestic commercial bank. The bank-specific factors are capital adequacy and leverage whereas the macroeconomic factors are real effective exchange rate and real interest rate. Return On assets is the dependent variable used in this research as a measurement for banks' performance. In this study, quantitative data have been taken because of dependent and independent variables involve quantitative measures. Quantitative data defined as numerical data which allow the user to measure or count.

3.2 Data Collection Method

Secondary data was employed in this research to carry out the empirical test. Two subsets of data have been collected which are bank-specific and macroeconomic

factors. For bank-specific factors, data are collected from the 8 domestic banks' annual report which listed in table 1.2.Those annual reports are downloaded from the website of Bursa Malaysia. 10 years annual reports (2005-2014) are collected from each bank. Meanwhile, macroeconomic data are obtained from World Bank.

Table 3.1 Data Sources

TYPES OF DATA	DATA SOURCES
Dependent variable	
Return On Assets	Bank's annual reports
Bank-specific factors	
Capital Adequacy	Bank's annual reports
Leverage	Bank's annual reports
Macroeconomic factors	
Real Effective Exchange Rate	World Bank Data
Real Interest Rate	World Bank Data

3.2.1 Return on Assets (ROA)

Return on Assets (ROA) is a financial ratio that represents how profitable a bank in relation to its total assets. Return on assets is commonly used by banks and financial institutions to measure their performance. Return on assets is a best indicator to measure how efficiently a bank fully utilized its assets to generate profits. In this research, return on assets is chosen to measure banks' performance instead of return on equity because of global financial crisis was occurred during research period.

According to European Central Bank (2010), long-term strategy of banking institutions or the long-term damages created by crisis does not take into account when calculating return on equity. If return on equity is chosen to measure banks' performance, the outcome might be less accurate.

$$Return\ on\ Assets = \frac{Total\ Net\ Income}{Total\ Asset}$$

3.2.2 Capital Adequacy

Olalekan and Adeyinka (2013) clarified that capital adequacy plays a key role in measuring banks' financial strength and stability. Capital adequacy is one of the important indicators to measure banks' risk management efficiency because it indicates the ability of bank to bear unpredictable losses and fulfill its obligations to depositors. Based on Iwara (2014), capital adequacy ensures the safety and efficiency of financial system by protecting depositors from risk of banks' insolvency. Aspal and Nazneen (2014) claimed that bank with high level of capital adequacy has greater liquidity and the probability of banks' failure can be reduced. Hence, capital adequacy is an important variables in strengthen banks' performance (Okafor, Ikechukwu & Adebimpe, n.d.).

Higher level of capital adequacy indicates higher stability of banks and greater protection for depositors (Aspal & Nazneen, 2014). However, there have many researchers argued that capital adequacy has negative impact on banking performance.

Osborne, Fuertes and Milne (2013) mentioned that banks with higher level of capital adequacy may lower the performance of banks because too much of capitals are holding by a bank can restrict the bank from investment. Hence, it is important to include capital adequacy as bank-specific factors that influence banks' performance.

$$Capital\ Adequacy = \frac{Total\ equity}{Total\ asset}$$

3.2.3 Leverage

Leverage is a measurement to measure how much debt of a bank used to finance its assets relative to the amount of value represented in shareholders' equity. Abubakar (2015) stated that bank must consider leverage as an important financing decision that will form their capital structure. Total debt to equity ratio was employed to measure a bank's financial leverage, leverage can be obtained by divided a bank's total liabilities by stockholders' equity. Banks with higher debt over equity ratio represent that the bank exposed to higher levels of risk because of heavily in taking debt to finance banks' growth. Financial leverage may bring greater potential returns to bank in investment meanwhile it also allow high levels of potential loss to bank. .When depositors deposit money into a bank, the bank is required to pay the interest on deposits to depositors although investment becomes worthless (Andy, Chuck & Alison, 2002). Hence, leverage is considered as a double-edged sword because of it can provides the opportunity to increase banks' profitability as well as generating potential loss and risk to bank.

$$\text{leverage} = \frac{\text{Total Debt}}{\text{Shareholders' Equity}}$$

3.2.4 Real Effective Exchange rate

In the component of exchange rate, there have many ways of measuring exchange rate. Nominal and real exchange rates determined foreign currency separately but nominal effective exchange rate and real effective exchange rate are not (The Economics Times, n.d.). Instead of using NEER, REER is more accurate in measuring banks' performance. REER is the NEER over index of costs (World Bank, n.d.). Changes of REER take into the consideration of NEER and after adjusting of inflation differential.

Exchange rate can directly affect domestic price level, allocation of resources and investment decision, and profitability of traded goods and services. Aburime (2008) said that exchange rate is significant factor that can affect banks' performance. Meanwhile Kiganda in 2014 stated that the exchange rate is insignificant effect on banks' performance in Kenya from 2008 to 2012 at the 5% of significant level. Hence, this independent variable will include in this empirical models to test the relationship between REER and banks' performance.

REER is calculated as an index of NEER adjusted for the appropriate link between the weights and the base price index of partner countries with the base index of domestic prices.

$$REER^t = NEER_t \sum_{i=1} \left(\frac{w_i P_{it}}{P_t}\right) NEER_t$$

where:

P_{it} – Base price index in the period t for each partner country i
P_t – Index of domestic prices compared with the base period

3.2.5 Real interest rate

For the part of interest rate, there consists of two categories which are nominal and real interest rate and of course there is slightly difference in the calculation part. First, the nominal interest rate is the rate that does not considering the inflation therefore inflation will not involve in the computation. Second, the real interest rate acts as the rate that has been adjusted after inflation. It is also revealed as the exact cost of funds of a borrower and the exact yield of a bank (Investopedia, n.d.).

By referring to the paper of Alper and Anbar in 2011, they studied about the effect of bank-specific and macroeconomic factors on the banking performance in Turkey between the years from 2002 to 2010. The result revealed the real interest rate is significantly affecting the banks' performance. They stated that the higher real interest rate lead to higher banks' performance. Besides that, the changes in interest rate will affect the amount of interest receive which directly affect the banks' performance.

Besides that, Lanker (1999) also examined on what are the variables that affecting the banks' income growth and the result shown that those variables are real interest rate and GDP growth. He found that there has positive relationship between variables (Real interest rate & GDP) and the performance of banks. This research paper has considered more on the actual yield based on the banks' side. Thus, real interest rate has been chosen as one of the macroeconomic factors.

Fisher equation has shown the relationship between nominal and real interest rate. The formula has stated as below:

$$\text{Real Interest Rate} \approx (\text{Nominal Interest Rate} - \text{Inflation}) \times 100\%$$

3.3 Sampling Design

3.3.1 Target Population

In this study, secondary data was collected to carry out the empirical test. The data collected from eight domestic commercial banks in Malaysia are stated as below:

1) Affin Bank

2) Alliance Bank

3) AmBank

4) CIMB Bank

5) Hong Leong Bank

6) Maybank

7) Public Bank

8) RHB Bank

3.4 Data Analysis

3.4.1 Panel Data Regression Model

This data as known as longitudinal or panel are referring to data to study about the behavior of entities with two or more than two time frame. The benefits of using panel data are providing informative data, more variability (more information for time series), less multicollinearity between X regressors, more degree of freedom, less

error but efficiency and can add more independent variables. There are three common types of models which known as Fixed Effects Model, Random Effects Model and Pooled Panel regression. The two types of analyses make conceptually contrasting assumptions as either fixed or random.

The model specification of this research can be shown as follow:

$$ROA_{it}=\alpha + \beta_1 CA_{it} + \beta_2 LEV_{it} + \beta_3 EX_{it} + \beta_4 RIR_{it} + \epsilon_{it}$$

Table 3.2 Symbols and Measurements

Symbol	Definition	Unit measurement
ROA	Return on Assets	Net Profit/Total Asset
α	Intercept	-
β_i (i=1,2,3,4)	Coefficient of each independent variables	-
CA	Capital Adequacy	Capital/Total Deposits ratio
LEV	Leverage	Total Liabilities/Total Equity
EX	Exchange Rate	Real effective exchange rate index (2010 = 100)
RIR	Real Interest Rate	Real interest rate (%)
ϵ_{it}	Error Term	-

3.4.2 Diagnostic Tests

The diagnostic tests such as VIF, Breusch-Pagan / Cook-Weisberg test, and Wooldridge test, are performed to reform the model to fulfill the Classical Linear Regression Model (CLRM) assumptions. The Classical Linear Regression Model (CLRM) assumptions are as below:

1. There is no relationship between independent variables (No multicollinearity)

2. The error term is constant across the number of observations (Homoscedasticity)

3. There is no relationship among the error term at the period t and the error term at period before t (No autocorrelation problem)

4. There are no relationship between error term and independent variables. (Homoscedasticity and no autocorrelation problem).

5. The error term is normally distributed.

Best Linear Unbiased Estimator (BLUE) result will be obtained once all the CLRM assumptions are fulfilled. When BLUE result is achieved, the variance of errors will be achieved at optimal level and its estimators are efficient. Since BLUE results are achieved, the research result would not overestimate or underestimated. Therefore, the p-values obtained will be accurate and reliable

3.4.2.1 Multicollinearity

Multicollinearity problem exist when the independent variables in the model are highly correlated with each other. Existing of multicollinearity problem might bring the consequences of increasing standard error of estimates of the β's and the accuracy of the models has been reduced. Variance Inflation Factor (VIF) is calculated to exanimate the seriousness of the multicollinearity problem among independent variables in this study. If the VIF obtained is equal or less than 1, indicates that multicollinearity problem does not exist in the model. However, if VIF obtained is between figures 1 to 10, it indicates that no serious multicollinearity problem exist in the model. Hence, it is not necessary to solve multicollinearity problem if the VIF is less than 10.

$$Formula: VIF\varepsilon = \frac{1}{1-R\varepsilon^2}$$

3.4.2.2 Heteroscedasticity

Heteroscedasticity occurs when the variance of error term is not constant across the number of observations. In this research, the heteroscedasticity problem is tested by using Breusch-Pagan / Cook-Weisberg test. If the p-value obtained is more than 10% significant level, it indicates no heteroscedasticity problem exist in the model. However, if the p-value obtained is less than 10% significant level, it indicates that the model consist of heteroscedasticity problem.

H_0 : There is no heteroscedasticity problem

H_1 : There is heteroscedasticity problem

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

Decision Making: Reject H_0 since the p-value is less than the significant level 0.10 (10%).

Conclusion : There is sufficient evidence to conclude that the model 1.1 consist of heteroscedasticity problem.

3.4.2.3 Autocorrelation

Autocorrelation problem occurred when error term for any observation is related to the error term of other observation. The autocorrelation problem is most likely occurs in a pure time series data while less likely to be occurred in a pure cross-sectional data. Autocorrelation can be categorized into two kinds, which are pure autocorrelation and impure autocorrelation. Pure autocorrelation is autocorrelation that exists in a correctly specified regression meanwhile impure autocorrelation is caused by specification errors such as omitted variables. Autocorrelation test is carried out by using Wooldridge test. If the p-value obtained is more than 10% significant level proved that there is no autocorrelation problem exists.

Wooldridge Test Statistic

H_0 : There is no autocorrelation problem

H_1 : There is autocorrelation problem

Decision Rule : Reject the H_0if p-value is less than significant level. Otherwise, do not reject theH_0.

Decision Making: Reject H_0 since the p-value is less than the significant level 0.10 (10%).

Conclusion : There is sufficient evidence to conclude that the model 1.1 consist autocorrelation problem.

3.4.2.4 Hausman Test

Hausman test is used to determine FEM versus REM is the most appreciate model to be employed to the research. Null hypotheses will be stated as random effect to be consistent and efficient or vice versa. FEM consists of some omitted data that constant over period but differ among cases while REM consists of omitted data that may have constant over period but fixed among cases or vice versa. To determine the best model to be used, Hausman test will be conducted to run the hypothesis testing as below:

H_0 : Random effect model is better than fixed effect model

H_1 : Fixed effect model is better than random effect model

Decision rule : Reject null hypothesis if p-value of test stats is not more than the significant level ($\alpha = 0.10$), otherwise do not reject null hypothesis.

When H_0 is rejected, the REM is not the best model compared to FEM.

3.5 Conclusion

In this chapter, the progress of this research is explained which includes the data collection methods, research framework, variable specification, and data analysis.

Next chapter 4 will provide discussion on hypothesis testing and diagnostic tests .Those diagnostic tests are carried out by using Stata 10.0.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

Referring to the earlier division, the research methodology (eg: configuration of the research, clarifications of data, methods involved for data collection, data analyses techniques and the treatment of econometric problems) of the study is discussed meticulously. For this chapter, all the related tests will be carried out so as to certify the trustworthiness of the data as well as to authenticate the hypothesis and the analysis of the outcomes will present in a systematized order then following by a conclusion.

4.1 Scale of Measurement

In order to prove that the results are accurate and trustworthy, a few econometric treatments are required to conduct on the model. The first test that has been implemented was the multicollinearity test that involving the Correlation Matrix Test and Variance Inflation Factor, VIF then followed by the Breusch-Pagan/Cook-

Weisberg Test for the detection of heteroscedasticity and Wooldridge Test for the issue of autocorrelation.

4.1.1 Multicollinearity Test

Multicollinearity would be an occurrence if there is a linear relationship between the independent variables in a model. Hence, in detecting purpose, selected common methods or tests were needed to conduct.

Initially, multicollinearity test was implemented to scrutinize the existence of relationship among the involved independent variables. In order to measure the strength of linear relationships among independent variables in a set, correlation matrix test is one of the ways. Result has been listed in the Table 4.1 after the correlation matrix test was performed on the model. The table shows the result of the strength of the correlation between four independent variables for all the independent variables.

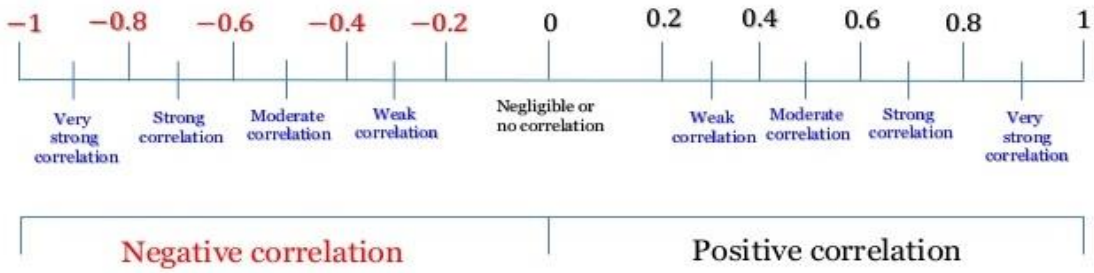
Table 4.1 Correlation among the Independent Variables

	Capital Adequacy	Leverage	Real Effective Exchange Rate	Real Interest Rate
Capital Adequacy	1.0000			
Leverage	-0.4435	1.0000		
Real Effective Exchange Rate	-0.0517	-0.1990	1.0000	
Real Interest Rate	-0.0446	-0.0750	-0.0464	1.0000

For a perfect model, the issue of multicollinearity must not shows in the model which take place when there are more than two independent variables are strongly interrelated with each other. This situation causes the problems of understanding and interpreting arise whether which independent variable contributes to the variance explained in the dependent variable, along with the practical concerns in computing a multiple regression model. As shown in the Table 4.1, the figures conclude that the strength between the independent variables involved is very weak which means that they are not highly correlated.

Among all the pairs within the four independents variables, the pair of capital adequacy and leverage gets the highest figure in correlation, -0.4435 which is consider moderate correlation. While the pair of capital adequacy and real interest rate gets the lowest figure, -0.0446 which is consider no correlation issue.

Table 4.2 Indication of Correlation



Source: Google Image

Since all the relationships among the independent variables are weakly correlated which are less than the positive or negative 0.6, therefore the possibilities for the model to suffer from the issue of multicollinearity are low.

Additionally, the variance inflation factor (VIF) can also be used as a pointer of the significance of multicollinearity problem in a model by measure the amount of variance of the estimated regression coefficients are overblown by comparing to when the predictor variables are not linearly related. It is also used in defining the seriousness of the multicollinearity occurs in the regression analysis. Multicollinearity is precarious because it can boost up the variance of the regression coefficients, make it difficult to interpret as well as making them unstable.

$$\textit{Formula:} \quad VIF\varepsilon = \frac{1}{1-R\varepsilon^2}$$

Table 4.3 Indications of VIF Value

VIF Value	Indication
1<VIF<10	No serious multicollinearity problem
VIF $\geqslant$ 10	Serious multicollinearity problem
VIF = ∞ (Undefined)	Perfect multicollinearity problem

Source: Google

Table 4.4 Figures of VIF among the Independent Variables

Variable	VIF
Capital Adequacy	1.35
Leverage	1.29
Real Effective Exchange Rate	1.07
Real Interest Rate	1.02
Mean VIF	1.18

Based on the result above, it shows that the model having a mean value, 1.18 for the VIF calculation. This figure can determine that no serious multicollinearity problem exists in the model. Thus, there is adequate confirmation to prove that the model does not contain any serious multicollinearity problem.

4.1.2 Heteroscedasticity Test

The Breusch-Pagan /Cook-Weisberg test is aimed to identify any linear form of heteroscedasticity (Williams, 2015). After detecting for the multicollinearity problem that has been performed in the previous part, next it is a heteroscedasticity test where it is testing for the constant variance of error term.

Table 4.5 Result of Breusch-Pagan/ Cook-Weisberg Test

	P- value
Breusch-Pagan Test	0.0337

Since the *p*-value is 0.0337 which is less than the significant level 0.10 (10%). Thus, there is sufficient evidence to conclude that the model consists of the heteroscedasticity problem.

4.1.3 Autocorrelation Test

When a time series data is influenced by its own historical values, this condition means that there is a presence of autocorrelation. According to the journal that wrote by Drukker in 2003, he mentioned that the issue of autocorrelation in the linear panel-data models biases the standard errors and results in making those specific data or value to be less competent, therefore it is essential to detect serialized correlation in the particular error term in a panel-data model. So at the following part, Wooldridge test is used for the detection of the issue of autocorrelation.

Table 4.6 Result of Wooldridge Test

	P-value
Wooldridge Test	0.0120

Since the *p*-value is 0.0120 which is less than the significant level 0.10 (10%). Thus, there is sufficient evidence to conclude that the model consists of the autocorrelation problem.

4.1.4 Hausman Test

This research is studying about the bank-specific and macroeconomic factors that influence the banking performance of domestic banks during the period from 2005 to 2014, and a panel-data sample is using to test the domestic banks' performance over the time span.

Hausman test is used to distinguish whether the panel data consists of either Fixed Effect Model (FEM) or Random Effect Model (REM).

Table 4.7 Result of Hausman Test

	P-value
Hausman Test	0.0828

Since the *p*-value is 0.0828 which is less than the significant level 0.10 (10%). Therefore, there is sufficient evidence to conclude that the model is considering as a Fixed Effect Model (FEM).

4.1.5 Cluster Robust Standard Error

Since the model involved the issues of heteroscedasticity and autocorrelation, therefore some specific methods are needed in order to solve the problems. In this case, the Cluster Robust Standard Error with the specific command of STATA xtreg, fe cluster() that produce robust standard error estimation is required. Referring to The Stata Journal, the author Hoechle stated that use the command xtreg, fe robust if the residuals are expected to be heteroscedastic while use xtreg, fe cluster() when the heteroscedasticity and autocorrelation consistently exist in the standard errors.

After performing the specific command, model will turn to efficient, consistent and unbiased. In the end, the variance of errors is attained at the acceptable or optimal level.

Table 4.8 Stata commands and options that produce robust standard error estimation.

Command	Option	SE estimates are robust to disturbances being	Notes
`reg, xtreg`	`robust`	heteroscedastic	
`reg, xtreg`	`cluster()`	heteroscedastic and autocorrelated	

Source: The Stata Journal

Table 4.9 Cluster Robust Standard Error for Panel Data Regression Model

Variable	Standard Error of Fixed Effect Model	Robust Cluster Standard Error
Capital Adequacy (CA)	-0.0384815 (0.0154327)**	-0.0384815 (0.0121369)**
Leverage (LEV)	-0.000868 (0.0002179)*	-0.000868 (0.0002778)*
Real Effective Exchange Rate (REER)	0.000054 (0.0001221)*	0.000054 (0.0001127)*
Real Interest Rate (RIR)	-0.000054 (0.0000773)*	-0.000054 (0.0000866)*
Constant	-0.0062555 (0.0134179)**	-0.0062555 (0.0092333)*

*significant at 1% (strong effect);**significant at 5% (effect);***significant at 10% (weak effect)

4.2 Inferential Analysis

Table 4.10 Result of the Fixed Effect Model

Independent Variable	Coefficient Value	Sign	P-Value
Capital Adequacy (CA)	-0.0384815	- ve	0.016**
Leverage (LEV)	-0.0008680	- ve	0.017**
Real Effective Exchange Rate (REER)	0.0003116	+ ve	0.028**
Real Interest Rate (RIR)	-0.0000540	-ve; Insignificant	0.552

*significant at 1% (strong effect); **significant at 5% (effect); ***significant at 10% (weak effect)

ROA = -0.00625 – 0.03848 CA – 0.00086 LEV + 0.00031 REER – 0.00005 RIR
(*Model 4.1*)

In the Model 4.1, panel data regression model is used to examine the selected data. According to Greene (2010), when there is a cross-sectional data which known as the data has observation across time for varies different units, Panel Data Regression Model is one of the models that usually carried out on those data. The relevant data of bank-specific factors are gathered from targeted financial institutions annual reports for 10 years, starting from 2005 until 2014. While for the macroeconomic data, they are collected from the Worldbank for the same period.

According to the figures in Table 4.10, it shown that capital adequacy, leverage and real effective exchange rate are significant at 5% which implies that they are significantly affect the bank's performance or have an effect on return on assets (ROA). However, it also verified on the real interest rate which does not has any effect on the bank's performance.

Bank-specific Factors

4.2.1 Capital Adequacy

The result shows the capital adequacy that used in measuring the bank's capital is significant and negatively correlated with the bank's performance. The capital adequacy was weighted by the ratio of equity to total assets while the bank's performance was measured by return on assets (ROA). This is parallel with the findings from the International Review of Business Research Papers that wrote by

Frederick in year 2015. In his paper, evidences were to prove that capital adequacy is negatively affecting banks' performance in Uganda over the period from year 2000 to year 2011 with the number -368 and -1.304 that resulted from increases the capital regulatory requirement. Furthermore, Cekrezi (2015) finding is also supporting this research result by proving capital adequacy has a negative impact on performance of banks in Albania. This is because higher capital ratio leads to lower profitability. On top of that, the results are in agreement with the study that carried out by Mathuva in 2009. In his study, he found out that there is an opposite relationship between capital adequacy and profitability of a bank.

4.2.2 Leverage

The leverage brings into being to be adversely correlated with the bank's performance, which denotes that the greater the ratio of debt-equity, the lesser the banks' profitability. Similar finding was found by previous researchers. In year 2015, Abubakar did a research on the relationship between the financial leverage and the financial performance of banks in Nigeria. In his research, ratio of debt-equity and return on assets were proven negatively related since increase in debt will automatically bring an increase in fixed interest charges which ultimately drag down financial performance. Furthermore, Wabwile, Chitiavi, Alala and Douglas (2014) have pointed out that the both factors total debt to equity and debt to assets ratios have a negative impact on the bank performance, return on assets. Most of the assets in bank are financed by both long-term and short-term liabilities and hence the return on such assets is deducted when some outstanding liabilities needed to pay off. In the conclusion, there is a negative relationship between the leverage and bank's performance.

Macroeconomic Factors

4.2.3 Real Effective Exchange Rate

Referring to the result, real effective exchange rate has a positive relationship and significant impact on the banks' performance. This finding can be supported by the economic research that done by Chen in year 2012 which discovered that a negative relationship arises between the real effective exchange rate and the same period level of export, ceteris paribus. Similar situation like this will be occurred due to the fluctuation of the rate, when a country has a higher real effective exchange rate relatively to other country, level of export of the country will be decreased due to the higher cost for the foreign investors. Meanwhile, the local citizens will tend to import the goods from other country since the import items have become cheaper. Hence, people will borrow more from the bank to import foreign goods while it is favourable to the bank's performance. As the real effective exchange rate and nominal effective exchange rate are closely linked, especially in the short run, therefore positive relationship has also exists between the exchange rate and bank's performance (Taiwo & Adesola, 2013). Currency depreciation will lead to the local commercial banks suffer loss from the loan that made by foreign borrowers. A depreciation of local currency will cause local commercial banks to receive lesser than it supposes to be. Moreover, according to Ekpung, Udude & Uwalaka in 2015, the estimated result shows that exchange rate is positively related to the deposit liability of commercial banks. The deposit liability is referring to all the money that people and entities in an economy have saved into the banks, at the same time the banks will have to pay back in the future (Financial Times, n.d.). When a country's currency is appreciating, naturally people will invest to that particular country since they believe that the

country is undergoing a growth and having a strong economic. Thus, currency appreciation will attract foreigners to invest or to deposit their money into the country. In addition, the real effective exchange rate act as one of the factors that affecting the stability of the banking sector. Banking distress can be occurred due to the sharp decline in the real effective rate of exchange (Sahminan, 2004). In brief, real effective exchange rate has a positive impact on the Malaysia's local commercial bank's performance.

4.2.4 Real Interest Rate

Based on the outcome, the real interest rate is negative and insignificant to the banks' performance. The real interest rate is defined as the lending interest rate that has been adjusted to eliminate the effects of inflation therefore at the higher inflation rate, the borrowers can enjoy the benefits of a lower lending interest rate and this will lead to the increasing of loans. Referring to the study that carried out by Noman, Chowdhury, Chowdhury, Kabir and Pervin in year 2015, the real interest rate has negative and insignificant effect to the banks' performance. Noman et. Al. (2015) further explained the insignificant effect arises is due to the positive relationship between inflation and profitability. This positive relationship supports the principle that inflation gives the banks an opportunity to alter interest rate changes which will lead to a generation of profit. Thus the result shown that the effect of real interest rate on profitability is in negative and insignificant. Besides, the report that wrote by Obidike, Ejeh & Ugwuegbe in 2015 also found out that interest rate negatively and insignificantly impact on bank performance in Nigeria. In other words, what drives the level of interest are more of macroeconomic factors that have an impact to bank performance. All of these issues best explain the insignificant of real interest rate in this research.

4.3 Conclusion

In summary, the result found out the real interest rate is the only independent variable that was insignificant in explaining the banks' performance. On the other hand, the bank's capital adequacy and leverage are significant and negatively correlated with the banks' performance. Meanwhile, the real effective exchange rate is significant and having a positive relationship with the banks' performance. All the findings are consistent with the previous researchers. In the coming chapter, discussion on the limitations of the study and recommendations for the future researchers will be carried out.

CHAPTER 5:
DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

Chapter 5 consists of the overall conclusion of the whole research. This chapter includes the interpretation of statistical analysis that was indicated and discussed in chapter 4. It also presents the implication and major findings of this research. The chapter followed by recommendation for future researchers and lastly ends with a conclusion that summarizes the research.

5.1 Summary of Statistical Analysis

Diagnosis Checking	Test Statistical	Decision	Result
Multicollinearity	Variance Inflation Factors	1 < VIF < 10	No serious multicollinearity problem
Heteroscedasticity	Breusch-Pagan / Cook-Weisberg test	Reject H0	Consist of Heteroscedasticity problem (Solved)
Autocorrelation	Wooldridge Test	Reject H0	Consist of Autocorrelation problem (Solved)

5.2 Discussion of Major Finding

Bank-specific Factors

5.2.1 Capital Adequacy

The results illustrated that capital adequacy is significant and negative relationship with the banking performance. It indicates that with every one unit increase in capital adequacy, return on assets will decrease 0.0384815 units, ceteris paribus. This result is consistent with the findings by Gul, Irshad and Zaman (2011), Mathuva (2009), and Barnor and Odonkor (2012). According to Bateni, Vakilifard and Asghari (2014), the existing of lowest capital adequacy ratio is to make sure that the banks has ability to absorb reasonable level of losses and can promote efficiency and stability of the financial system. However, the negative relationship indicates that with more capital is set aside as a cushion for banks safety and this will reduce the opportunity in investment. Capital adequacy requirement has limits the risk of investment of banks, thus affecting its ability to reach the goal levels of profitability (Almazari, 2013).

5.2.2 Leverage

The findings from previous chapter show that leverage has negative significant relationship with the banking performance. One unit increase in leverage will contribute 0.0008680 unit decrease in return on assets, vice versa. This result is agreed by Raza (2013), Titman & Wessels (1988), and Majumdar & Chhibber (1999). The main source of bank funding is deposits, so it has large impact on the performance of the banks. Nevertheless, according to Gul, Irshad & Zaman (2011),

bank's funding are less profitable if too rely on debts. This is because when the bank interest rate increases, the bank cost will increase rapidly. Besides that, the growth in debt will lead to the growth of fixed interest rate payment. Thus, the banks' performance will be affected.

Macroeconomic Factors

5.2.3 Exchange rate

Exchange rate is found to have positive significant relationship with bank's profitability. The result shown that one unit increase in exchange rate will contribute 0.0003116 unit increases in return on assets, ceteris paribus. The result is stand in line with the studies of Acaravci and Calim (2013), Makori (2015) and Taiwo and Adesola (2013). Taiwo and Adesola (2013) found that exchange rate is positively affected banks' performance. They used return on assets to represent as measurement for banks' performance. A stable exchange rate regime and an ideal loan rule can help in improving banks 'performance. In the journal written by Adebiyi (2006), for the country which is focusing on import, the stability and maintenance of exchange rate is vital in credit allocation.

5.2.4 Real interest rate

Refer to the outcome that shown in the previous chapter, there is a negative and insignificant relationship between real interest rate and return on assets. The result shows that one unit increase in real interest rate will contribute 0.0000540 unit decrease in return on asset. This result supported by Amin, Sanusi, Kusairi and Abdallah (2014), and Vejzagic and Zarafat (2014). In addition, Nominet (2015) also stated that real interest rate effects has negative significantly on banks' performance. The result shows that rise in the real interest rate will give out a negative impact on the banks' performance due to the reduction on the demand of bank loan that caused by higher cost of borrowing. Moreover, according to the Amin, Sanusi, Kusairi and Abdallah (2014), a higher level of real interest rate will lead to a lower financial performance of the banks, vice versa which due to the shifting of customers to other particular banks when the real interest rate is greater than the average market interest rates.

5.3 Implication of the Study

Based on the outcomes of this study, in this section will recommend the useful implications for policy makers and banks' management. The existing of implications is to provide recommendation on certain policies and relevant strategies, so that government and banks can improve banks' performance by manage bank-specific and macroeconomic factors.

5.3.1 Capital Adequacy

In this study, capital adequacy has a significant negative relationship with the banks performance. Banks should decrease the level of capital adequacy. The bank with minimum capital requirement also can absorb the unexpected losses. If the bank with high capital adequacy level, it means that the bank is set aside the capital as a cushion for banks' safety and this will decrease the opportunity of bank to gain additional profit from others investment. In order to increase banks' performance, the banks should engage in low risk investment or diversified the investment. Diversification cannot fully eliminate the risk from investment but it can manage the level of risk by invest in different types of investment. This means that, it can hedge against the risk by using the gain form one market to cover losses from another market.

5.3.2 Leverage

Based on this research, leverage has a negative significant relationship with the banks' performance. The banks should reduce the level of leverage. Although the main source of banks' funding is deposits, but if the bank are too rely on it are less profitable. This is because market interest rate increases, the fixed interest payment for depositors also increase. Banks can improve their performance by given a lower interest rate on deposits and offer a free credit card (provide loan) for those who reach

the minimum amount of deposits. In this case, when market interest rate increase, the creditor need to pay interest rate for bank. Thus, this helps to improve the banks' performance.

5.3.3 Exchange Rate

The empirical result revealed the exchange rate is significant and positive relationship with the banks' performance. Exchange rate is a variable which only can be control and make changes by Malaysian Government to boost the banks' performance. The raise in exchange rate will directly increase the banks' performance. Hence, a few suggestions are recommended to government.

Since the result found out is positively and significantly relationship, Malaysia government may decide to fix or float the exchange rate. The decision is critical to the impact of banks' performance. The former Prime Minister of Malaysia Tun Dr. Mahathir Mohammad has pegged the Ringgit Malaysia during the Asian Financial Crisis in 1998. This action had helped to control and maintain the exchange rate against currency depreciation. However, controlling the exchange rate required large amount of country's reserves in order to buy or sell the Ringgit Malaysia constantly. Hence, government need to take into consideration of the requirement before pegging the exchange rate.

5.3.4 Real Interest rate

Real interest rate has a negative and insignificant relationship with banking performance. This means that the banks with lower lending interest rate lead to increasing of loans. The banks should more focus on inflation. When inflation increases, the real interest rate will decrease. On the other side, when inflation decreases, the real interest rate will increase. The banks should create a department and do some research on historical trend about inflation. This can help banks absorb some losses when inflation occur and to prevent the depreciation in value of money.

5.4 Limitation of the Study

This research has suffers from some limitations. Firstly, this research had some difficulties in data collection process. As the data of bank-specific factors is collect from annual report of each bank, there are only limited for recent years that can be found at Bursa Malaysia website. It is because of the refurbishment of website from time to time. In this research, the time range is limited and that might cause distortion of result compared to longer duration of study.

In this research two variables are chosen from bank-specific factors and another two variables from macroeconomic factors. Independent variable that has been included in this research is capital adequacy, leverage, real effective exchange rate and real interest rate. However, future researchers can know which factors are influence the most in banks performance with more independent variables. For example, GDP, inflation rate, and liquidity are variables that can influence the banks' performance.

These four independent variables have been employed in this research because of these four factors have greater impact on banks' performance.

Furthermore, every country is distinctive and different countries have different regulations, political background, culture, and economy policy. Since this research is based on 8 domestic banks in Malaysia, thus the implications and findings are only useful and meaningful to Malaysia's government, domestic banks, and future researcher. For other countries' researcher, they only can use this research as a reference because the findings and implications might not be applicable in other countries.

5.5 Recommendation of the Study

Futures researchers are recommended to increase the sample size in future studies by finding other sources of database like DataStream which consists of greater availability of data in order to obtain more accurate result. Moreover, the researcher can even use high frequency data such as monthly and quarterly data instead of annually data. Besides that, Gujarati (2009) also stated that sample size should be considered; at least 50 or more sample size should be used in doing research as it allows the researchers to control the probability of getting a false-negative results. Thus, small sample size may contribute to data constraints problem and caused the result to be unreliable.

Future researcher should take note on other variables that might affect the banks' performance. According to Jamal, Karim and Hamidi (2012), they stated that inflation and gross domestic product (GDP) have positive relationship towards banks' performance. Guisse (2012) also did a similar study in Malaysia and found that inflation have positively related to the bank profitability. Therefore, future researchers are suggested to include this variable or other relevant variables into the model if the data are available.

In addition, future researchers are suggested to include more tests such as of ARDL model. ARDL model allowed the author to develop a dynamic error correction model (ECM) through a simple linear transformation (Banerjee & Newman, 1993). The usage of ECM is to integrate the short-run dynamics with the long-run equilibrium without losing the long-run information.

5.6 Conclusion

The purpose of this research project is to investigate the bank-specific and macroeconomic factors that affect domestic commercial banks' performance in Malaysia during 2005-2014. In this research, capital adequacy, leverage, exchange rate, and real interest rate are employed to measure banks' performance. Panel data regression model are involved by using Stata to do data analysis. Data analysis result shows that capital adequacy, leverage, exchange rate contributes significant

relationship on banks' performance, however, real interest rate is found to be insignificant.

Future researchers are recommended to have wider coverage of data collection method, target samples, and comparative analysis between local and foreign banks should be carried out.

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APPENDICES

Appendix 1.1 Profitability Trend of Banking System in Malaysia (%)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
ROA	1.4	1.3	1.5	1.5	1.2	1.5	1.6	1.6	1.5	1.5
ROE	16.8	16.2	19.8	18.6	13.9	16.6	17.4	17.4	15.9	15.2

Source: The World Bank

Appendix 1.2 Raw data of dependent and independent variables for eight local commercial banks in Malaysia from 2005 to 2014

Bank(s)	Year	ROA	Capital Adequacy (CA)	Leverage (LEV)	Real Effective Exchange Rate (REER)	Real Interest Rate (RIR)
Affin Bank	2005	0.00755555	0.14938272	8.72684560	91.87090108	-2.67296881
Affin Bank	2006	0.00639494	0.13594850	9.20580797	95.00504162	2.40917258
Affin Bank	2007	0.00683917	0.16577414	7.68859503	96.97335856	1.45656534
Affin Bank	2008	0.00794762	0.16377609	7.35046114	97.55335372	-3.90325712
Affin Bank	2009	0.00930674	0.16557388	7.43753000	94.79421005	11.78209181
Affin Bank	2010	0.01039541	0.15713835	8.03741776	100.00000000	-2.11239194
Affin Bank	2011	0.00945352	0.14206654	8.60906680	100.36916359	-0.47186863
Affin Bank	2012	0.01126444	0.14074994	8.23719978	100.10583245	3.74852619
Affin Bank	2013	0.01084244	0.13466211	8.40162331	100.58916176	4.42864808
Affin Bank	2014	0.00918493	0.15776836	7.35071259	99.88500096	2.06291099
Alliance Bank	2005	0.00909482	0.11500432	11.15401435	91.87090108	-2.67296881
Alliance Bank	2006	-0.00855809	0.09890802	12.49555236	95.00504162	2.40917258
Alliance Bank	2007	0.00406689	0.10190605	12.55524605	96.97335856	1.45656534
Alliance Bank	2008	0.01373057	0.12150699	9.67010447	97.55335372	-3.90325712
Alliance Bank	2009	0.00718544	0.10817166	10.51418560	94.79421005	11.78209181
Alliance Bank	2010	0.00952197	0.12492127	9.72731606	100.00000000	-2.11239194
Alliance Bank	2011	0.01134264	0.11841688	9.74656014	100.36916359	-0.47186863
Alliance Bank	2012	0.01211608	0.11438606	9.77547918	100.10583245	3.74852619
Alliance Bank	2013	0.01231627	0.11207459	9.82780647	100.58916176	4.42864808
Alliance Bank	2014	0.01172234	0.10617549	10.53972860	99.88500096	2.06291099
AmBank	2005	0.00326317	0.13888515	11.92762065	91.87090108	-2.67296881
AmBank	2006	0.00505815	0.15771194	10.77293858	95.00504162	2.40917258
AmBank	2007	-0.00063917	0.31796175	11.93862377	96.97335856	1.45656534
AmBank	2008	0.00974639	0.15185958	10.46847777	97.55335372	-3.90325712
AmBank	2009	0.00977001	0.12336456	10.36222664	94.79421005	11.78209181
AmBank	2010	0.01080643	0.14292724	8.80093767	100.00000000	-2.11239194
AmBank	2011	0.01285291	0.14171217	9.24280627	100.36916359	-0.47186863
AmBank	2012	0.01400161	0.14926383	8.71428852	100.10583245	3.74852619
AmBank	2013	0.01333299	0.15476352	8.66961593	100.58916176	4.42864808
AmBank	2014	0.01413683	0.15713005	8.39049270	99.88500096	2.06291099
CIMB Bank	2005	0.00728314	0.07370997	9.22159896	91.87090108	-2.67296881
CIMB Bank	2006	0.01008021	0.07165091	11.57807700	95.00504162	2.40917258
CIMB Bank	2007	0.01593912	0.07765069	9.84577092	96.97335856	1.45656534
CIMB Bank	2008	0.00973487	0.07310604	10.25861316	97.55335372	-3.90325712
CIMB Bank	2009	0.01269696	0.06269615	9.59685741	94.79421005	11.78209181

CIMB Bank	2010	0.01369858	0.06477572	10.08353036	100.00000000	-2.11239194
CIMB Bank	2011	0.01357192	0.05841036	10.17525663	100.36916359	-0.47186863
CIMB Bank	2012	0.01304470	0.05411696	10.49653156	100.10583245	3.74852619
CIMB Bank	2013	0.01242562	0.05674381	10.87735832	100.58916176	4.42864808
CIMB Bank	2014	0.00766512	0.06982203	9.78781561	99.88500096	2.06291099
Hong Leong Bank	2005	0.00901946	0.11025263	12.09361294	91.87090108	-2.67296881
Hong Leong Bank	2006	0.00907515	0.09894518	12.83188968	95.00504162	2.40917258
Hong Leong Bank	2007	0.00867287	0.08213605	14.33123654	96.97335856	1.45656534
Hong Leong Bank	2008	0.00957719	0.08206885	14.09012538	97.55335372	-3.90325712
Hong Leong Bank	2009	0.01139261	0.08547743	12.74529623	94.79421005	11.78209181
Hong Leong Bank	2010	0.01166364	0.09214998	12.18575183	100.00000000	-2.11239194
Hong Leong Bank	2011	0.00780423	0.06499627	18.48022256	100.36916359	-0.47186863
Hong Leong Bank	2012	0.01044543	0.09276779	12.81758164	100.10583245	3.74852619
Hong Leong Bank	2013	0.01134740	0.10544268	11.54816408	100.58916176	4.42864808
Hong Leong Bank	2014	0.01234083	0.11155407	10.72393091	99.88500096	2.06291099
Maybank	2005	0.01304110	0.12858781	10.38590675	91.87090108	-2.67296881
Maybank	2006	0.01250460	0.12822524	11.83057480	95.00504162	2.40917258
Maybank	2007	0.01267349	0.12138649	11.91853050	96.97335856	1.45656534
Maybank	2008	0.01115694	0.10737822	12.39358390	97.55335372	-3.90325712
Maybank	2009	0.00241590	0.12120484	11.05911985	94.79421005	11.78209181
Maybank	2010	0.01178632	0.12099517	10.74604817	100.00000000	-2.11239194
Maybank	2011	0.00593042	0.11156809	12.00576369	100.36916359	-0.47186863
Maybank	2012	0.01195736	0.10627890	8.28455950	100.10583245	3.74852619
Maybank	2013	0.01208210	0.10237297	8.82175979	100.58916176	4.42864808
Maybank	2014	0.01079345	0.10504099	8.80142874	99.88500096	2.06291099
Public Bank	2005	0.01299462	0.10599414	11.51577230	91.87090108	-2.67296881
Public Bank	2006	0.01214674	0.08643024	14.29546851	95.00504162	2.40917258
Public Bank	2007	0.01264267	0.07190901	16.45317742	96.97335856	1.45656534
Public Bank	2008	0.01336979	0.06303155	18.17765623	97.55335372	-3.90325712
Public Bank	2009	0.01175088	0.06855413	17.53437037	94.79421005	11.78209181
Public Bank	2010	0.01369280	0.07737278	15.53836468	100.00000000	-2.11239194
Public Bank	2011	0.01412939	0.07765966	15.02825617	100.36916359	-0.47186863
Public Bank	2012	0.01424402	0.08284664	13.72993993	100.10583245	3.74852619

Public Bank	2013	0.01342918	0.08449289	13.42303156	100.58916176	4.42864808
Public Bank	2014	0.01319945	0.10441521	10.97305628	99.88500096	2.06291099
RHB Bank	2005	0.00351236	0.08999309	18.78620807	91.87090108	-2.67296881
RHB Bank	2006	0.00576805	0.10520063	16.07116999	95.00504162	2.40917258
RHB Bank	2007	0.00781770	0.09333271	13.86492400	96.97335856	1.45656534
RHB Bank	2008	0.01004235	0.10601277	12.33166291	97.55335372	-3.90325712
RHB Bank	2009	0.01051406	0.10301830	12.15205816	94.79421005	11.78209181
RHB Bank	2010	0.01104612	0.10560802	11.96760093	100.00000000	-2.11239194
RHB Bank	2011	0.00986693	0.09882832	12.30913608	100.36916359	-0.47186863
RHB Bank	2012	0.00946579	0.05741268	11.32540083	100.10583245	3.74852619
RHB Bank	2013	0.00964749	0.12300402	10.27858030	100.58916176	4.42864808
RHB Bank	2014	0.00940699	0.12024188	10.60968760	99.88500096	2.06291099

Source: Targeted financial institutions' annual reports and DataStream

Appendix 1.3 Result of Correlation Among Independent Variables

```
. cor capitaladequacy leverage realeffectiveexchangerate realinterestrate
(obs=80)
```

	capita~y	leverage	realef~e	realin~e
capitalade~y	1.0000			
leverage	-0.4435	1.0000		
realeffect~e	-0.0517	-0.1990	1.0000	
realintere~e	-0.0446	-0.0750	-0.0464	1.0000

Appendix 1.4 Result of Variance Inflation Factor (VIF) Among Independent Variables

```
. vif
```

Variable	VIF	1/VIF
leverage	1.35	0.742766
capitalade~y	1.29	0.775340
realeffect~e	1.07	0.930353
realintere~e	1.02	0.980856
Mean VIF	1.18	

Appendix 1.5 Result of Breusch-Pagan/ Cook-Weisberg Test

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        roa[code,t] = Xb + u[code] + e[code,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+------------------------------
                 roa |   .0000138       .0037154
                   e |   8.48e-06       .0029118
                   u |   1.46e-06       .0012102

        Test:   Var(u) = 0
                             chi2(1) =     4.51
                          Prob > chi2 =     0.0337
```

Appendix 1.6 Result of Wooldridge Test

```
. xtserial roa capitaladequacy leverage realeffectiveexchangerate realinterestrate

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,       7) =     11.334
           Prob > F =      0.0120
```

Appendix 1.7 Result of Hausman Test

```
. hausman fixed

                 ---- Coefficients ----
                 |      (b)          (B)          (b-B)     sqrt(diag(V_b-V_B))
                 |    fixed            .       Difference          S.E.
-----------------+------------------------------------------------------------
capitalade~y     |  -.0384815    -.0417612       .0032797        .0088153
    leverage     |   -.000868    -.0005421      -.0003259        .0001137
realeffect~e     |   .0003116     .0003689      -.0000573               .
realintere~e     |   -.000054    -.0000389      -.0000152               .
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        8.25
                Prob>chi2 =      0.0828
                (V_b-V_B is not positive definite)
```

Appendix 1.8 Result of Fixed Effect Model

```
. xtreg roa capitaladequacy leverage realeffectiveexchangerate realinterestrate, fe

Fixed-effects (within) regression               Number of obs      =        80
Group variable: code                            Number of groups   =         8

R-sq:  within  = 0.3581                         Obs per group: min =        10
       between = 0.0099                                        avg =      10.0
       overall = 0.1800                                        max =        10

                                                F(4,68)            =      9.48
corr(u_i, Xb)  = -0.3978                        Prob > F           =    0.0000

------------------------------------------------------------------------------
         roa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
capitalade~y |  -.0384815   .0154327    -2.49   0.015    -.0692769   -.0076861
    leverage |   -.000868   .0002179    -3.98   0.000    -.0013028   -.0004332
realeffect~e |   .0003116   .0001221     2.55   0.013     .000068    .0005552
realintere~e |   -.000054   .0000773    -0.70   0.487    -.0002082    .0001002
       _cons |  -.0062555   .0134179    -0.47   0.643    -.0330306    .0205195
-------------+----------------------------------------------------------------
     sigma_u |  .00232217
     sigma_e |  .00291175
         rho |  .38876558   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(7, 68) =     3.67                 Prob > F = 0.0020
```

Appendix 1.9 Result of Cluster Robust Standard Error

```
. xtreg roa capitaladequacy leverage realeffectiveexchangerate realinterestrate, fe cluster (code)

Fixed-effects (within) regression               Number of obs      =        80
Group variable: code                            Number of groups   =         8

R-sq:  within  = 0.3581                         Obs per group: min =        10
       between = 0.0099                                        avg =      10.0
       overall = 0.1800                                        max =        10

                                                F(4,7)             =      6.71
corr(u_i, Xb)  = -0.3978                        Prob > F           =    0.0152

                                    (Std. Err. adjusted for 8 clusters in code)
------------------------------------------------------------------------------
             |               Robust
         roa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
capitalade~y |  -.0384815   .0121369    -3.17   0.016    -.0671807   -.0097823
    leverage |   -.000868   .0002778    -3.13   0.017    -.0015248   -.0002112
realeffect~e |   .0003116   .0001127     2.77   0.028     .0000451    .0005781
realintere~e |    -.000054   .0000866    -0.62   0.552    -.0002587    .0001507
       _cons |  -.0062555   .0092333    -0.68   0.520    -.0280887    .0155777
-------------+----------------------------------------------------------------
     sigma_u |  .00232217
     sigma_e |  .00291175
         rho |  .38876558   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Appendix 2.0 Cluster Robust Standard Error for Panel Data Regression Model

Variable	Standard Error of Fixed Effect Model	Robust Cluster Standard Error
Capital Adequacy (CA)	-0.0384815 (0.0154327)**	-0.0384815 (0.0121369)**
Leverage (LEV)	-0.000868 (0.0002179)*	-0.000868 (0.0002778)*
Real Effective Exchange Rate (REER)	0.000054 (0.0001221)*	0.000054 (0.0001127)*
Real Interest Rate (RIR)	-0.000054 (0.0000773)*	-0.000054 (0.0000866)*
Constant	-0.0062555 (0.0134179)**	-0.0062555 (0.0092333)*

*significant at 1% (strong effect);**significant at 5% (effect);***significant at 10% (weak effect)

Appendix 2.1 Result of the Fixed-Effect Model

Independent Variable	Coefficient Value	Sign	P-Value
Capital Adequacy (CA)	-0.0384815	- ve	0.016**
Leverage (LEV)	-0.0008680	- ve	0.017**
Real Effective Exchange Rate (REER)	0.0003116	+ ve	0.028**
Real Interest Rate (RIR)	-0.0000540	-ve; Insignificant	0.552

*significant at 1% (strong effect); **significant at 5% (effect); ***significant at 10% (weak effect)