

BANK-SPECIFIC AND MACROECONOMIC  
DETERMINANTS OF BANK'S PROFITABILITY: A  
STUDY OF COMMERCIAL BANKS IN MALAYSIA

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(HONS) BANKING AND FINANCE

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**BY**

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

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BANKING AND FINANCE**

**UNIVERSITI TUNKU ABDUL RAHMAN**

**FACULTY BUSINESS AND 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 20,829 words.

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## DEDICATION

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Lastly, we dedicate our study to those future researchers who have interest in studying this topic. Thus, this paper can be referred to by them to enhance their understanding. We wish that our study can provide future researchers a clear guideline regarding the determinants of bank's profitability.

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## LIST OF ABBREVIATIONS

ARCH Test	Autoregressive Conditional Heteroscedasticity Test
BGLM Test	Breusch-Godfrey Serial Correlation LM Test
BS	Bank Size
CA	Capital Adequacy
CPI	Consumer Price Index
CR	Credit Risk
GDP	Gross Domestic Product
INF	Inflation
IRS	Interest Rate Spread
JB Test	Jarque-Bera Test
Pooled OLS	Pooled Ordinary Least Square
Ramsey RESET Test	Regression Equation Specification Error Test
ROA	Return on Assets
ROE	Return on Equity
VIF	Variance Inflation Factor

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## PREFACE

The commercial banking industry of Malaysia is developing rapidly and has been acted as one of the critical driving forces of economy growth of the country. Increased of rivalry among commercial banks have drew the intention of conducting this research in order to have a deeper understanding on the determinants of profitability of commercial banks in Malaysia.

In this research, return on assets (ROA) ratio is being used to measure the bank's profitability. ROA ratio indicates the performance of bank on using the total assets to generate profits. The higher the ROA ratio, the more efficient the bank is in utilizing its asset.

The determinants of bank's profitability have been categorized into bank-specific determinants (internal factor) and macroeconomic determinants (external factor). The bank-specific determinants are capital adequacy, credit risk and bank size. Whereas macroeconomic determinants are inflation, gross domestic product and interest rate spread.

The process of conducting this research is uneasy. However, precious teamwork have been developed throughout the process that we have come out the idea and solutions together to complete the research. We believe that the efforts we have put in this research will not be wasted, as it will help us or other researchers to better understand the determinants of bank's profitability in the future.



## ABSTRACT

The purpose of this study is to examine the effect of bank-specific and macroeconomic determinants on commercial banks' profitability in Malaysia during 2004-2013. This study is focus on the five local commercial banks which are Malayan Banking Berhad, CIMB Bank Berhad, Public Bank Berhad, RHB Bank Berhad and Ambank Berhad. The Pooled Ordinary Least Square Model is used to regress the balanced panel data. The result shows that capital adequacy, credit risk, bank size, gross domestic product and interest rate spread are significant influencing banking profitability. However, inflation is insignificant in explaining banking profitability.

## **CHAPTER 1: RESEARCH OVERVIEW**

### **1.0 Introduction**

In this chapter, discussion on the research overview will be included. There are eight sections to be discussed in this chapter. It includes research background, problem statement, research objectives, research questions, hypotheses, significance of the study, chapter layout and conclusion. First of all, the background of Malaysia banking sector and the overall profit of each bank will be explained to provide the context of this research. In problem statement section, the main research problem and few research objectives will be briefly discussed to address the purpose of this study. Consequently, research questions and hypotheses will be identified as a guidance to carry out this research. Furthermore, the significance of this study was constructed to identify the contribution of this study. Chapter layout will outline each chapter of this research. Lastly, conclusion will be made as a summary of Chapter 1 and provide a linkage to Chapter 2.

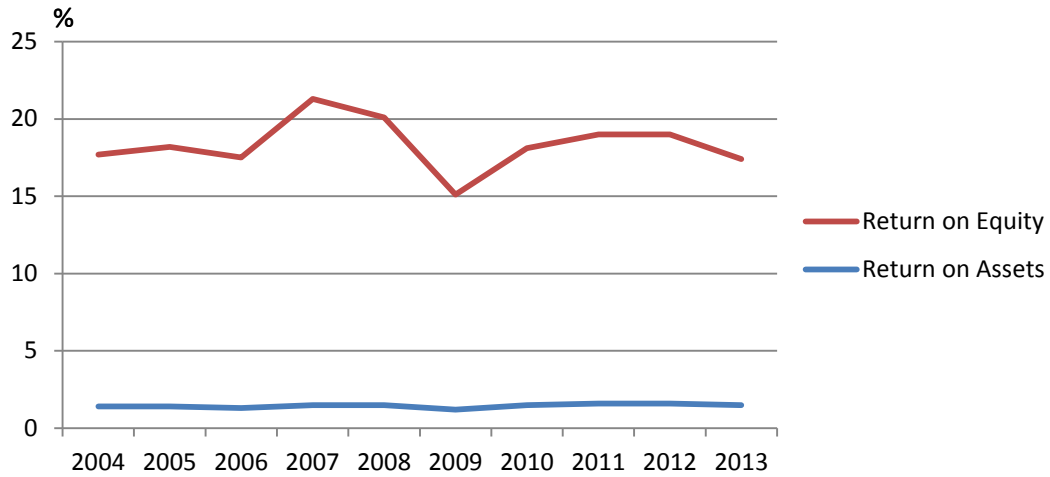
### **1.1 Research Background**

During the past 20 years, Malaysia's banking sector underwent huge structural changes especially financial crisis occurred in 1986, 1998 and 2008. This has formed the consolidation trend whereby most of the banks and other financial institutions have actively involved in mergers and acquisition in order to strengthen their capital and asset base. Furthermore, as a result of liberalization and globalization, it even speed up the consolidation and increase the competitiveness for commercial banks to become one-stop financial centre to provide innovative financial services in order to meet changing financial needs of customers.

Banks have played an intermediary role to facilitate flow of funds between surplus funds unit and deficit funds units in an economy, banks have significant influence in shaping the trend of an economy and thus banks have been widely recognized as the most critical agencies in a financial system. According to Abdul Jamal, Abdul Karim & Hamidi (2012), a well-managed and profitable bank is able to promote economic growth of the country and is able to sustain with the sudden economic downturn. Ramlall (2009) had also pointed out that it is prerequisite for banking sector to maintain a level of financial stability especially after the 2008 United State Subprime crisis which had led serious undesirable conditions to many countries worldwide. Therefore, it is essential for banks to maintain profitable growth so that it can ensure the safety and soundness of financial system.

Banking sector is the backbone for a country's economy as banks' performance can generate spillover impacts on different sectors (UNDP, 2009). A stable profitable banking sector enables proper expansion of existing companies and encourages the establishment of new companies by allowing the lending of capital and loans. In addition, by maintaining good profit figures, banks are able to create public confidence to stakeholders, depositors and potential shareholders, also able to stay competitive in financial market. Therefore, banking profitability has become an significant issue and it captures the interests from government and other parties such as bankers, shareholders and investors to investigate the determinants on bank profitability. The understandings of the determinants can help them to have a clearer picture in the current circumstances of the Malaysia banking industry they are participating in and can help in improving their consideration in the decision makings. In order to have a clearer picture on the performance of banks, table 1.1 illustrates the trend of profitability in Malaysian banking system. It shows that bank's profitability which measured by return on equity and return on asset appeared to be constant during 2004-2013.

Table 1.1: Profitability Trend of Banking System in Malaysia



Source: Bank Negara Malaysia

The banking system in Malaysia comprises of Bank Negara Malaysia, commercial banks, Islamic banks, investment banks and foreign banks. There are 8 local commercial banks and 19 foreign commercial banks in Malaysia (BNM: 2013). According to Abdul Jamal, Abdul Karim & Hamidi (2012), until 2011, commercial banks account the bulk of RM1,7138.3 trillion assets and they represent the largest segment of all financial institutions in Malaysia. Therefore, this research is only focused on commercial banks since they are the largest fund provider in a country. Functions of commercial banks are to grant loans and advances, also to provide facilities for savings, payments, investments and others.

Table 1.2: List of Local Commercial Banks in Malaysia

No.	Name of Local Commercial Banks	Ownership
1.	Malayan Banking Berhad	Local
2.	Public Bank Berhad	Local
3.	CIMB Bank Berhad	Local
4.	RHB Bank Berhad	Local
5.	AmBank Berhad	Local
6.	Affin Bank Berhad	Local
7.	Alliance Bank Berhad	Local

8.	Hong Leong Bank Berhad	Local
----	------------------------	-------

Source: Bank Negara Malaysia, 2013

In order to have a clearer view on the determinants of bank's profitability, the determinants are categorized into bank-specific and macroeconomic in the research. Basically, bank-specific variables arise from the internal which is within the control of bank management whereas macroeconomic variables arise from external which is beyond their control. The most relevant and significant variables have been chosen to investigate their impacts on bank's profitability which is measured by return on assets. The bank-specific are capital adequacy, credit risk and bank size, whereas the macroeconomic variables are inflation, gross domestic product, and interest rate spread. The research is focus on the performances of the top 5 commercial banks in Malaysia ("Top Banks in Malaysia," 2015), and use the most recent data set from year 2004 to 2013 in order to provide up-to-date findings.

Malaysia is being chosen in this study due to the rising competition in the banking sectors that has raised the concerns in both local and foreign parties. The consolidation and restructuring of banking industry, also the successful reforms of banking sector following the Asian financial crisis 1997 such as the improvements in governance structure and risk management framework has preserve stability of Malaysia to better withstand the economic stress when Subprime crisis occurred in 2008 (Ibrahim, n.d.). Furthermore, precautionary measures and monetary policy implemented by Bank Negara Malaysia speed up the economic recovery. Thus, these combined conditions make Malaysia to stay sustained and not much affected by financial crisis. Since this study does not take into account of the effect of financial crisis, therefore this research focused in Malaysia which is less affected by financial crisis. This also provide a support to use constant coefficients model (Pooled OLS model) to regress data in this research since this research assume there are no time effect, which means all determinants of bank's profitability that used in the model are not affected by economic crisis. In conclusion, this research is to investigate the internal and external determinants of local commercial bank's profitability in Malaysia during 2004-2013.

## 1.2 Problem Statement

The financial crisis in 2008 led to financial distress in many institutions across the globe. Banks struggled during the financial crisis and most of their financial instruments were affected, for example loans were defaulted. This crisis has caused the failure of some banks around the world (Rosman, Norazlina & Zainol, 2014). Until now, the global economy is not fully recover and still suffering from this severe financial crisis. The commercial banks play significant role in maintaining the stability of economy in a country, because performance of banks not only could influence the financial sector, but also influence other sectors as well. The main economic function of a bank is to facilitate the flow of funds from surplus funds unit to deficit funds unit, which means commercial bank acts as an agent to manage the funds in economy and also supply credit in economy. According to Abdul Jamal, Abdul Karim & Hamidi (2012), commercial banks in Malaysia is the dominant financial institutions and they are crucial in stabilizing economy and commercial banks should perform well so that they can generate financial benefits to individual, households, financial institutions, non-financial institutions and government. Banks who achieve sustainable profits will become more capable to withstand negative shocks and able to sustain even though financial crisis hit the country's economy. As mentioned in the research background, the overall profitability trend of Malaysian banking system is considered as stable, furthermore Malaysia also not much affected by financial crisis. Therefore, this poses research questions regarding what are the potential internal and external factors that contribute significant changes to the bank's profitability in Malaysia, thus it captures interest to conduct the relevant investigation.

Internationally, there is a minimum requirement on capital adequacy ratio of eight percent that set by Basel Committee for all banks. It acts as a benchmark in measuring the level of capital adequacy of a bank. The global financial meltdown had urged the impotency of observing and maintaining the bank performances as well as the bank profitability since banks have played an important role in assisting the economies of one country (Ikpefan, 2013). According to Ikpefan (2013), measuring of

bank capital adequacy is essential as inadequate bank capital can lead to the loss in public confidence, leading to the bank failure in the areas of lending. However, the impact of capital adequacy on the bank's profitability can be ambiguous. Garcia-Herrero, Gavila & Santabarbara (2009) supported that bank capital adequacy can raise the bank profitability as when one bank have higher capital adequacy, it have better cushion to absorb the risk come from risky assets like loans. However, there are some other researchers argue that a bank with lower capital adequacy ratio have a better chance to earn higher return due to higher risk exposure. Therefore, this research intends to examine to what extent bank capital adequacy can give effect on one bank's profitability.

Based on the research done by Kolapo, Ayeni, & Oke (2012), the researchers claimed that when a bank is exposed to higher credit risk, the bank is more likely to be affected by financial crisis and vice versa. Besides, they also explained that bank may face liquidity and solvency problems which will affect bank's profitability when there is an increase in credit risk level. Other than that, poor quality of loan increase the credit risk and it will significantly affect bank profitability. Poor quality of bank's outstanding loans will result in higher amount of non-performing loans and thus expose higher credit risk to the bank which may lead to bankruptcy (Ahmad & Ariff, 2007). Credit risk management is important for all banks as it will influence their profitability. Once there is a poor credit risk policy within the bank, credit risk exposure will be larger as loan default rate increases and therefore bank's performance will be affected (Afriyie & Akotey, 2013). However, some researches reveal that credit risk can improve bank's profitability which indicates banks operate in high credit risk environment will be compensated by higher returns. Thus, it create question on whether Malaysian commercial banks able to benefit if operate in a high credit risk environment.

Economic theory suggests that if economies of scale exist in the industry, large institutions are able to provide services at lower cost and hence achieve efficiency (Haron, 1996). Generally, large banks are expected to create economies of scale and

able to produce services cheaply and efficiently when compared to small banks. This is because large banks are able to reduce the cost of gathering and processing information, and also they have greater loan diversification and easier access to capital markets, hence bank with larger size can reduce costs and earn higher profits (Abduh & Idrees, 2013). However, according to Obamuyi (2013), economies of scales does not sustained when it reach certain level, diseconomies of scale will set in and this means banks who are growing size are no longer efficient, because the banks will have difficulty to manage the high level of bureaucracy and agency cost. This arise a problem that growing bank's size may not be the best for every bank and they should consider the respective costs and risks. Thus, this research attempts to investigate how the growth of bank size can affect its profitability, it also can examine whether economies of scale phenomenon is held among the commercial banks in Malaysia.

Inflation in economy can bring financial difficulties to both consumers and banking institutions as it reduce purchasing power of money. In the view point of borrowers, when inflation occur unexpectedly, borrowers face cash flow difficulties and it lead to the premature termination of loan arrangements and therefore precipitate loan losses to bank (Ameur & Mhiri, 2013). In the view point of banks, inflation can directly or indirectly affects the banks through different ways such as interest rate, asset price, exchange rate, operating cost, customer's needs and the general economic environment (Haron, 1997). Even though inflation is classified as macroeconomic variable which is not controllable by bank management, however somehow researchers argue that inflation can be anticipated by bank and then bank can adjust interest rate according to the expected inflation rate so that revenue will be increased faster than cost. But once inflation is not anticipated or not fully anticipated by bank, it cause cost rise faster than revenue and hence deteriorate bank's profits. Another issue arise is many previous researchers found that inflation have no significant impact to bank's profitability, for example in the study conducted by Aigheyisi & Edore (2014), Alper & Anbar (2011) and Ramadan, Kilani & Kaddumim (2011), insignificant findings provide ambiguous of inflation effect as it cannot conclude



whether or not the inflation is anticipated by banks. Similarly, it poses question on whether the commercial banks in Malaysia is able to predict inflation occur accurately and gain benefit from inflationary environment, or inflation might have no impact to banks.

The growth rate of Gross domestic product (GDP) captures the upswings and downswings in the business cycle. Also, GDP could contribute different impacts on bank's profitability due to the different economic conditions in respective countries. The economic growth affects the performance of a bank in a number of ways. Firstly, in the times of economic boom, borrowers are more capable in servicing debts, therefore banks can generate profits. Alternatively, in the time of economic recession, borrowers tends to default loans and hence bank's profitability reduced. Not only because of the loans are defaulted, but the loan application also has been declined. This is supported by Muda, Shaharuddin & Embaya (2013a) who state that when slowdown of domestic economic activities occur in Malaysia during 1998 and 2008, the loan application in the country showed declining trend as well. On the other hand, many previous studies finds that GDP is insignificant related to bank's profitability, thus it create an ambiguous impact in the sense that how GDP could contribute no effect on bank's profitability. Since economic growth can affect bank's profitability in several ways, thus this research aims to study their relationship and also to investigate whether bank's profitability in Malaysia tend to have pro-cyclical or counter-cyclical movement with GDP during 2004-2013.

Interest rate spread is one of the major concerns for banks as it will affect banks' profitability. It is the interest margin for banks in connecting depositors and borrowers. As the interest a bank can earn from its assets and the interest it pays on debts fluctuate, this may affect its profitability to some extent. When the spread is high, banks pay a low deposit rate and charge borrowers a high financing rate (Ghazali & Ali, 2002). It will discourage potential savers from keeping their monies in banks and also limit potential borrowers to obtain loans. This may reduce banks' profits since the number of customers decrease. Consequently, it will lead to financial

disintermediation. However, lower interest rate spread helps banks to dominate the banking industry by offering lower financing rate to borrowers (Doliente, 2003). This will attract more customers and boost banks' profit. In short, the impact of interest rate spread on bank's profitability should be studied to identify the true determinants of bank profitability.

### **1.3 Research Objectives**

Research objectives define as the purposes for conducting the research. At the end of the research, all the research objectives should be achieved. Research objectives can be separated into general objective and specific objective.

#### **1.3.1 General Objective**

To examine which internal and external determinants that could affect the bank's profitability which measured by return on assets (ROA). The research is conducted based on the study of five local commercial banks in Malaysia during the period 2004-2013.

#### **1.3.2 Specific Objectives**

- To examine the relationship between capital adequacy and bank's profitability.
- To examine the relationship between credit risk and bank's profitability.
- To examine the relationship between bank size and bank's profitability.
- To examine the relationship between inflation and bank's profitability.

- To examine the relationship between gross domestic product and bank's profitability.
- To examine the relationship between interest rate spread and bank's profitability.

## **1.4 Research Questions**

The main purpose of conducting this research is to identify the variables that will influence the profitability of local commercial banks in Malaysia. This research is focus on measuring the five largest commercial banks' profitability in Malaysia.

- 1) Is there any relationship between capital adequacy and bank's profitability?
- 2) Is there any relationship between credit risk and bank's profitability?
- 3) Is there any relationship between bank size and bank's profitability?
- 4) Is there any relationship between inflation and bank's profitability?
- 5) Is there any relationship between gross domestic product (GDP) and bank's profitability?
- 6) Is there any relationship between interest rate spread and bank's profitability?

## **1.5 Hypothesis of the Study**

### **1.5.1 Capital Adequacy**

H<sub>0</sub>: There is no significant relationship between capital adequacy and bank's profitability.

H<sub>1</sub>: There is significant relationship between capital adequacy and bank's profitability.

### **1.5.2 Credit Risk**

H<sub>0</sub>: There is no significant relationship between credit risk and bank's profitability.

H<sub>1</sub>: There is significant relationship between credit risk and bank's profitability.

### **1.5.3 Bank Size**

H<sub>0</sub>: There is no significant relationship between bank size and bank's profitability.

H<sub>1</sub>: There is significant relationship between bank size and bank's profitability.

### **1.5.4 Inflation**

H<sub>0</sub>: There is no significant relationship between inflation and bank's profitability.

H<sub>1</sub>: There is significant relationship between inflation and bank's profitability.

### **1.5.5 Gross Domestic Product**

H<sub>0</sub>: There is no significant relationship between gross domestic product growth and bank's profitability.

H<sub>1</sub>: There is significant relationship between gross domestic product growth and bank's profitability.

### **1.5.6 Interest Rate Spread**

H<sub>0</sub>: There is no significant relationship between interest rate spread and bank's profitability.

H<sub>1</sub>: There is significant relationship between interest rate spread and bank's profitability.

## **1.6 Significance of Study**

The main purpose of this study is to identify the determinants of bank-specific and macroeconomics determinants on the commercial bank profitability in Malaysia by using variables that have been determined in previous studies. The independent variables are capital adequacy, asset quality, inflation rate, bank size and interest rate spread whereas the dependent variable is return on asset (ROA). Each of the independent variables is calculated using a fixed formula to get more standard and accurate figures to ensure more trustable results. The result of this investigation is beneficial for investors, shareholders and government when it comes to decision makings, either on choosing the investment or implementing a new policy. It is especially useful for the banks to have a deeper understanding on the factors affecting bank's profitability since it could help bank in evaluating which factor had affected their performance and thus the bank is able to improve the bank's overall performance.

This research aims to provide a general understanding for all the users who are participating in the banking activities such as investors who are engaging in the investment activities. As for the investors, it is crucial to know how well the bank is performing before they make decision in order to acquire desirable return with lesser risk. In another aspect, their investment can become more valuable if they invest in the right bank.

From the perspective of internal users such as managers and employees, this research is useful for them too where they can calculate their relevant financial ratio such as liquidity ratio and capital adequacy and then make improvement on the weaker part. In the meanwhile, managers are able to come out the proper strategies to either expand the banking business or improve their operational activities.

Other than that, government can find themselves benefit from this research too where they can implement a new policy or amend the existing policy to better improve the economic growth of the country.

## **1.7 Chapter Layout**

Chapter one of this study is the introduction of the purposes that researchers discuss on the 'Profitability of Banking System in Malaysia'. This chapter inclusive of introduction, research background, problem statement, research objectives, research questions, hypotheses and significance of the study.

Chapter two explains with the literature review of all chosen variables. It includes introduction, review of the literatures, review of relevant theoretical models, proposed theoretical/conceptual framework, hypotheses development and conclusion.

Chapter three is the introduction on research methodology of the study. This chapter consists of introduction, data processing, research design, data collection methods, variables specifications of measurements, data analysis, econometric diagnosis tests, and conclusion.

Chapter four describes the empirical analysis results by utilizing the data and relevant tests in previous chapter. It consists of introduction, description analysis, inferential analyses and the conclusion.

Chapter five will summarize the findings from chapters 1 to 4. It covers introduction, summary of statistical analyses, discussion of major finding, implications of the study, limitation of the study, recommendation for future research and conclusion.

## **1.8 Conclusion**

In conclusion, this chapter provides the research overview in terms of research background, problem statement, research objectives, research questions, hypothesis of the study, significance of study and chapter layout. This chapter started from the research background that describes the banking sector and economy in Malaysia. Problem statements have discovered the mixed result of research that have been done by the previous researchers and therefore these become the reasons to conduct this research in order to investigate the relationship between determinants and bank's profitability in Malaysia. The next chapter will provide the literature review and each of the variables will be discussed in detail.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.0 Introduction**

In this chapter, a comprehensive review of the journals from secondary sources will be included. There are five sections to be discussed in this chapter. This includes review of the literature, review of relevant theoretical models, proposed theoretical/ conceptual framework, hypotheses development and conclusion. For the first part of this chapter, an effective literature review on the related topic will be provided. Consequently, theoretical models which are related to bank's profitability will be studied to build a foundation for the proposed theoretical/ conceptual framework. Next, hypotheses related to the relationships among relevant variables which are testable will be stated. Lastly, conclusion of Chapter 2 will be provided.

### **2.1 Review of Literature**

Bank plays an important role to maintain good performance because banking sector is vital to maintain stability of economy in a country. The profitability of a bank can be used to access the performance of bank, and there are various internal and external factors that affect profitability of a bank. Internal factors are controllable as they are the bank-specific factors such as capital adequacy, credit risk and bank size, whereas external factors are uncontrollable as they are the macroeconomic factors such as inflation, gross domestic product and interest rate spread.



## **Dependent variable: Bank's Profitability**

### **2.1.1 Return on Assets (ROA)**

Return on assets (ROA) is used as an indicator to measure profitability of a bank, it is calculated by dividing the total net income to total assets. ROA is the most widely used indicator and researchers adopted ROA as an indicator to study bank's profitability in many countries, for example the studies conducted by Abdul Jamal, Abdul Karim & Hamidi (2012) in Malaysia, Mustafa, Ansari & Younis (n.d.) in Pakistan, Obamuyi (2013) in Nigeria and Curak, Poposki & Pepur (2012) in Macedonian. In line with Javaid, Anwar, Zaman & Gafoor (2011), Muda, Shaharuddin & Embaya (2013b) and Obamuyi (2013), they found that ROA is better than ROE because ROA shows the profits earned per unit of asset which reflects bank's ability in utilizing the financial and real assets to generate profits, whereas ROE has neglects financial leverage. Also, Sufian & Chong (2008) pointed out that ROA depends on the policy decisions of a bank and also uncontrollable economic factors, furthermore ROA is not distorted by high equity multipliers.

The limitations of using ROE also highlighted by Bashir (2003), he mentioned that ROE is calculated by dividing the total net income to total equity, which means ROE only reflects how effectively a bank in utilizing shareholders' funds to generate profits, but it disregards the financial leverage or debt. In other words, high ROE does not mirror high profit in a bank, because high ROE might due to the lower capital or equity. ROE only shows how shareholders' funds being used to generate profits, but it does not take into account of liabilities such as borrowed funds and bonds, thus ROA is better since its denominator is total assets which already incorporated the liabilities and equity. This is also supported by Davydenko (2010), he mentioned that high ROE means low level of capital, resulting in high level of financial leverage which is undesirable and associated with high degree of risk. He further added that ROE is not optimal to measure bank's profitability since the level of capitalization is often determined by regulators.

On the other hand, some researchers argue about using ROA as an indicator of bank's profitability. Alexiou & Sofoklis (2009) argue that ROA may be biased since it excludes the off-balance-sheet activities. Likewise, Goddard, Molyneux & Wilson (2004) used ROE as an indicator to study bank's profitability as they argue that off-balance-sheet activities make significant contribution of profits to the European banks, thus ROE is more appropriate to be used.

## **Independent variables: Bank-Specific Determinants**

### **2.1.2 Capital Adequacy (CA)**

Capital Adequacy (CA) is used to measure the strength of bank's capital towards its risk, the measure indicates safety and soundness of a bank. The equity-to-assets ratio is used as a proxy to measure capital adequacy of bank. Capital adequacy ratio is expressed in percentage form that represents a bank's risk weighted credit exposures. A minimum capital requirement has been developed by the national regulators for the purpose of protecting the bank from insolvency or bankruptcy. It enables the national regulators to check on a bank's Capital Adequacy Ratio to ensure the bank have enough capital to absorb a reasonable level of losses such as losses of bad loans, thus large size of equity or capital means bank has lower risk. It also protects the depositors and safeguards the stability and efficiency of the financial system.

Berger (2005) finds that capital adequacy is positively related to United States bank's profitability since well-capitalized bank has better ability to absorb losses and can better handle shareholder's risk, eventually it reduce the expected bankruptcy cost. In addition, a well-capitalized bank attracts a larger share of deposits and investment did contribute in increasing a bank's income (Garcia-Herrero, Gavila & Santabarbara, 2009). Consistent with Acaravci & Calim (2013), Bennaceur & Goaid (2008) and Sufian & Chong (2008), they agree that a highly capitalized bank has a better deal in reducing its cost of funding where it possibly can charge more on loans or pay less on

deposits since they have lower bankruptcy risk. Also, Onuonga (2014) pointed out that well-capitalized banks are able to improve profitability because they are able to diversify investments, funding at cheaper cost and invest in better quality of assets, and even stay strong during financial crisis. Furthermore, Staikouras & Wood (n.d.) suggest that well-capitalized banks will be less restricted and can reduce risk-related barrier to entry which provides opportunity for banks to expand into some profitable products line. They also mentioned that well-capitalized banks are perceived to be safer, and thus when investment opportunities arises, they able to borrow uninsured funds more easily in order to raise revenue. Ani, Ugwunta, Ezeudu & Ugwuanyi (2013), Javaid, Anwar, Zaman, & Gafoor (2011), Almazari (2013) and Ongore & Kusa (2013) also support the positive relationship between capital adequacy and bank's profitability.

However, Barnor & Odonkor (2012) argued that there is a negative relationship between capital adequacy and bank's profitability. In their study of the Ghanaian banks, they explained that when a bank reserves a minimum amount of capitals to meet the minimum capital requirement, where a number of money is set aside to be functioned as a cushion to absorb unexpected loss, it actually affects the performance of the bank. Mathuva (2009) also supported this in his research as he pointed that although a bank with lower amount of capital tends to have a more risky position, it somehow might have the chance to earn higher return under higher risk exposure. This is consistent with the risk-return theory mentioned by Olweny & Shipho (2011) who explained that higher equity-to-asset ratio means lower equity risk which result in lower return on equity. In the study conducted by Aremu, Ekpo & Mustapha (2013) in Nigeria, they found that capital adequacy is negatively related to bank's profitability in both short and long run, they suggest that banks do not utilize or manage their capital efficiently. Furthermore, higher equity-to-asset ratio will reduce after-tax earnings since it will reduce the tax shield provided by the deductibility of interest payments. Wasiuzzaman & Ahmad Tarmizi (n.d.) found negative relationship and they explained that the lower the equity-to-asset ratio, the higher the leverage or debt financing, the higher the bank's profitability. This is because banks are not focus

in rising equity to boost profits. Instead, banks prefer to increase leverage or debt financing which ultimately cause higher profits.

Other than that, there are some researchers have found that there is an insignificant relationship between capital adequacy and bank's profitability. In a research of bank's profitability in Nigeria, Olalekan & Adeyinka (2013) found that capital adequacy does not have a significant relationship to the profitability for both domestic and foreign banks. This result is in line with Owolabi, Owolabi & Olanrewaju (2014), where they have found positive insignificant relationship between capital adequacy and the performance of a bank. They pointed out that the efficient utilization and quality of capital is what really matter compared to adequacy. While in a research of bank's profitability in Sri Lanka, Weersainghe & Perera (2013) discovered that there is a negative insignificant relationship between these two variables. They explained that a well-capitalized bank might face scale inefficiencies due to over-cautious in handling their operation.

### **2.1.3 Credit Risk (CR)**

Credit risk can be defined as the likelihood that credit customers unable or refuse to repay the honoring debt in full or at maturity date which ultimately causes bank to lose wholly or partially on their outstanding loans. There are several proxies for credit risk had been used in previous studies. For example, Ana, Blanka & Roberto (2011) use loan loss provision / total loans to measure bank's credit risk in Croatia, the ratio indicates how much the total portfolio have been provided for but not charged off. Poudel (2012) used default rate as the measurement for credit risk in Nepal. The default rate is calculated as Total Nonperforming Loans/ Total Loans, it shows the amount of loans that turned out to be non-performing loans thus it indicates soundness of credit portfolio and how well a bank manage its credit risk. On the other hand, Said (2013) used total loans/ total assets as the proxy for credit risk in his study conducted on selected Islamic banks in Middle East and North Africa region, reason

of using the formula is because loans are illiquid and have higher default risk than other assets in a bank.

In line with Abiola & Olausi (2014) and Marshal & Onyekachi (2014), credit risk which is measured by the ratio of non-performing loans to loans and advances has positive relationship with return on assets (ROA) of commercial banks. The positive relationship means even the banks have huge defaulted loans, but banks still able to gain profits, the researchers said that this finding is unusual because, theoretically the non-performing loans should have negative relationship with bank's profits. They suggest that this unusual positive relationship implies that the bank has an improper credit risk management of banks which will accumulate more non-performing loans in loan portfolio. Moreover, the positive relationship is due to the bank has transfer the cost of loan losses to other customers by charging them higher interest rate on loans. Hence, banks still able to cover loan losses and earn high profits from charging the other customers with high interest margin on loans. Marshal & Onyekachi (2014) further added that the positive relationship is due to those selected banks in the study have very small amount of non-performing loans in their loan portfolio, therefore the minimal non-performing loans are not critical enough to deteriorate bank's profitability. Furthermore, Boahene, Dasah & Agyei (2012) supported that credit risk is significantly and positively related to bank's profitability and their findings indicate that Ghanaian banks tend to benefit from higher credit risk as it brings more incomes for banks. This is because high credit risk will lead to prohibitively lending/interest rates, fees and commission. Researchers also agree that the positive relationship support the risk-return theory, which indicates that Ghanaian banks operated in high credit risk environment need to be compensated with high returns.

In contrast, researchers found the negative relationship between credit risk and bank's profitability. For instance, in the study by Nawaz, Munir, Siddiqui & et al, (2012), they explained that if bank has good and proper credit risk management consequently it can successfully reduce credit risk and brings higher profits to the bank. This is in line with the studies by Chen & Pan (2012) and Kolapo, Ayeni & Oke (2012) who

done their research on Taiwanese commercial banks and Nigeria commercial banks respectively. Higher-risk loans require banks to have higher loan loss provisions which make banks difficult to maximize their profits as they reserve more funds for loan losses (Soana, 2011; Abdullahi, 2013 and Alexiou & Sofoklis 2009). Therefore, it explain the higher the credit risk (loan loss provision-to-total loans), the lower the bank's profitability. Mustafa, Ansari &Younis (n.d.) agree that higher amount of loan reserve will deteriorate profit as bank has insufficient funds to lend for borrowers as the funds have been reserved, it is consistent with the "Credit Rationing Theory" explained by Ana, Blanka & Roberto (2011). Furthermore, the findings are highlighted by Aremu, Ekpo & Mustapha (2013) who found that credit risk which measured by loan loss provision-to-total loans has an almost perfectly negative significant relationship with ROA and ROE at significance level of 1% among Nigerian banks. In addition, Sufian & Chong (2008) stressed out that banks failed to recognize impaired assets and provide reserve to write off the assets and this worsen bank's profitability. This is supported by Mustafa, Ansari &Younis (n.d.) who agree that lack of management expertise to control lending operations will eventually end up with higher loan loss provision is required to cover the risk, hence the loan loss provision-to-total loan ratio will negatively influence bank's profitability.

However, some researchers found that credit risk is not always reflecting impact on bank's profitability. Weersainghe & Perera (2013) reported that the expected sign of this variable between credit risk and bank's profit was not supported by their regression results. Hence, they concluded that credit risk is insignificant in determining bank's profitability. Similarly, Alkhatib (2012) and Sayedi (2014) agreed that credit risk has negative insignificant relationship on bank profit.

#### **2.1.4 Bank Size (BS)**

The size of a bank is used to evaluate how size is related to bank's profitability, it is also used to prove the existence of economies of scale theory. Industrial economic

theory tell us that if economies of scale existed in an industry, then large institutions are able to become more efficient and produce goods or services at lower costs, eventually profits will be increased (Muda, Shaharuddin & Embaya, 2013b). Thus, in general, larger bank size is expected to achieve economies of scale and gain higher profits. Natural logarithm of book value of total assets is used as a proxy to measure bank size and this proxy is able to capture the possible cost advantages related with the size (Sufian & Chong, 2008). Since the dependent variable and independent variables are expressed in terms of ratios, therefore it would be appropriate to log the total assets so that its unit measurement is consistent with other ratios (Javaid, Anwar, Zaman & Gafoor, 2011).

Bank size is found to be positively related to bank's profitability in the empirical researches conducted by Alper & Anbar (2011) in Turkey, Abduh & Idrees (2013) in Malaysia and Alexiou & Sofoklis (2009) in Greek. They explained that the positive relationship between bank size and bank's profitability evidenced that larger bank can achieve economies of scales. As an illustration, larger bank is able to reduce cost of gathering and processing information which ultimately increased profitability. The findings also highlighted by Jabbar (2014), shows that larger bank size has a lot of branching network across the country and able to extend credit efficiently further, also larger bank is able to experiment with different types of portfolio to gain higher diversified profits. This is supported by Abduh & Idrees (2013) who mentioned that larger bank has greater loan diversification and also greater accessibility to capital markets when compared to small bank. Not only because of economies of scales and diversification portfolio, Kosak & Cok (2008) further added that larger bank can exercise market power to impose higher lending rate in a low competitive banking market which eventually enhances greater profitability, and also larger bank will be well protected by government regulatory because of "too big to fail".

However, there are some researchers argue that if bank are extremely large and bank size reached until an optimum level, diseconomies of scale will set it and eventually growing bank size will negatively influence bank's profitability (Acaravci & Calim,

2013; Ameer & Mhiri, 2013 and Obamuyi, 2013). In line with the studies by Almazari (2014) in Saudi Arabia and Staikouras & Wood (n.d.) in European, they found that growing bank size will face diminishing marginal return and cause average profits will decline with size. They also mentioned that information advantage and enforcement of power gained from size are no longer significant for large bank. To emphasize, Staikouras & Wood (n.d.) split the sample into 138 large banks and 547 small banks, and the result indicates that size variable has negative impact on large banks but a positive one on small banks. This result shed some light and give support to the recent papers mentioned diseconomies of scale exists from a level of size upwards. Also, Obamuyi (2013) stated that bank with extremely large size might suffer from the problems such as bureaucratic procedures, agency cost and managerial inefficiencies.

On the other hand, Curak, Poposki & Pepur (2012) discovered that bank size is insignificant in explaining the bank profitability in Republic of Macedonia. This result stand in line with findings of Wasiuzzaman & Ahmad Tarmizi (n.d.), they explained the insignificant relationship could be due to the inefficiency in lending to state-owned enterprises without writing off bad debt. Aigheyisi & Edore (2014) suggest that insignificant bank size might due to the weak asset management.

## **Independent variables: Macroeconomic Determinants**

### **2.1.5 Inflation (INF)**

Inflation refers to the sustained increases in general level of price for goods and services, it can reduce the purchasing power of money. Inflation is associated with the cost and income as well, for example, higher inflation rate will lead to higher loan interest rate and higher investment income as well. According to Sufian & Chong (2008), inflation may contribute direct effect such as increase in labour cost and also the indirect effect such as changes in the interest rate and asset price, thus inflation



will affect bank's expense and income. Furthermore, researchers explained that the positive or negative impact of inflation is actually depends on whether the inflation is fully anticipated by bank management. Consumer Price Index (CPI) is the most widely used proxy to measure annual inflation rate. It reflects the annual percentage changes in the price level of a market basket of consumer goods and services which purchased by household (Vejzagic & Zarafat, 2014).

Pan & Pan (2014) found that inflation has a positive impact on commercial banks' profitability in China. They pointed out there are two reasons to explain the positive relationship between inflation and bank's profitability. Firstly, since the residents' decision for investment and saving is based on their nominal income, therefore inflation will increase the value of nominal income which eventually encourages residents to save and invest more, so this will then increase bank's profitability. Secondly, if inflation is anticipated by bank managements, they will able to adjust their decision according to the expected inflation so that the income can be increased faster than the costs. This is in line with the studies by Tan & Floros (2012) and Haron (1997) who found positive relationship between inflation and bank's profitability, they indicated that inflation is anticipated by bank which give opportunity for the bank to adjust the interest rate according to the expected inflation rate, therefore it enable the revenue to be increased faster than the costs. This is supported by Gul, Irshad & Zaman (2011) said that if the banks expect inflation rate is likely to be increased in future, banks believe that they can increase price to earn more profits without suffering a decline in demand of their output.

However, researchers argue that increased in inflation rate might not increase bank's profitability. In the research conducted by Muda, Shaharuddin & Embaya (2013a) in Malaysia, they found that inflation rate has a significant negative relationship on the ROE for both local and foreign banks. This is because the bank failed to anticipate and predict the level of inflation rate, which results that cost increased faster than revenue. This result is consistent with the studies by Tariq, Usman, Mir, Aman & Ali (2014) who found that inflation has a negative impact on bank's profitability due to

that inflation is unexpected, thus bank failed to adjust the interest margin accordingly. They also stress out that the situation become more serious especially for larger banks because inflation will involve higher cost since they have large branch network and business operation. Also, Ameer & Mhiri (2013) explained the negative effect of inflation on bank's profitability. Borrowers face cash flow difficulties when inflation occurs unexpectedly, it lead to the premature termination of loan arrangements and therefore precipitate loan losses.

On the other hand, some researchers investigated that inflation did not imply any impact on bank's profitability. Aigheyisi & Edore (2014) and Alper & Anbar (2011) found that inflation has no significant impact on profitability of banks in Nigeria and Turkey. This is also consistent with Ramadan, Kilani & Kaddumim (2011) who found that inflation is insignificant to ROA and ROE of banks. They suggest that it is due to the banks failed to predict the inflation level accurately, and the banks failed to grab opportunity to benefit from inflationary environment.

### **2.1.6 Gross Domestic Product (GDP)**

Gross Domestic Product (GDP) is an indicator used to measure total economic activity in a country. Changes in GDP reflect the changes in consumption, investment, government spending and net export, consequently changes in GDP is expected to affect supply and demand for loans and deposits. Several proxies for GDP are used in previous researches, for example Riaz & Mehar (2013) used GDP growth rate to measure growth in economic activities in Pakistan and the GDP has been adjusted for inflation, Acaravci & Calim (2013) used real GDP to measure economic growth in Turkish, Davydenko (2010) used logarithm of nominal GDP to measure economic growth in Ukraine, and Muda, Shaharuddin & Embaya (2013a) used GDP per capita which take into account of population when measuring economic growth in Malaysia.

In the study of 15 commercial banks in Romania, Roman & Danuletiu (2013) found that GDP contribute significant positive relationship on bank's profitability, they explained that when GDP increase, economic growth will increase the demand for financial services such as the demand for loans, and thus increasing bank's profitability. In the same way, when GDP decrease especially during international crisis, it could lead to negative impact on bank's profitability as it increase non-performing loans. The findings are in line with Curak, Poposki & Pepur (2012), they also found that GDP contribute positive relationship on Macedonian bank's profitability. They explained that increasing economic growth indicates favorable economic condition that encourages household savings and enterprises financing. They further added that due to the underdeveloped non-bank financial institutions in the country, it cause the household savings dominantly flow to banks. Also, the capital market is underdeveloped as well, thus banks become the main source for enterprises financing. In bank's perspective, higher economic growth encourages banks to lend more and charge higher margins, likewise improving the quality of their assets (Said & Tumin, 2011). It is also supported by Davydenko (2010) indicated that economic growth can improve debt servicing capacity of domestic borrowers, therefore banks can successfully collect their debts and extend new loans. Furthermore, small market size and imperfect competition in the banking industry also tends to cause GDP positively related to bank's profitability (Staikouras & Wood, n.d.).

On the other hand, some of the researchers argue that GDP not necessary positively related to bank's profitability. In the case of European commercial and saving banks, Staikouras & Wood (n.d.) found that GDP growth is negative related to the bank's profitability. They explained that countries with higher GDP usually have a banking system which operates in a mature environment, and eventually it leads to high competitive level of interest and profit margin. In other words, banks could not benefit and gain profit from economic growth due to the intense competition in banking industry. The findings stand in line with Ameer & Mhiri (2013) who found that GDP is negatively related to ROE and NIM of commercial banks in Tunisia.

Also, Francis (2013) found that GDP growth has a strong significant negative relationship with bank's profitability at the significant level of 1, 5 and 10 percent. He reveals that the negative GDP effect could result from the extremely low and negative economic growth which experienced by Sub-Saharan countries during the study period.

However, GDP effect also found to be insignificantly related to bank's profitability and eventually its impact become ambiguous for some researchers. For example, empirical researches conducted by Abduh & Idrees (2013) in Malaysia and Ramadan, Kilani & Kaddumi (2011) in Jordan show that real GDP contributes an insignificant positive impact on bank's profitability. Ramadan et al. (2011) said that banks failed to benefit from economic growth might due to the entry of new banks which provide more intense competition. Similarly, Alexiou & Sofoklis (2009) also found insignificant GDP and pointed out that economic growth does not reflect any characteristic of banking regulation and advanced technology in banking sector.

### **2.1.7 Interest Rate Spread (IRS)**

Interest rate spread is the difference between lending rate and deposit interest rate. Interest rate spread helps to generate a sufficient margin for banks to continue their businesses in Malaysia. This is because banks can use the spread to cover their operating expenses and other costs of performing intermediation function.

According to Mirzaei, Moore & Liu (2013), interest rate spread will be a crucial factor to raise the profits of emerging banks. Also, interest rate spread is one of the bank's profitability indicators in advanced economies. This variable will determine the ability and willingness of banks to demand and channel funds to the market. A bank can choose to set higher spread in a concentrated banking system by lowering deposit rates and rising lending rates. Bank will adjust interest rate more in emerging economies in order to capture more revenues.

Warue (2013) supported that the wider the gap between lending and deposit interest rates, the higher profit a bank can earn. This relationship is consistent for all bank categories in the study of Warue (2013). The researcher also recommends that the banks can use the profits generated to enhance their lending policies to reduce non-performing loans (NPLs). Low level of NPLs helps to ensure the safety of banks and the banks are less likely to bankrupt.

The positive relationship between interest rate spread and bank's profitability is further supported by Khrawish, Abadi & Hejazi (2008). The researchers explain that banks that offer more loans and hold lower level of financial leverage will have higher interest rate spread. During inflationary environment, banks can charge higher financing rate on loans. Thus, higher interest rate spread can be gained and profit of banks can be increased. The researchers also indicate that interest rate spread plays a significant role in representing a bank's profitability, stability and efficiency. When there is new technology available in the market, the banking businesses can be improved, causing higher interest rate spread for banks.

According to Naceur & Goaid (2001), developments in banking industry such as introduction of new monetary policies will impact the interest rate spread of a bank. As if the policies benefit banks, the interest rate spread will be higher. Consequently, banks can earn more interests from providing loans to end users. Higher loan rate enables banks to generate more interest income. At the end, their profits can be improved as well. The researchers also found that foreign banks tend to have higher spreads and profits on developing countries in their study.

However, Ghazali & Ali (2002) argued that decrease in interest rate spread will raise bank's profit. This is because as interest rate spread decreases, bank's equity will be inversely influenced. Their finding is agreed by Doliente (2003). According to Doliente (2003), banks that have low interest rate spread may have higher profit in poorly regulated financial system. Banks are more likely to earn higher market share by granting lower rates' loan to individuals and firms. When the amount of loans

granted has increased, banks can generate more interest margins which will raise their profits as well.

In short, there is a mixed finding among the studies on the relationship between interest rate spread and bank's profitability. However, most of the researchers agree that interest rate spread is significantly and positively related to bank's profit. This is owe to higher interest rate spread contributes to higher efficiency and returns for banks. Some researchers argue that decrease in interest rate spread will raise the total loan amount to customers which will increase the bank's profitability.

## **2.2 Review of Relevant Theoretical Models**

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 foundation to develop the proposed theoretical or conceptual framework. Based on previous studies, there are numerous theoretical models used to explain the theoretical relationship between capital adequacy, credit risk, bank size, GDP and bank's profits.

### **2.2.1 Signaling Theory (1973)**

According to Aremu, Ekpo & Mustapha (2013), "Signaling Theory" explained the positive relationship between capital adequacy and bank's profitability. Higher capital created a positive signal to the market regarding the value of a bank. In other words, only profitable banks are able to have higher capital because they able to raise their equity without deteriorating profitability. Furthermore, higher capital also means lower leverage which indicates that banks perform better than their competitors. Under the signaling theory, bank management will signal private information and

they will increase capital if they found out that future prospects are good by increasing capital. In conclusion, market will treat higher capital as a positive signal as it indicates bank is more profitable, and bank will also increase capital to earn more profits if they see the future prospects are good, therefore the signaling theory explain the positive link between capital and profitability.

### **2.2.2 Bankruptcy Cost Theory (1958)**

Aremu, Ekpo & Mustapha (2013) suggest that “Bankruptcy Cost Theory” also explain the positive link between capital adequacy and profitability. If the bankruptcy costs are unexpectedly high due to the environmental changes, banks will need to hold more equity and increase their capital ratio in order to reduce the expected value of bankruptcy cost and avoid financial distress.

### **2.2.3 Risk-Return Theory (1952)**

According to Olweny & Shipho (2011), “Risk-Return Theory” explained negative relationship between capital adequacy and profitability. When a bank decides to take up more risk to achieve higher expected returns, the bank will increase leverage or debt in order to boost up profitability. This suggests that if a bank intends to increase leverage, then the bank will need to reduce the equity-to-asset ratio (capital). Thus, this theory explained capital adequacy can be negatively linked to bank's profitability due to that bank prefers to use leverage rather than equity. The similar explanations also being presented through “Financing Theory” which explained that bank finance by increased leverage and reduce equity-to-asset ratio will lead to higher risk and higher expected returns (Aremu, Ekpo & Mustapha, 2013).

“Risk-return Hypothesis” presents the positive view of credit risk on bank's profitability (Curak, Poposki & Pepur, 2012). Higher credit risk means higher loan-to-asset ratio and eventually the banks will need to generate higher returns to

compensate the high credit risk, thus it makes the banks want to improve their overall profitability.

#### **2.2.4 Regulatory Theory (1887)**

“Regulatory Theory” presents the negative view of capital ratios on bank performance. Basel accord regulation which require bank to hold minimum capital ratio will negatively affect bank's profitability because such regulation will constrain value-maximizing bank in risk-taking (Adeusi, Kolapo & Aluko, 2014).

#### **2.2.5 Market Discipline Argument (1983)**

However, according to Fungacova & Poghosyan (2011), the negative sign between loan loss reserve to gross loan and profitability can be explained through “Market Discipline Argument”. The higher level of loan loss reserve indicates that bank is inherent with high credit risk, therefore depositors will demand for higher premium to deposit their savings in riskier bank. Consequently, rising in deposit rates *ceteris paribus* will lead to decline in interest margin, indicates that bank profit margin will be reduced as well.

#### **2.2.6 Credit Rationing Theory (1969)**

“Credit Rationing Theory” also supports the negative relationship between credit risk (loan loss reserve-to-total loans ratio) and bank's profitability (Ana, Blanka & Roberto, 2011). As mentioned in literature review, if the level of loan loss provisions are too high, this will reduce the bank's ability to supply loans to customers and this situation is known as credit shortage, thus it reduce bank's lending activities and deteriorate profits. This is in line with “Credit Rationing Theory” which is a situation



whereby lender fail to supply credit to the borrowers who demand for funds, this also means demands of credit exceed supply of credit. In other words, even though borrowers willing to pay higher interest rate for credit, but bank is not able to supply credit due to the credit shortage that arise from high loan loss reserve.

### **2.2.7 Economies of Scale Theory (1974)**

“Economies of Scale Theory” suggests that large corporations are able to gain cost advantage when produce outputs. This means when the scale of output is increased, average cost per unit will reduced. Identically, economies of scale explain the positive relationship between bank size and profitability. According to Bashir (1999), large bank is able to benefit from economies of scale as large bank is able to reduce cost of gathering and processing information which ultimately increased profitability.

### **2.2.8 Efficiency Structure Theory (1963)**

“Efficiency Structure Theory” also suggest that banks able to earn higher profits if they are efficient than others. Efficient structure hypothesis suggests that large banks have superior management and production technologies which able to lower down operational costs, therefore earned higher profits when compared to small banks (Soana, 2011).

### **2.2.9 Market Power Hypothesis (1962)**

“Market Power Hypothesis” explained the ability of an institution to affect the quantity and price in the market. Market power theory is applied in a banking industry which means bank's profitability will be affected by its market share, this theory explained positive relationship between bank size and profitability. According

to Olweny & Shiphoh (2011), only large bank is able to exercise market power to influence price such as to lower deposit rates and charge higher loan rates, eventually earned non-competitive profits.

### **2.2.10 Financial Intermediation Theory (1980)**

According to Wasiuzzaman & Ahmad Tarmizi (n.d.), Gross Domestic Product (GDP) or economic growth is used as a measurement of the cyclical input effects. They expected that there is a positive relationship between GDP and banks' profitability. They explained that when GDP of a country boost up, the demand for financial services such as loans will increase as consumers need funds and capitals to cater business activities in economy, thus leading to the greater earnings for banks.

Increase in business activities that boost up GDP growth which consequently increase bank's profitability can illustrated by using "Financial Intermediation Theory" (Vejzagic & Zarafat, 2014). Since bank plays an intermediation role in matching surplus fund units and deficit fund units in economy, thus bank can generate more profits because more efficient the capital and funds can be matched by banks when GDP grow continuously. Vice versa, when GDP of a country slows down, the amount of non-performing loans tends to increase as the recession influences the credit quality, thus reducing the bank profits.

### **2.2.11 CAMEL Model (1979)**

$$ROA = \beta_0 + \beta_1 CAR + \beta_2 ASQ + \beta_3 EFF + \beta_4 LQR + \beta_5 INF + \beta_6 GDP + \mu$$

CAMEL represents capital adequacy, asset quality, management quality, earning ability and liquidity. It is a ratio-based model which is used to evaluate performance of banks and it indicates safety and soundness of a bank. Since these ratios are essential for a bank's performance, thus it has been treated as important internal

determinants by researchers. Based on the research conducted by Adeusi, Kolapo & Aluko (2014) in Nigeria, they developed the above equation based on the CAMEL model to capture important internal determinants, and they also include macroeconomic determinants to carry out their investigation. ROA represents return on assets, CAR represents capital adequacy, ASQ represents asset quality, EFF represents management efficiency. LQR represents liquidity ratio, INF represents inflation and GDP represents gross domestic product.

### 2.2.12 Fixed Effect Model (1984)

$$ROA_{jt} = \delta_0 + \alpha_1 LLP/TL_{jt} + \alpha_2 NII/TA_{jt} + \alpha_3 NIE/TA_{jt} + \alpha_4 LNTA_{jt} + \alpha_5 EQASS_{jt} + \beta_1 LNGDP_t + \beta_2 MSG_t + \beta_3 INFL_t + \beta_4 MKTCAP_t + \varepsilon_{jt}$$

Sufian & Chong (2008) developed the above equation to study on how the bank-specific and macroeconomic determinants affect the bank's profitability in Philippines. Dependent variable is Return on Assets ( $ROA_{jt}$ ).  $LLP/TL_{jt}$  represents loan loss provisions/total loans which is to measure credit risk,  $NII/TA_{jt}$  represents non-interest income/total assets which is to measure off balance sheet activities,  $NIE/TA_{jt}$  represents non-interest expense/total assets which is to measure management efficiency,  $LNTA_{jt}$  represents natural logarithm of total assets which is to measure bank size,  $EQASS_{jt}$  represents equity/total assets which is to measure capital adequacy,  $LNGDP_t$  represents natural logarithm of gross domestic product which is to measure economic activity,  $MSG_t$  represents growth of money supply,  $INFL_t$  represents annual inflation rate and  $MKTCAP_t$  represents ratio of stock market capitalisation which is to measure financial development. Bank-specific determinants are the bank's ratios which extracted from financial statements, whereas macroeconomic data are retrieved from IMF Financial Statistics database. The empirical research is focus on domestic and foreign commercial banks during the period 1990-2005. Fixed effect model are used to regress the panel data.

### 2.2.13 Pooled Ordinary Least Square Model (1722)

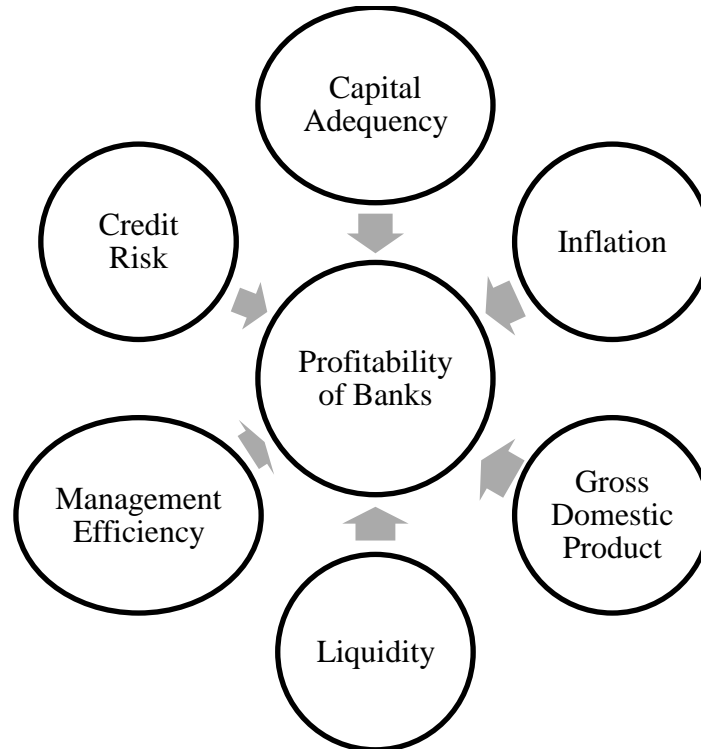
$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \mu_{it}$$

Javaid, Anwar, Zaman & Gafoor (2011) used Pooled OLS model to study the internal determinants of banks' profitability among the top 10 banks in Pakistan during the period 2004-2008. The above equation is developed by Javaid et al. (2011).  $Y_{it}$  represents return on assets,  $X_{1it}$  represents natural logarithm of total assets which is to measure bank size,  $X_{2it}$  represents total equity/total assets which is to measure capital adequacy,  $X_{3it}$  represents total loans/total assets which is to measure asset composition and  $X_{4it}$  represents deposit/total assets which is to measure liability of bank. Javaid et al. (2011) highlighted the advantages of using Pooled OLS model which assume homogeneity across companies. It will provide more reliable estimates of parameters in model and it also provide valid procedure since the relationship between variables is stable across cross sectional units.

## 2.3 Conceptual Frameworks

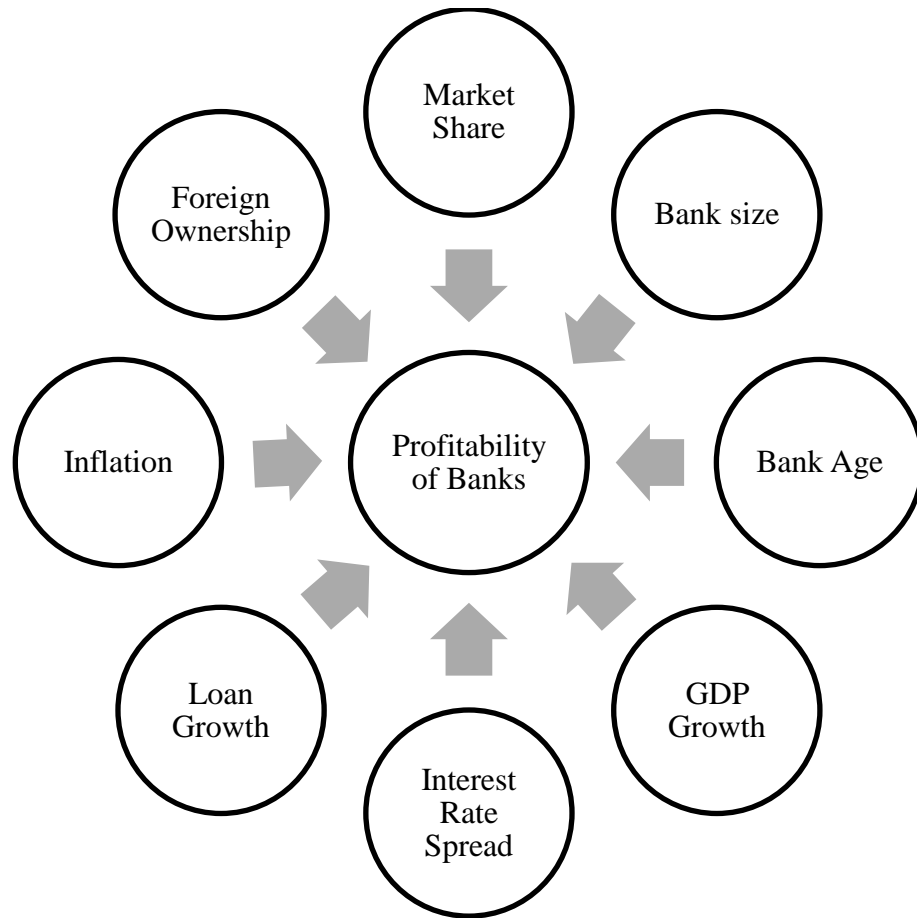
### 2.3.1 Previous Conceptual Frameworks

Figure 2.1: Determinants of commercial banks' profitability in Kenya



Adapted from “Determinants of Financial Performance of Commercial Banks in Kenya,” by Ongore, V. O. and Kusa, G. B, 2013, *International Journal of Economics and Financial Issues*, 3(1), 237-252. The authors study on profitability of commercial banks in Kenya, the variables adopted in the study are capital adequacy, credit risk, management efficiency, liquidity, inflation and gross domestic product. Linear multiple regression model and generalized least square is used to regress the panel data.

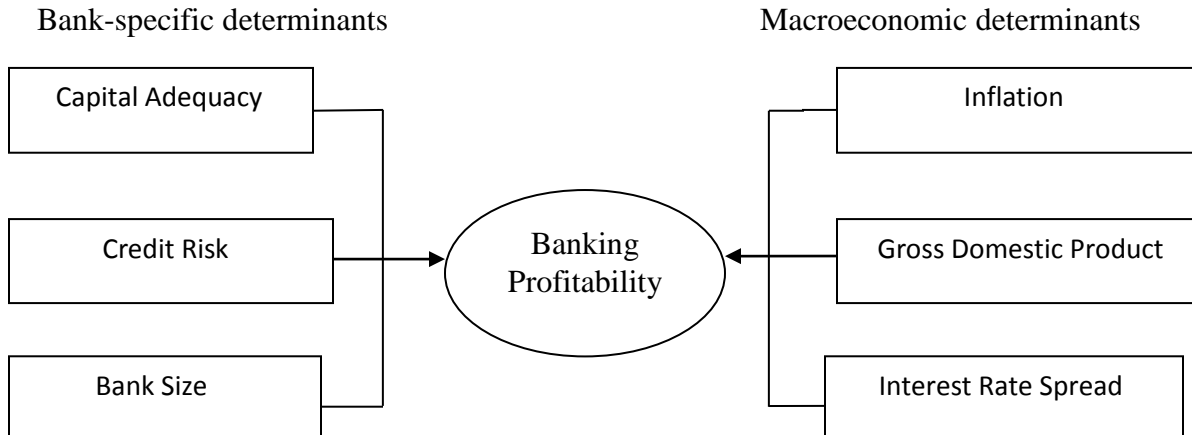
Figure 2.2: Determinants of banks' profitability in European countries



Adapted from “Does Market Structure Matter on Banks’ Profitability and Stability? Emerging vs. Advanced Economies,” by Mirzaei, A., Moore, T. and Liu, G., 2013, *Journal of Banking and Finance*, 37(1), 2920-2937. The authors used market share, bank size, bank age, GDP growth, interest rate spread, loan growth, inflation and foreign ownership to study the banking profitability in Eastern Europe, Middle East and Western Europe. Fixed effect model and least square dummy variable procedure are used to regress the panel data.

### 2.3.2 Proposed Theoretical or Conceptual Framework

Figure 2.3: Determinants of commercial banks' profitability in Malaysia



Adapted from Ongore (2013) and Mirzaei, Moore & Liu (2013), these are the determinants chosen to study banking profitability of commercial banks in Malaysia during 2004-2013.

#### 2.3.2.1 Capital Adequacy (CA)

Capital adequacy has a significant relationship to the profitability of a bank. It is used to measure the amount of funds available to act as cushion when there are any unexpected losses incurred. It is expected to have a positive relationship to bank's profitability, as the sufficient capital allow the bank to deal with more potential profitable product lines. At the same time, a well-capitalized bank is assumed to be safer compared to low-capitalized bank (Athanasoglou, Brissimis & Delis, 2008). However, referring to Risk-Return Theory, it indicates a negative relationship between capital adequacy and bank's profitability. It explains that a low-capitalized bank tends to take up more risks to achieve higher bank returns (Onuonga, 2014). The business of

banking is very risky because loans granted by banks might defaulted and cause severe financial losses to a bank, therefore capital adequacy not only important to protect solvency and profitability of bank, but also help promote stability of financial system. Hence, it is important to adopt capital adequacy as an internal determinant of bank performance.

### **2.3.2.2 Credit Risk (CR)**

Credit risk refers to the risk that a bank has to bear when borrowers unable to repay the debt in a required period. According to Risk-return Hypothesis, higher credit risk leads to higher return as bank tends to gain more profit in order to cover the high credit risk (Curak, Poposki & Pepur, 2012). While under Market Discipline Argument, it indicates a negative relationship where customers tend to request for higher premium for their deposition in the bank due to the higher credit risk exposed (Fungacova & Poghosyan, 2011). Since commercial banks' primary function is to grant loans and they are the largest lending channel to borrowers in an economy, it can say that the banks operate in a high credit risk environment therefore it is important to evaluate how credit risk can affect bank's profitability.

### **2.3.2.3 Bank Size (BS)**

Bank size refer the total assets of bank, it is important to evaluate how size is related to bank's profitability as it can capture the existence of economies of scale in a bank. If increase in bank size will generate higher profits, this means that the bank is able to gain cost advantage as describe in the "Economies of Scale Theory". Large bank can become more efficient and produce goods or services at lower costs since it has superior management and advanced technologies as described in "Efficient Structure Theory". Furthermore, larger



bank size usually have grater loan diversification profile and branching network which make them able to extend credit efficiently and earn diversified profits. However, when bank size is too large, diseconomies of scale will set in and bank will face diminishing marginal return, eventually average profits will decline with size. Therefore, bank size will be adopted as an internal determinant to investigate how size is related to bank's profit and to examine whether economies of scale theory is held among the commercial banks in Malaysia.

#### **2.3.2.4 Inflation (INF)**

Inflation refers to the sustained increases in general level of price for goods and services, it will reduce the purchasing power of money. Tan & Floros (2012) explained that if inflation is anticipated by bank, then bank will adjust interest rate so that revenue will increase faster than cost, eventually profits will be increased. However, Muda, Shaharuddin & Embaya (2013a) explained that if the inflation is not fully anticipated by bank, then it will cause costs increased faster than revenue, eventually profits will be reduced. In short, the relationship between inflation and profits of banks is varied depends on the bank's ability to forecast inflation. Inflation affects the banks through different ways such as interest rate, asset price, exchange rate, operating cost, customer's needs and the general economic environment (Haron, 1997). Therefore, this research includes inflation as a macroeconomic determinant to study its effect on bank's profitability since inflation will affect the real value of cost and revenue in a bank.

### **2.3.2.5 Gross Domestic Product (GDP)**

Gross Domestic Product (GDP) is a measurement that used to express the economic growth or business cycle of a country. GDP is used to investigate how bank's profitability move according to the business cycle. GDP and bank's profitatbility is expected to have a positive relationship and move in same direction, which indicates GDP and bank's profitability have pro-cyclical movements. When GDP is having a positive growth, the demand for credit will increase as companies demand more funds in order to expand their business in a growing economy (Curak, Poposki & Pepur, 2012). Furthermore, good economic growth will improve debt servicing capacity of domestic borrowers and hence reduce default risk for bank since bank can successfully collect debt and extend new one. However, researchers evidence that GDP and bank's profitability have negative relationship and move in different direction as well, this indicates they have counter-cyclical movements. This might due to that competition in banking sector is too intense and cause banks failed to benefit from economic growth (Ameur & Mhiri, 2013). Therefore, GDP is adopted as a macroeconomic indicator to study how bank's profitability move according to economic growth, also to examine whether the banks tend to have pro-cyclical or counter-cyclical movement with GDP during 2004-2013 in Malaysia.

### **2.3.2.6 Interest Rate Spread (IRS)**

Interest rate spread plays an important role in determining bank's profitability. It is the gap between bank's lending rate and deposit interest rate. When the interest rate spread is higher, borrowers have to pay more interests on their loans. At the same time, savers receive lower interest payments on the total amount of their savings. This may alter the amount of deposits placed with the banks and the amount of loan granted by banks. Hence, interest rate spread

will affect bank's profitability. This is supported by Mirzaei, Moore & Liu (2013) and Warue (2013). Since bank's profits depends on the interest income and interest expense, thus it is suggested to use interest rate spread as an explanatory variable to investigate bank's profit, instead of using only market interest rate (Vejzagic & Zarafat, 2014). Therefore, this research use interest rate spread (lending rate – deposit rate) which indicates net profit rate to a bank, and it is more efficient to be used in examining relationship between interest rate and bank's profitability in Malaysia.

## **2.4 Hypotheses Development**

### **2.4.1 Capital Adequacy**

H<sub>0</sub>: There is no significant relationship between capital adequacy and bank's profitability

H<sub>1</sub>: There is significant relationship between capital adequacy and bank's profitability.

### **2.4.2 Credit Risk**

H<sub>0</sub>: There is no significant relationship between credit risk and bank's profitability

H<sub>1</sub>: There is significant relationship between credit risk and bank's profitability.

### **2.4.3 Bank Size**

H<sub>0</sub>: There is no significant relationship between bank size and bank's profitability

H<sub>1</sub>: There is significant relationship between bank size and bank's profitability.

#### **2.4.4 Inflation**

H<sub>0</sub>: There is no significant relationship between inflation and bank's profitability

H<sub>1</sub>: There is significant relationship between inflation and bank's profitability.

#### **2.4.5 Gross Domestic Product**

H<sub>0</sub>: There is no significant relationship between gross domestic product and bank's profitability

H<sub>1</sub>: There is significant relationship between gross domestic product and bank's profitability.

#### **2.4.6 Interest Rate Spread**

H<sub>0</sub>: There is no significant relationship between interest rate spread and bank's profitability

H<sub>1</sub>: There is significant relationship between interest rate spread and bank's profitability.

### **2.5 Conclusion**

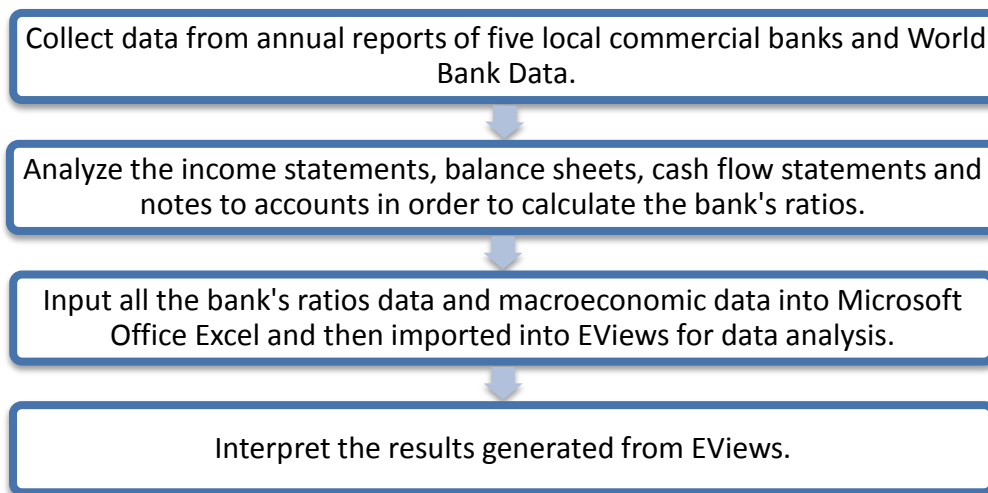
In a nutshell, Chapter 2 includes the literature review to discuss previous studies of bank-specific and macroeconomic determinants of banking profitability in various countries. Relevant theoretical models have been discussed to support the theoretical relationship of variables. The previous conceptual frameworks are revised in order to build proposed conceptual framework in this research. Lastly, the hypotheses are developed.

## **CHAPTER 3: METHODOLOGY**

### **3.0 Introduction**

This chapter will provide discussion on the research methodology. There are six sections to be discussed in this chapter, they are research design, data collection methods, sampling design, variables specifications of measurements, data analysis and econometric tests. Research objective is to examine how the bank-specific and macroeconomic independent variables such as capital adequacy, bank size, credit risk, inflation, gross domestic product and interest rate spread will contribute relationship on the bank's profitability which is measured by return on asset. Therefore, researchers employed quantitative and secondary data in order to conduct quantitative research. The quantitative data was collected from the two main sources, which are annual reports of banks and World Bank Data. In terms of sample design, researchers have chosen five local commercial banks in Malaysia and sample periods are 10 years which are started from year 2004-2013. Research model and each variable's unit measurement will be discussed in this chapter. Besides, this chapter also discuss about the techniques used for data analysis and briefly introduce the econometric tests that will be conducted in next chapter.

### 3.1 Data Processing



### 3.2 Research Design

Quantitative data is the numerical data which provides information that can be measured or counted. The research objectives are to examine the relationship of bank-specific and macroeconomic variables on the bank's profitability. The bank-specific independent variables are capital adequacy, credit risk and bank size whereas the macroeconomic independent variables are inflation, gross domestic product and interest rate spread. The dependent variable is the return on assets which is used to measure bank's profitability. Since all the dependent and independent variables involve quantitative measures, therefore quantitative data is being collected in the research. The 10 years data from 2004 until 2013 is collected and the data is collected from annual reports of five local commercial banks in Malaysia and World Bank Data. The recent 10 years data is used in order to provide an up-to-date findings.

The research study is based on the data collected from five local commercial banks in Malaysia, they are the top five commercial banks in Malaysia. In this research, all the banks are assumed to have similar characteristics since Pooled OLS Model is used to

regress the data. Therefore, the top five local commercial banks have been chosen as target samples since their assets and profits are close to each other, this can reduce the gap of performance between banks and hence provides more reliable results for the research. The top five local commercial banks which ranked by assets and market capitalization are stated as below ("Top Banks in Malaysia," 2015).

- 1) Malayan Banking Berhad (Maybank)
- 2) CIMB Bank Berhad
- 3) Public Bank Berhad
- 4) RHB Bank Berhad
- 5) Ambank Berhad

Researchers are using panel data for the research and panel data is the combination of cross-sectional data and time series data. In this case, the cross-sectional data are based on the five local commercial banks, so the sample size for cross-sectional data is 5. On the other hand, the time series data are based on the period 2004-2013, so the sample size for time series data is 10. Therefore, the sample size of panel data is 50 ( $5 \times 10 = 50$ ).

### **3.3 Data Collection Methods**

In order to conduct quantitative research, secondary data is being employed in the research. The secondary data has been categorized into two categories, which are data for bank-specific variables and data for macroeconomic variables. For bank-specific variables, data is collected from annual reports of five local commercial banks which are Maybank, CIMB Bank, Public Bank, RHB Bank and Ambank. The annual reports are downloaded from the bank's official website and website of Bursa Saham Malaysia. 10 years annual reports are collected for each banks and the annual reports are from year 2004 to 2013. Since all the independent variables are measured by ratios, therefore researchers use each of the variable's ratio formula to calculate out

all the financial ratios for each bank. The ratios are calculated by referring to the balance sheets, income statements, cash flow statements and notes to accounts in the annual reports. For macroeconomic variables, the macroeconomic data is collected from the World Bank Data and the data is also based on the period 2004-2013. After all the financial ratios and macroeconomic data have been extracted, then all these data will be inputted into Microsoft office excel and then will be imported into EViews to conduct data analysis. The data sources and unit measurements for each variables are shown as below:

Variables	Unit measurement	Data Sources
Return on Assets	Total net income / Total asset	Annual reports
Capital Adequacy	Total equity / Total asset	Annual reports
Credit Risk	Loan loss provision / Total loan	Annual reports
Bank Size	Log of total assets	Annual reports
Inflation	Consumer prices (annual %)	World Bank Data
Gross Domestic Product	GDP growth rate (annual %)	World Bank Data
Interest Rate Spread	Lending rate – deposit rate (annual %)	World Bank Data

### 3.4 Variables Specifications of Measurements

#### 3.4.1 Return on Assets (ROA)

Return on Assets (ROA) refers to how profitable a bank is relative to its total assets. It is the most widely used indicator by banks and other financial institutions as a means to measure their bank's performance. The ratio of total



net income to total assets is used as a proxy to measure return on assets, this proxy measure the ability of bank in utilizing their financial and real assets in order to generate profits. Obamuyi (2013) states that return on assets (ROA) is a better indicator than the return on equity (ROE), because ROE is measured by ratio of net income to shareholder's equity but this ratio neglects the financial leverage. However, return on assets (ROA) is better as it takes into account of financial leverage because asset acquisition is financed by a combination of debts and equity (Abdul Jamal, Abdul Karim & Hamidi, 2012). In other words, the equity figure in ROE formula only counted for equity, but assets figure in ROA formula has incorporated the debts and equity, therefore ROA is better. Furthermore, ROA also indicates how well a bank can utilize the capital and debt in order to acquire assets to make profits, this means ROA can measure bank's management efficiency to manage funds in order to generate profits. The higher the ROA, the higher the profitability of a bank and therefore the bank will be well-performed and low risk.

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

### **3.4.2 Capital Adequacy (CA)**

Capital adequacy is one of the measurements that used to measure the safety and soundness of a bank because it indicates the ability of a bank to absorb losses and risks. The ratio of total equity to total asset is used as a proxy to measure bank's capital adequacy (Alper & Anbar, 2011). Normally, bank losses are expected to be covered by the normal earnings. However, normal earnings might not be able to absorb some unforeseen losses. Therefore, capital is important to act as a cushion to absorb the abnormal losses. Bank with large amount of capital can bring higher level of confident to public as well as shareholders as this indicates that there is an amount of capital can be

discharged effectively whenever there is a risk of bank failure. Thus, capital adequacy ratio (CAR) is an important variable in determining the banks' profitability (Olalekan & Adeyinka, 2013). According to Alper & Anbar (2011), higher capital adequacy results in higher profitability because bank who has higher capital tend to be more capable to withstand the losses and risk, eventually it results in higher profitability. Capital adequacy is expected to contribute positive relationship with the bank's profitability.

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

### **3.4.3 Credit Risk (CR)**

Credit risk, known as default risk is the risk of delay in servicing loans or the risk that loan becomes irrecoverable. Credit risk is associated with the quality of bank's loan or investment portfolio. Since the bank's major source of income is derived from loan income, bank is also the largest lender in economy so it means bank operates under a high credit risk environment, thus loan ratio is widely used to measure bank's credit risk. The ratio of loan loss provision to total loan is used as a proxy to measure bank's credit risk. This ratio indicates the total loan portfolio which has been set aside to absorb the losses from bad debts, this ratio also reflects capital risk and credit quality of a bank (Wasiuzzaman & Ahmad Tarmizi, n.d.). Generally, if a bank is operating in high risk environment and lack of management expertise to control lending operations, it could results in higher loan loss provision that needed to absorb the credit risk, hence the loan loss provision ratio is expected to contribute negative relationship on the bank's profits (Mustafa, Ansari & Younis, n.d.). Therefore, higher ratio of loan loss provision to total net loan will results in higher credit risk, eventually lower down the bank's profits.

$$\textit{Credit Risk} = \frac{\textit{loan loss provision}}{\textit{total loan}}$$

### **3.4.4 Bank size (BS)**

Bank size is commonly used to measure the potential diseconomies or economies of scale of a financial institution (Sufian & Habibullah, 2009). Logarithm of total assets is used as a proxy to measure bank size. For example, bank's assets include plants and equipments, intangible assets, investments and loans. This ratio shows that as the bank has more assets, its size will be larger. If larger bank size contributes higher profits, it means the bank is able to achieve economies of scale, eventually can enjoy the benefits such as costs reduction in providing financial services. When the bank grows larger, more marginal cost savings can be created, thus the bank can generate more profits. Therefore, relationship between bank size and bank's profit is expected to be non-linear (Sufian & Habibullah, 2009). The positive effect of bank size on its profit only takes place up to a particular level. When the bank becomes larger and larger, its size could be negatively related to its profitability due to the bureaucratic and some other factors (Athanasoglou, Brissimis & Delis, 2008). Since the dependent variable and independent variables are expressed in terms of ratios, therefore it would be appropriate to log the total assets so that its unit measurement is consistent with other ratios (Javaid, Anwar, Zaman & Gafoor, 2011). Thus, natural logarithm of bank's total asset has been used to measure the bank size.

$$\textit{Bank Size} = \log (\textit{Total Assets})$$

### **3.4.5 Inflation (INF)**

Inflation occurs when there is a continuously rising in prices, in other words, there is a continuously falling in the value of money. By referring to The Bureau of Labor Statistics (BLS), in general, Consumer Price index (CPI) is the best measurement of consumer inflation rate in one country. CPI is computed based on the annual percentage change in price level of a market basket of consumer goods and services that purchased by household (Vejsagic & Zarafat). CPI is efficient as it updated the changes in consumer product prices from time to time. According to Sufian & Chong (2008), CPI is negatively related to bank profitability under unexpected circumstances, where the costs will increase in a higher rate than the revenues. However, Pasiouras & Kosmidou (2007) argued that if the bank managers had correctly predicted the happen of inflation in the first place, the bank can gain profit since the managers can increase the loan rates faster than the operating costs. In other words, the impact of CPI is depends on whether it is anticipated by bank management.

$$\text{Inflation} = \text{Consumer price index (annual \%)}$$

### **3.4.6 Gross Domestic Product (GDP)**

GDP growth rate is used as an indicator to measure economic growth in a country. GDP growth rate is used as a proxy rather than using nominal value of GDP. This is due to the GDP growth rate can better indicate the upswing and downswing of business cycle (Riaz & Mehar, 2013). According to World Bank Data, GDP is the total gross value added by all residents producer plus any product taxes and minus subsidies that not included in the value of a product.. Annual percentage of GDP growth rate extracted from World Bank is based on constant local currency, which means this is a real GDP growth

rate which adjusted for inflation. As the economic in good condition, the GDP growth rate is indicated in positive sign. When in bad economic condition, the GDP growth rate will be in negative sign. GDP growth rate have direct impact on the supply of deposit and also the customer's demand for bank loans, more importantly it affect the debt servicing capacity of borrowers, thus significantly influence the generation of cash flows and bank profitability. Kanwal & Nadeem (2013) stated that GDP growth rate have positive effect to bank profits.

$$\text{Gross domestic product growth} = \text{growth rate (annual \%)}$$

### **3.4.7 Interest Rate Spread (IRS)**

Interest rate spread is the difference between asset interest rate and liability interest rate offered by a bank and it is an interest rate factor in an economy (Mirzaei, Moore & Liu, 2013). It is suggested to use interest rate spread to measure the interest rate factor in economy, rather than using only market interest rate (Vejsagic & Zarafat, 2014). Interest rate spread in a banking system is known as a macroeconomic factor because the lending and deposit rates in banking system are influenced by other macroeconomic factors such as inflation, gross domestic product growth and monetary policy. The changes of interest rate spread in a banking system will then directly influence individual banks' interest rate spread and profits. The measurement is lending rate minus deposit rate and this spread is measured in term of percentage. According to World Bank, lending rate is the rate charged by banks on loans whereas deposit rate is the rate paid by banks for demand, time and savings deposits. Higher interest rate spread means a bank can receive more interest income, which increase bank's profitability. The relationship between interest rate spread and bank's profit is proved to be asymmetric due to the higher lending rate as compared to deposit rate (Ghazali & Ali, 2002). Moreover, as

mentioned by Ghazali & Ali (2002), when market interest rate changes, it will also change the interest rate spread. The rate of changes depends on the sensitivity of lending and deposit rate to open market interest rate.

$$\text{Interest Rate Spread (\%)} = \text{Lending rate(\%)} - \text{Deposit rate (\%)}$$

## **3.5 Data analysis**

### **3.5.1 Pooled OLS Model**

Pooled OLS regression model, also known as constant coefficients model is a type of panel regression model that used to analyze the panel data for this study. According to Gujarati & Porter (2009), there are three assumptions needed to be fulfilled in order to use pooled OLS model, they are constant intercepts across companies, constant slopes across companies, and there is no time effect (time invariant). In this study, Pooled OLS Model is used to examine the relationship of bank-specific and macroeconomic determinants on the bank's profitability, therefore assume all the banks has constant intercepts, constant slopes and time invariant in this observations. As mentioned in chapter 1 research background, banking profitability were stable and Malaysia is not much affected by financial crisis. Therefore, it provides a support to use constant coefficients model (Pooled OLS model) to regress data in this research since we assume there are no time effect, which means all determinants of bank's profitability that used in the model are not affected by economic crisis. Furthermore, the top 5 local commercial banks have been chosen as target samples, so that the top 5 banks that have similar performance and similar characteristics can fulfill the assumption of constant intercepts in Pooled OLS model. Since this research objective is aim to determine the true relationship between variables and bank profitability, thus

Pooled OLS model is appropriate to use since the absence of time effect and different slopes of bank will not distort the true relationship between dependent and independent variables.

$$ROA_{it} = \alpha + \beta_1 CA_{it} + \beta_2 CR_{it} + \beta_3 BS_{it} + \beta_4 INF_{it} + \beta_5 GDP_{it} + \beta_6 IRS_{it} + \varepsilon_{it}$$

Symbol	Definition	Unit measurement
ROA	Return on Assets	Total net income / Total asset
$\alpha$	Intercept	-
$\beta_i$ (i = 1,2,3,4,5,6)	Coefficient of each independent variables	-
CA	Capital Adequacy	Total equity / Total asset
CR	Credit Risk	Loan loss provision / Net loan
BS	Bank Size	Log of total assets
INF	Inflation	Consumer prices (annual %)
GDP	Gross Domestic Product	GDP growth rate (annual %)
IRS	Interest Rate Spread	Lending rate – deposit rate (annual %)
$\varepsilon_{it}$	Error terms	-

### 3.6 Econometric Diagnosis Tests

The objective of diagnosis checking is to detect whether the research model consists of the econometric problems such as non-normality, model specification error, multicollinearity, autocorrelation and heteroscedasticity. In order to ensure the model is valid and fulfill the Classical Linear Regression Model Assumptions, we need to run the diagnosis tests to ensure the research model fulfill the assumptions of normality, correct model specification, no multicollinearity, no autocorrelation and homoscedasticity. Once the model fulfill all these assumptions, all the estimators will achieve Best, Linear, Unbiased and Efficient (BLUE) properties, and hence the model will provide valid and significant result for this study.

#### 3.6.1 Normality test (Jarque-Bera Test)

Normality of error terms defined as error terms are normally distributed. Normality assumption for error terms is one of the assumptions in classical linear regression model. Error terms are represent the omitted variables, specification bias or error of measurements, therefore error terms need to be normally distributed in order to ensure the mistakes captured by error terms are small and at best random. Once the error terms are normally distributed, the OLS estimators will achieve best, linear, unbiased and efficient (BLUE) properties, therefore all the hypothesis testing will become straightforward, valid and reliable (Gujarati & Porter, 2009). Normality test, known as Jarque-Bera Test is a diagnosis test to detect whether a regression model meets the normality assumption for error terms. The hypothesis testing can be p-value approach or test statistics approach. The formula of the test statistics is 
$$JB = n \frac{s^2}{6} + \frac{(K-3)^2}{24}$$
, where s= skewness, and k= kurtosis. The Jarque-Bera Test (p-value approach) is shown as below:

H<sub>0</sub>: Error terms are normally distributed.



$H_1$ : Error terms are not normally distributed.

Decision rule: Reject  $H_0$  if the p-value is less than significance level of 0.05.

Otherwise, do not reject  $H_0$ .

Decision: Do not reject  $H_0$  since p-value is greater than the significance level of 0.05.

Conclusion: There is insufficient evidence to conclude that the error terms are not normally distributed at significance level of 5%.

### 3.6.2 Model Specification (Ramsey's RESET Test)

Model specification error is defined as the model is incorrectly regressed. A correct model specification is important as it ensure the regression model is a correct model and hence the model is appropriate to be used to conduct the research objectives. There are three types of model specification errors, they are omitting important independent variables, including unimportant independent variables and choosing wrong functional form of model (Gujarati & Porter, 2009). Ramsey's RESET Test is a diagnosis test to detect the existence of wrong functional form of a regression model. The hypothesis testing can be p-value approach or test statistic approach. The formula of test statistic is 
$$\frac{(R^2_{unrestricted} - R^2_{restricted}) / (K_{unrestricted} - K_{restricted})}{(1 - R^2_{unrestricted}) / (n - K_{unrestricted})}$$
. The

Ramsey's RESET Test (p-value approach) is shown as below:

$H_0$ : Model specification is correct.

$H_1$ : Model specification is incorrect.

Decision rule: Reject  $H_0$  if the p-value of the test is less than significance level

Otherwise, do not reject  $H_0$ .

Decision: Do not reject  $H_0$  since p-value of is greater than the significant level of 0.05.

Conclusion: There is insufficient evidence to conclude that the model specification is incorrect at significance level of 5%.

### 3.6.3 Multicollinearity

Multicollinearity occurs when two or more explanatory variables in the model are correlated with one another. In classical linear regression model (CLRM), the regressors are assumed to have no exact linear relationship between them. There are two types of multicollinearity, perfect multicollinearity and imperfect multicollinearity. If two or more independent variables are perfectly correlated, the degree of multicollinearity problem in the model will be more serious as compare to imperfect multicollinearity.

In fact, there is no any particular method to detect multicollinearity but there are some rules of thumb. First of all, if the model contains multicollinearity problem, it will lead to high R-squared but few significant t ratios in the model (Gujarati & Porter, 2009). This is because F-test for overall model will be significant when R-squared is high but the individual t-test will provide that none or few right hand side variables are different from zero.

Secondly, there are high pair-wise correlation coefficients between regressors. However, it is hard to suspect multicollinearity problem if there are more than two regressors that act together to cause multicollinearity (Gujarati & Porter, 2009).

Lastly, researchers may suspect multicollinearity by using variance inflation factor (VIF) and tolerance (TOL).

$$VIF_j = \frac{1}{(1-R^2_j)} \qquad TOL_j = \frac{1}{VIF_j}$$

According to Gujarati & Porter (2009), when VIF and TOL are equal to 1, there is no multicollinearity problem in the model. As VIF more than 10 or TOL close or near to zero, the model contains serious multicollinearity problem.

### 3.6.4 Autocorrelation

Autocorrelation is defined as error term for any observation is related to the error term of other observation. The assumption of no autocorrelation between the error terms is one of the classical linear regression model assumptions. The problem of autocorrelation normally occurs in a pure time series data but less likely to be occurred in a pure cross-sectional data. There are two types of autocorrelation, they are pure autocorrelation which caused by internal data problem, and impure autocorrelation which caused by external factors such as specification bias. Once the error terms are independent and not correlated to each other, the OLS estimators will achieve best, linear, unbiased and efficient (BLUE) properties, as a result all the hypothesis testing will become valid and reliable (Gujarati & Porter, 2009).

$H_0$ : The model does not have autocorrelation problem.

$H_1$ : The model has autocorrelation problem.

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

Decision: Do not reject  $H_0$  since p-value of is greater than significance level of 0.05.

Conclusion: There is insufficient evidence to conclude that the model has autocorrelation problem at significance level of 5%.

### 3.6.5 Heteroscedasticity

Heteroscedasticity is defined as the variances of error terms are not constant. The assumption of homoscedasticity is one of the classical linear regression model assumptions. The presence of heteroscedasticity will cause the variance or standard errors to be underestimated, eventually leading to higher T-statistic or F-statistic value and causes the null hypothesis to be rejected too often (Gujarati & Porter, 2009). Therefore, it is important for the model to

achieve homoscedasticity so that OLS estimators will achieve best, linear, unbiased and efficient (BLUE) properties, as a result all hypothesis testing will become valid and reliable.

$H_0$ : The model does not have heteroscedasticity problem.

$H_1$ : The model has heteroscedasticity problem.

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

Decision: Do not reject  $H_0$  since p-value of is greater than significance level of 0.05.

Conclusion: There is insufficient evidence to conclude that the model has heteroscedasticity problem at significance level of 5%.

### **3.7 Conclusion**

In conclusion, this chapter discussed on how the research methodology is being conducted in terms of data processing, research design, data collection method, variables specifications of measurements, data analysis and econometric diagnosis tests. The chapter 4 will provide discussion on the research's model and results of data analysis.

## CHAPTER 4 : DATA ANALYSIS

### 4.0 Introduction

This chapter shows the empirical data analysis results and interpretation of the study on the factors affecting bank profitability of the top five local banks. These section the OLS method and Pooled Least Square method is determined, to make sure the data is precise and reliable. The E-views result included normality of error term, multicollinearity, heteroscedasticity, autocorrelation, and pooled least square.

### 4.1 Pooled OLS Model

In chapter 3, the model in the study is stated as below:

$$ROA_{it} = \alpha + \beta_1 CA_{it} + \beta_2 CR_{it} + \beta_3 BS_{it} + \beta_4 INF_{it} + \beta_5 GDP_{it} + \beta_6 IRS_{it} + \mathcal{E}_{it}$$

(Where  $\alpha$ = constant;  $\beta_{1-6}$ = coefficient of independent variables)

Based on the regression result, the Pooled OLS Model is stated as below:

$$ROA_{it} = \alpha + 0.056122 CA_{it} - 0.495840 CR_{it} - 0.000756 BS_{it} - 0.012924 INF_{it} + 0.032457 GDP_{it} + 0.113718 IRS_{it}$$

Table 4.1: Eview result

Variable	Coefficient	P value	t-statistic	Standard Error
C	0.013598	0.0003	3.906866	0.003480
CA	0.056122	0.0128*	2.598469	0.021598
CR	-0.495840	0.0000**	-7.664872	0.064690
BS	-0.000756	0.0120*	-2.621730	0.000288
INF	-0.012924	0.6088	-0.515632	0.025064
GDP	0.032457	0.0274*	2.284004	0.014211

IRS	0.113718	0.0484*	2.032098	0.055961
R-squared = 0.692052				
Prob(F-statistic) = 0.000000				

Note: \* significant at 5 percent \*\*significant at 1 percent  
Sources adapted from Eview 6.

## 4.2 Poolability Test

Table 4.2 Poolability Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.464975	(4,39)	0.0163
Cross-section Chi-square	15.204170	4	0.0043

$H_0$ : There is a common intercept on all the banks (Pooled OLS is better).

$H_1$ : There is no common intercept on all the banks (FEM is better).

Significance level: 0.01

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

p-value = 0.0163

Decision: Do not reject  $H_0$  since p-value (0.0163) is greater than significance level of 0.01.

Conclusion: There is no sufficient evidence to conclude that no common intercept between all the banks. Therefore, Pooled OLS model is better and it is valid at significance level of 0.01.

## 4.3 Significance of Independent Variables

### 4.3.1 Capital Adequacy (CA)

$$H_0: \beta_1 = 0$$

$$H_1: \beta_1 \neq 0$$

Decision Rule: Reject  $H_0$  if p-value is less than significance level.

Otherwise, do not reject  $H_0$ .

$$p\text{-value} = 0.0128$$

Decision: Reject  $H_0$  since p-value (0.0128) is less than significance level of 0.05

Conclusion: The Capital Adequacy is significant in explaining the Return on Assets.

$\beta_1$  = capital adequacy. When capital adequacy increase by 1 percentage point, on average, the return on assets for all banks will increase by 0.056122 percentage point respectively, ceteris paribus.

### 4.3.2 Credit Risk (CR)

$$H_0: \beta_2 = 0$$

$$H_1: \beta_2 \neq 0$$

Decision Rule: Reject  $H_0$  if p-value is less than significance level.

Otherwise, do not reject  $H_0$ .

$$p\text{-value} = 0.0000$$

Decision: Reject  $H_0$  since p-value (0.0000) is less than significance level of 0.05

Conclusion: The Credit Risk is significant in explaining the Return on Assets.

$\beta_2$ = credit risk. When credit risk increase by 1 percentage point, on average, the return on assets for all banks will decrease by 0.495840 percentage point respectively, ceteris paribus.

### **4.3.3 Bank Size (BS)**

$H_0: \beta_3 = 0$

$H_1: \beta_3 \neq 0$

Decision Rule: Reject  $H_0$  if p-value is less than significance level.

Otherwise, do not reject  $H_0$ .

p-value = 0.0120

Decision: Reject  $H_0$  since p-value (0.0120) is less than significance level of 0.05

Conclusion: The Bank Size is significant in explaining the Return on Assets.

$\beta_3$ = bank size. When bank size increase by 1 percentage point, on average, the return on assets for all banks will decrease by 0.000756 percentage point respectively, ceteris paribus.

### **4.3.4 Inflation (INF)**

$H_0: \beta_4 = 0$

$H_1: \beta_4 \neq 0$



Decision Rule: Reject  $H_0$  if p-value is less than significance level.

Otherwise, do not reject  $H_0$ .

p-value = 0.6088

Decision: Do not reject  $H_0$  since p-value (0.6088) is greater than significance level of 0.05

Conclusion: The Inflation is insignificant in explaining the Return on Asset.

### **4.3.5 Gross Domestic Product (GDP)**

$H_0: \beta_5 = 0$

$H_1: \beta_5 \neq 0$

Decision Rule: Reject  $H_0$  if p-value is less than significance level.

Otherwise, do not reject  $H_0$ .

p-value = 0.0274

Decision: Reject  $H_0$  since p-value (0.0274) is less than significance level of 0.05

Conclusion: The Gross Domestic Product is significant in explaining the Return on Asset.

$\beta_5$  = gross domestic product. When gross domestic product increase by 1 percentage point, on average, the return on assets for all banks will increase by 0.032457 percentage point respectively, ceteris paribus.

### 4.3.6 Interest Rate Spread (IRS)

$$H_0: \beta_6 = 0$$

$$H_1: \beta_6 \neq 0$$

Decision Rule: Reject  $H_0$  if p-value is less than significance level.

Otherwise, do not reject  $H_0$ .

$$p\text{-value} = 0.0484$$

Decision: Reject  $H_0$  since p-value (0.0484) is less than significance level of 0.05

Conclusion: The Interest Rate Spread is significant in explaining the Return on Assets.

$\beta_6$  = interest rate spread. When interest rate spread increase by 1 percentage point, on average, the return on assets for all banks will increase by 0.113718 percentage point respectively, ceteris paribus.

### 4.4 R-square

Based on the result, the  $R^2 = 0.692052$ , therefore the  $R^2$  is considered as high. 69.2052% of the variation in expected Return of Assets can be explained by the variation in the independence variables which are Capital Adequacy, Credit Risk, Bank Size, Inflation, Gross Domestic Product (GDP) and Interest Rate Spread.

### 4.5 Overall Significance of Model ( F Test )

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$$

$H_1$ : At least one of  $\beta_i$  is not equal to zero, where  $i = 1, 2, 3, 4, 5, 6$

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

F-statistic = 0.0000

Decision Making: Reject  $H_0$  since p-value (0.0000) is less than significance level of 0.05

Conclusion: The model is significant and it is valid at significance level of 0.05.

## 4.6 Diagnosis Checking

Econometric tests are conducted to test the presence of wrong model specification, non-normality, autocorrelation, heteroscedasticity and multicollinearity. This is to ensure the validity and reliability of data analysis result.

### 4.6.1 Model Specification ( Ramsey RESET Test )

Table 4.3: Ramsey RESET

F-statistic	1.089315	Prob. F(1,42)	0.3026
Log likelihood ratio	1.280272	Prob. Chi-Square(1)	0.2578

$H_0$ : Model specification is correct.

$H_1$ : Model specification is incorrect.

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

p-value = 0.3026

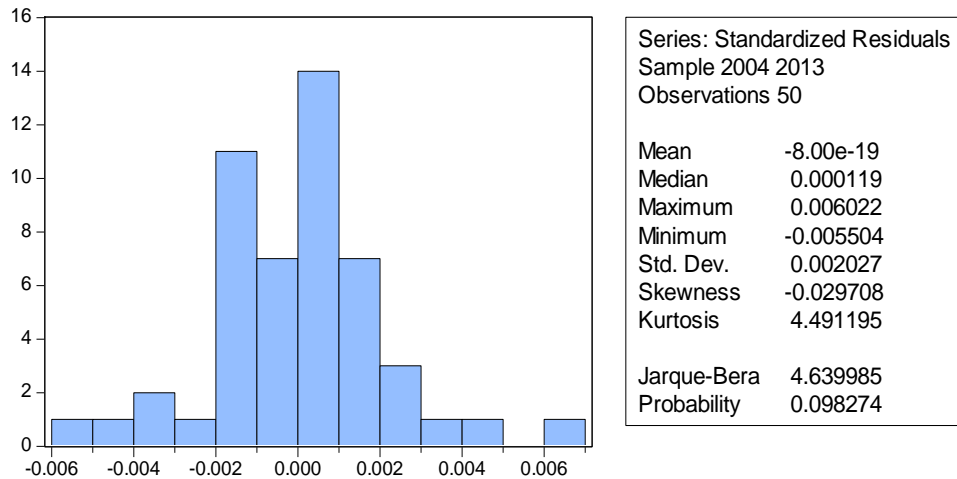
Decision: Do not reject  $H_0$  since p-value (0.3026) is greater than significance level of 0.05.

Conclusion: There is no sufficient evidence to conclude that the model specification is incorrect. Therefore, the model specification is correct and it is valid at significance level of 0.05.

### 4.6.2 Normality

Jarque-Bera Normality test is used to determine whether the error term of the model is normally distributed.

Table 4.4: Jarque-Bera Normality result



$H_0$ : Error Terms are normally distributed.

$H_1$ : Error Terms are not normally distributed.

Decision Rule: Reject  $H_0$  if the p-value is less than significance level.

Otherwise, do not reject  $H_0$ .

p-value = 0.0983

Decision: Do not reject  $H_0$  since p-value (0.098274) is greater than significance level of 0.05.

Conclusion: There is no sufficient evidence to conclude that the error terms are not normally distributed. Therefore, error terms are normally distributed and it is valid at significance level of 0.05.

### 4.6.3 Autocorrelation

Table 4.5: Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.904379	Prob. F(2,41)	0.1619
Obs*R-squared	4.250016	Prob. Chi-Square(2)	0.1194

$H_0$ : There is no autocorrelation problem.

$H_1$ : There is an autocorrelation problem.

Decision Rule: Reject  $H_0$  if the p-value is less than significance level.

Otherwise, do not reject  $H_0$ .

p-value = 0.1194

Decision: Do not reject  $H_0$  since p-value (0.1194) is greater than significance level of 0.05

Conclusion: There is no sufficient evidence to conclude that the model has autocorrelation problem. Therefore, the model does not contain autocorrelation problem and it is valid at significance level of 0.05.

#### 4.6.4 Heteroscedasticity

Table 4.6: ARCH test result

F-statistic	1.095070	Prob. F(1,47)	0.3007
Obs*R-squared	1.115674	Prob. Chi-Square(1)	0.2909

$H_0$ : There is no heteroscedascity problem.

$H_1$ : There is heteroscedascity problem.

Decision Rule: Reject  $H_0$  if the p-value is less than significance level.

Otherwise, do not reject  $H_0$ .

p-value = 0.2909

Decision: Do not reject  $H_0$  since p-value (0.2909) is greater than significance level of 0.05

Conclusion: There is no sufficient evidence to conclude that the model has heteroscedascity problem. Therefore, the model does not contain heteroscedasticity problem and it is valid at significance level of 0.05.

#### 4.6.5 Multicollinearity

##### 4.6.5.1 Pair-wise correlation coefficient

Table 4.7: Correlation Among the Independent Variables

	CA	CR	BS	INF	GDP	IRS
CA	1.000000	-0.127396	0.393452	-0.039815	-0.137713	-0.246629
CR	-0.127396	1.000000	0.152163	0.020862	0.109163	0.555499

BS	0.393452	0.152163	1.000000	-0.016671	-0.021412	-0.102356
INF	-0.039815	0.020862	-0.016671	1.000000	0.267519	0.156651
GDP	-0.137713	0.109163	-0.021412	0.267519	1.000000	-0.047456
IRS	-0.246629	0.555499	-0.102356	0.156651	-0.047456	1.000000

Based on the table 4.6, majority of the independent variables does not have serious multicollinearity as the major of the correlation of coefficient does not exceed 0.50. Only the Interest Rate Spread (IRS) and Credit Risk (CR) have slightly higher correlation of coefficient which is 0.555499. Therefore, it can be concluded that all the independent variables does not have problem of serious multicollinearity.

#### 4.6.5.2 Variance Inflation Factor (VIF)

Table 4.8: Results of VIF

Variables	R <sup>2</sup>	VIF=[1/(1-R <sup>2</sup> )]	Low/ High
CA	0.2221	[1/(1-0.2221)]= 1.2855	Low
CR	0.3874	[1/(1-0.3874)]=1.6324	Low
BS	0.2164	[1/(1-0.2164)]= 1.2762	Low
INF	0.1190	[1/(1-0.1190)]= 1.1351	Low
GDP	0.1390	[1/(1-0.1390)]= 1.1614	Low
IRS	0.4048	[1/(1-0.4048)]= 1.6801	Low

Based on the table 4.7, the VIF of all independent variables are below than 2, therefore there are no serious multicollinearity.

## 4.7 Conclusion

In conclusion, data is regressed in the form of Pooled OLS Model by using Eviews. Poolability test indicated there are common intercepts between banks which prove Pooled OLS Model is better than FEM. The Pooled OLS Model has achieved Classical Linear Regression Model (CLRM) assumptions because the model has fulfill the normality, correct model specification, homoscedasticity, non-autocorrelation and no serious multicollinearity. As a result, all the estimators achieve Best, Linear, Unbiased and Efficient (BLUE) properties, and the hypothesis testing will become valid and reliable. Data analysis result also shows that R-squared is high and the overall model is significant. There are five independent variables (CA, CR, BS, GDP and IRS) are significant in explaining their relationship with bank's profitability (ROA), except one independent variable (INF) which is insignificant. Furthermore, Capital Adequacy, GDP and Interest Rate Spread have positive relationship with the bank's profitability. Meanwhile, the Bank Size and Credit Risk have negative relationship with the bank's profitability. The next chapter will proceed with the discussions on major findings, limitations of the study and recommendations for future research.



## **CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS**

### **5.0 Introduction**

In this chapter, descriptive and inferential analyses from previous chapter will be summarized. In the second section, major findings will be discussed and compared with the hypotheses written on the first chapter. Next, implications of this study will be included to provide relevant parties some practical implications regarding this study. Moreover, some limitations that had been acknowledged during the whole progress of this study have been described. Therefore, few recommendations have been made to overcome the limitations stated. Lastly, the conclusion section will give the overall summary of this research.

### **5.1 Summary of Statistical Analyses**

Table 5.1: Result of Statistical Analyses

<b>Pooled OLS Model:</b>	P-value	Decision	Result
Capital Adequacy	0.0128*	Reject $H_0$	Significant
Credit Risk	0.0000**	Reject $H_0$	Significant
Bank Size	0.0120*	Reject $H_0$	Significant
Inflation	0.6088	Do not reject $H_0$	Insignificant
Growth Domestic Product	0.0274*	Reject $H_0$	Significant
Interest Rate Spread	0.0484*	Reject $H_0$	Significant
Significance of Model (F Test)	0.0000	Reject $H_0$	Model is significant

<b>Diagnosis Checking:</b>			
Model Specification (Ramsey's RESET Test)	0.3026	Do not reject $H_0$	Model specification is correct
Normality (Jarque-Bera Test)	0.098274	Do not reject $H_0$	Error terms are normally distributed
Autocorrelation (Breusch-Godfrey LM Test)	0.1194	Do not reject $H_0$	No autocorrelation
Heteroscedasticity (ARCH Test)	0.2909	Do not reject $H_0$	No heteroscedasticity
Multicollinearity (Variance Inflation Factor)	-	-	All VIF less than 2, no serious multicollinearity

Note: \*significant at 5 percent \*\* significant at 1 percent

The data is regressed in form of Pooled OLS Model by using Eviews and the result is shown in table 5.1. There are five independent variables are significant at level of 5 percent, they are capital adequacy, credit risk, bank size, growth domestic product and interest rate spread. However, inflation is found to be insignificant. By referring to the F-test, p-value is 0.0000, it prove that the Pooled OLS Model is significant at level of 1 percent. In terms of diagnosis checking, the model specification is correct, normality assumption achieved, no autocorrelation, no heteroscedasticity and no serious multicollinearity. Thus, it shows that the model has achieved Classical Linear Regression Model (CLRM) assumptions since the model does not contain any econometric problems. All estimators is proved to be Best, Linear, Unbiased and Efficient (BLUE) which makes the hypothesis testing in our research become valid and reliable.

## **5.2 Discussions of Major Findings**

### **5.2.1 Capital Adequacy (CA)**

Based on the result in Chapter 4, there is a positive relationship between capital adequacy and bank profitability. It indicates that with every one unit increase in capital adequacy, return on assets will increase 0.056122 units, *ceteris paribus*. This result is consistent with the findings by Berger (2005), Garcia-Herrero, Gavila & Santabarbara (2009), Acaravci & Calim (2013), Bennaceur & Goaid (2008), Sufian & Chong (2008), Onuonga (2014), Staikouras & Wood (n.d.), Ani, Ugwunta, Ezeudu & Ugwuanyi (2013), Javaid, Anwar, Zaman, & Gafoor (2011), Almazari (2013) and Ongore & Kusa (2013). Well-capitalized banks perceived to have lower bankruptcy risk which enable banks to obtain cheaper cost of funds by pay less on deposits, this consistent with "Bankruptcy Cost Theory". Besides, bank with higher capital adequacy level could attract larger share of deposits, it has a better ability in absorbing those unexpected losses. Furthermore, banks with high level capital can reduce risk-related barrier to entry and eventually banks can easily enter some profitable products line to earn higher profits. Also, well-capitalized banks are perceived to be safer, thus when investment opportunities arise banks can easily borrow uninsured funds to invest and raise profits.

### **5.2.2 Credit Risk (CR)**

Credit risk is found to have significant negative relationship towards bank's profitability. As the result shows that one unit increase credit risk will causes 0.495840 unit decreases in return on assets, *ceteris paribus*. The result is stand in line with the studies of Mustafa, Ansari & Younis (n.d.), Sufian & Chong (2008) and Aremu, Ekpo & Mustapha (2013) who found higher credit risk

(measured by loan loss reserve ratio) will deteriorate bank's profitability. This could be due that if the level of loan loss provisions are too high which means extremely large amount of funds need to be set aside for provisions, it might cause the bank to have difficulty to supply loanable funds for other borrowers. As a consequence, bank face credit shortage and this reduce bank's lending activities which eventually reduce bank's profits. Furthermore, banks will have difficulty to maximize profits as large amount of funds have been reserve to absorb high credit risk. In addition, if the credit risk is high, but bank failed to recognize the impaired assets and provide reserve to write off the assets, this means the inaccurate loan loss reserve provided by banks will be insufficient to cover credit risk and eventually deteriorate bank's profits

### **5.2.3 Bank Size (BS)**

The findings in previous chapter indicate that there is a negative significant relationship between bank size and bank's profitability. It shows that one unit increase in bank size will contribute 0.000756 unit decrease in return on assets, *ceteris paribus*. This result is in line with the studies by Acaravci & Calim (2013), Ameer & Mhiri (2013), Obamuyi (2013), Almazari (2014) and Staikouras & Wood (n.d.) which they agree that growing bank size will face diminishing marginal return and bank's profits will be declined further when size grows larger. This is consistent with the "diseconomies of scale" theory which is explained by the researchers. This phenomenon will exist when banks fail to gain cost advantage when size is growing. This might due to the information advantage and enforcement of power no longer useful to increase profits in large banks. It is even worse for large bank which often incur high cost of running bank's operation, and ultimately bank's profits are not sufficient to cover costs. Furthermore, bank become too large will face problems such as bureaucratic procedures, agency cost and managerial inefficiencies.

### **5.2.4 Inflation (INF)**

From the result shown in previous chapter, there is a negative but insignificant relationship between inflation and return of assets. This result is supported by Aigheyisi & Edore (2014), Alper & Anbar (2011) and Ramadan, Kilani & Kaddumim (2011). The impact of inflation on bank is insignificant due to the banks are unable to predict the inflation and adjust the rates and charges accordingly to the inflation rates. As the inflation rate is unable to be forecasted, the inability of banks to adjust interest rate in a proper way will cause the cost of operating business grows faster than revenue earned by banks.

### **5.2.5 Gross Domestic Product (GDP)**

Gross domestic product is found to have positive significant relationship with bank's profitability. The results show that one unit increase in GDP will contribute 0.032457 unit increase in return on assets, *ceteris paribus*. This result is agreed with the studies by Romania, Roman & Danuletiu (2013), Curak, Poposki & Pepur (2012), Said & Tumin (2011) and Davydenko (2010). This can be explained that when economic growth increased in a country, consumer spending tends to increase therefore they need to demand for more loans to finance their spending, eventually it encourage banks to lend more and charge higher margins. It is even in favor for banks when the non-bank financial institutions and capital market are underdeveloped in a country, the banks will become the main channel to obtain financing and save funds. Also, economic growth improves debt servicing capacity of borrowers which will cause banks to collect debts successfully and extend new loans and vice versa. Furthermore, banks able to raise profit and gain benefits from the increased in GDP is because of the small market size and imperfect competition in banking industry. Imperfect competition makes the banks with larger market power is

possible to charge higher loan rates and lower deposit rates in order to earn non-competitive profits during economic growth.

### **5.2.6 Interest Rate Spread (IRS)**

Based on the results obtained in previous chapter, interest rate spread has positive and significant impact in determining the profitability of commercial banks in Malaysia. The data analysis result shows that one unit increase in interest rate spread will contribute 0.113718 unit increase in return on assets, *ceteris paribus*. The positive and significant relationship between interest rate spread and bank's profitability is consistent with the results found by Warue (2013), Khrawish, Abadi & Hejazi (2008) and Naceur & Goaid (2001). This is because higher interest rate spread leads the banks to achieve higher efficiency and thus higher profit. Banks can charge borrowers a higher rate on loans granted while offer lower deposit rate to savers. As the gap between loan rate and deposit rate is wider, the more profits can be generated by banks. Furthermore, banks can benefit from the increase in interest rate spread since they can use the spread to cover the cost of operating business and performing intermediation function. When the spread earned by banks is much higher than the expenses incurred, banks can keep the funds as retained earnings or grant more loans to end users to capture more revenues. In short, bank's profitability can be enhanced when the interest rate spread is higher.

## **5.3 Implications of the Study**

Based on the findings in this research, this section will suggest the practical implications for bank's management and policy makers. This is to suggest relevant strategies and policies so that it can provide recommendations or references on how to manage the bank-specific and macroeconomic factors in a way that can improve

bank's profitability. Generally, bank-specific factors are controlled by bank itself, however policy maker like central bank can intervene into the banking system and influence these factors as well, thus bank-specific factors are implicated to both parties. For macroeconomic factors, normally it is controlled by policy maker, bank management can only predict the happen of the macroeconomic factors, thus macroeconomic factors are implicated to policy maker.

## **Bank-specific determinants:**

### **5.3.1 Capital Adequacy**

In this study, capital adequacy contributes significant positive relations with the profitability of banks. This is implicated to both bank management and policy maker. Banks should increase their capital adequacy level as it represents the safe and soundness level of a bank. Capital adequacy level also enables the national regulators to check on a bank's ability in absorbing the unexpected losses. By having a high capital adequacy level, a bank could bring larger confidents to the markets, investors and depositors. In order to achieve this, bank can try to increase the capital adequacy level by raising more capital from stakeholders and shareholders. Enhancement of the profitability of commercial banks could be achieved through the strengthening of capitalization of banks under government's regulation programs, by shrinking the size of large banks to finest levels and by applying incentive measures to lessen the size of non-interest bearing assets in favor of bank loans (Bennaceur & Goaid, 2008).

### **5.3.2 Credit Risk**

Credit risk variable can be implicated to bank management and policy makers as well. The findings in this research reveal that credit risk is negatively related to bank's profitability. Thus it is recommend for bank management and policy makers to implement strategy that helps in reducing credit risk among the banks. In order for bank to diversify the risk or reduce credit risk, bank should has better practice in credit risk analysis, carefully in screening the potential borrowers, accessing value of collateral to ensure it is sufficient to cover losses and closely monitor repayment schemes. Besides that, bank need to be accurate in predicting loan losses, so that the loan loss reserve will not over or under provided. Besides, regulator should closely monitor the credit risk of bank. For example, Central Bank can impose higher regulatory capital on riskier bank so that capital is sufficient to absorb high credit risk.

### **5.3.3 Bank Size**

Bank size variable is implicated to bank's management and policy makers. Based on the results, bank size is found to have negative significant relationship with bank's profitability, which indicates diseconomies of scale held among the commercial banks in Malaysia. This means when bank size increased up to a point, profit will start to decline with an upward of size. Therefore, bank is suggested to not over-expanding the size of assets, instead bank should maintain at low asset size level which still able to gain advantage of scale economies. As a suggestion, bank need to identify its own threshold level of asset size, and bank can consider to shrink the assets size if the current level exceeds the threshold level, for example bank can reduce the volume of trading activities or dispose less profitable investment assets. In the real banking world today, profitability is not much rely on bank size, whereas it is critical depends on the advanced technology (Hoffmann, 2011). Therefore,



instead of expanding bank size with network of branches that incurred high operation costs, bank is suggested to focus in using advanced technology to deliver innovative product and service to customers more efficiently. On the other hand, the other reason that contribute larger bank size but lower profitability is because of the agency cost problem. Agency cost arises when managers who desire to get high paid will try to expand bank size at the expense of bank shareholders. Therefore, it is recommended to offer incentives for managers so that they will be rewarded to keep the bank safe instead of pursuing high growth strategy. For example, employee stock purchase plan can be given to top managers.

Bank size also can be controlled by policy maker. Regulatory intervention can be useful to constrain the banks from growing too large. For example, central bank can enforce higher capital requirements for large banks so that banks will loss incentive to grow larger as it becomes difficult for them to maintain high regulatory capital. In the regulator's perspective, reducing bank size are benefits for them as it can prevent large banks become "too big to fail" and abuse market power.

## **Macroeconomic determinants:**

### **5.3.4 Inflation**

Even this finding reveals that inflation is insignificant, however inflation is still considered as an important macroeconomic factor that will affect bank's profitability thus it is suggested to control inflation to prevent losses among banks. In order to further improve the local banks' profitability, banks should revise inflation reports and try their best to forecast the inflation rate accurately in order to adjust the interest rate accordingly. Thus, banks can capture the opportunity to gain more profits before the inflation rate raise. The

anticipated inflation will benefit the banks by increasing their income. Moreover, the government should impose restrictions on cross border flow of capital and use relevant macroeconomics management tools to control the inflation fluctuation (Aigheyisi & Edore, 2014). For example, government can implement fiscal policy to control inflation through reducing government spending and increasing tax rate.

### **5.3.5 Gross Domestic Product**

The findings indicate that gross domestic product has a significant positive relationship with bank's profitability. Since this finding reflects that bank's profitability in Malaysia tends to have pro-cyclical movement with GDP growth, therefore policy maker should design fiscal or monetary policy in order to promote GDP stability or growth so that it can foster the financial intermediation of banks and generate more profits. For example, government should implement expansionary fiscal policy by reducing taxes or increase government spending. Central bank can implement expansionary monetary policy by lower down reserve requirement ratio, lower down discount rate and conduct open market operation to buy T-bills, T-notes and T-bonds. As a result, more money can be injected into economy and it will reduce interest rate which eventually encourage investment and boost up GDP. Other than the three tools in monetary policy, central bank also can reduce overnight policy rate (known as federal funds rate) which in turn it cause commercial banks to reduce their base rate charged for loans. This will then reduce consumer's cost of borrowing which encourage more investment and boost up GDP.

Other than using policies that aimed to promote GDP growth, credit allocation of banks are very important to promote GDP growth. Generally, there are two types of credit which are the credit for productive purpose (credit for creation of new goods and services that contribute to GDP) and credit for non-

productive purpose (credit for transaction that no contribute to GDP). As a suggestion, central bank can impose restriction on loans granted for non-GDP transactions, whereas impose incentives for loans granted for production purpose so that it can drive up GDP growth. For example, central bank can provide subsidies such as offer low interest and flexible repayment options for productive sectors.

### **5.3.6 Interest Rate Spread**

Since interest rate spread is found to have positive impact on bank's profitability in Malaysia, thus policy makers should implement policies which can promote the increase in interest rate spread so that it can improve profitability of commercial banks. As interest rate spread is influenced by open market interest rate, policy makers and financial analysts should monitor the liquidity status of Malaysia economy to ensure the profitability of local commercial banks (Ghazali & Ali (2002). When the economy is in good condition, the market interest rate will boost up and lead to a higher interest rate spread. In addition to that, policy makers need to conduct an appropriate and correct policy to ensure the stability of financial system and thus the whole Malaysia economy (Khravish, Abadi & Hejazi, 2008). This is because banks can benefit from a well-performed economy which has high open market interest rate. Therefore, a favorable movement of open market interest rate will enhance the financial performance of local commercial banks.

Other than that, Central Bank can manipulate the lending and deposit rates to control the supply of money in the economy. For example, Central Bank can conduct monetary policy by increasing interest rate to reduce supply of money. When higher discount rate is imposed on banks, the market interest rate will increase. Thus, higher lending rate will be charged on individuals and firms which leads to lower amount of borrowings made by borrowers. However, it

will also attract savers to make more deposits as the rate is higher. In the contrary, the policy maker can increase the money supply through lowering the interest rate. People will find out it is more attractive to borrow funds and increase consumption which will reduce savings.

#### **5.4 Limitations of the Study**

As mentioned in first chapter, there are 8 local commercial banks in Malaysia but only 5 of them are included in this study. Therefore, the finding of this paper may not reflect the real condition of whole Malaysian banking industry. This limitation occurs due to the constrained resources and limited information available for some of the banks.

Secondly, there are some difficulties in data collection process. The data of macroeconomic variables for the years before 2004 is untraceable from the 'World Bank' website. Furthermore, the data of internal variables is limited as only most recent years of annual report could be found from the 'Bursa Saham Malaysia' website. It is due to the refurbishment of website from time to time. The limited time range might cause distortion of result compared to longer duration of study.

Thirdly, there are only quantitative variables included in this study but the qualitative factors have been neglected. The result of the study could not really define the true determinants of bank profitability.

Fourthly, the unit measurement used for capital adequacy is the ratio of total equity to total asset. The equity figure in this ratio has reflect the tier one and tier two capital, however the total asset figure did not adjusted to its risk level.

Lastly, this study has only focused on the domestic banks of Malaysia without include foreign banks. However, the effect of variables might be different for different ownership of banks in Malaysia.

## **5.5 Recommendation for Future Research**

In order to provide a comprehensive understanding regarding the impact of various determinants on bank profitability, future researchers should include all the 8 local commercial banks in Malaysia. It is also recommended to include foreign banks in future research to better reflect all the banks' profitability in Malaysia.

Furthermore, it is recommended to improve the data collection method to obtain complete information. For example, DataStream that offer more data information can be used.

Other than quantitative variables, qualitative variables should have been taken into account in future research. Qualitative variables or dummy variables such as effect of financial crisis and regulations by central bank should have been included as it may influence the profit level of banks.

In future research, it is also recommended to improve unit measurement for capital adequacy by using the ratio of total capital to risk-weighted assets in order to provide a more accurate measurement of a bank's capital adequacy in absorbing different risk level of assets.

Lastly, cross banks comparison between foreign banks and domestic banks should have included when doing the research in order to examine whether the effect of variable is consistent across different bank's ownership.

## 5.6 Conclusion

This research project aims to investigate the bank-specific and macroeconomic determinants of commercial bank's profitability in Malaysia during 2004-2013. The potential key drivers of bank's profitability have been identified, they are capital adequacy, credit risk, bank size, inflation, gross domestic product and interest rate spread. Since Malaysia is not much affected by financial crisis and assume the top 5 banks have similar characteristics, thus it provides rationale for using Pooled OLS Model to regress the data. Data analysis result shows that capital adequacy, credit risk, bank size, gross domestic product and interest rate spread contribute significant relationship on bank's profitability, but only inflation is found to be insignificant. Moreover, hypothesis testing in this research is proved to be valid and reliable since it does not contain any econometric problems.

For future research, it is recommended to have wider coverage of target samples, improve data collection, qualitative factors should be considered and comparative analysis between local and foreign banks should be carried out.

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## APPENDICES

### Appendix 1.1 Profitability of Malaysian banking system

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
ROA (%)	1.4	1.4	1.3	1.5	1.5	1.2	1.5	1.6	1.6	1.5
ROE (%)	16.3	16.8	16.2	19.8	18.6	13.9	16.6	17.4	17.4	15.9

Sources: Bank Negara Malaysia

### Appendix 1.2 Raw data for dependent and independent variables for five local commercial banks in Malaysia during 2004-2013.

		ROA	CA	CR	BS	INF	GDP	IRS	
<b>Maybank</b>	2004	0.0135	0.0839	0.0045	11.2541	1.5185	0.068	0.0305	
	2005	0.013	0.0878	0.0069	11.2831	2.9609	0.053	0.0295	
	2006	0.0125	0.0779	0.0067	11.3506	3.6092	0.056	0.0334	
	2007	0.0127	0.0774	0.0053	11.4094	2.0274	0.063	0.0324	
	2008	0.0112	0.0747	0.0049	11.4299	5.4408	0.048	0.0295	
	2009	0.0024	0.0829	0.0091	11.4924	0.5833	-0.015	0.03	
	2010	0.0118	0.0851	0.0058	11.5272	1.71	0.074	0.025	
	2011	0.0114	0.0788	0.002	11.6149	3.2	0.051	0.02	
	2012	0.0075	0.083	0.0015	11.8444	1.6554	0.056	0.0181	
	2013	0.0091	0.0868	0.0021	11.7224	2.105	0.047	0.0103	
	<b>CIMB</b>	2004	0.0067	0.0785	0.0179	11.0491	1.5185	0.068	0.0305
		2005	0.0073	0.0849	0.0148	11.0551	2.9609	0.053	0.0295
		2006	0.0101	0.0795	0.0113	11.2031	3.6092	0.056	0.0334
2007		0.0159	0.0922	0.0118	11.2621	2.0274	0.063	0.0324	
2008		0.0097	0.0888	0.0068	11.3154	5.4408	0.048	0.0295	
2009		0.0127	0.0944	0.0072	11.3802	0.5833	-0.015	0.03	
2010		0.0137	0.0902	0.0038	11.4303	1.71	0.074	0.025	
2011		0.0136	0.0895	0.0027	11.4774	3.2	0.051	0.02	
2012		0.013	0.0871	0.0016	11.5277	1.6554	0.056	0.0181	
2013		0.0124	0.0842	0.0029	11.5693	2.105	0.047	0.0103	
<b>Public Bank</b>		2004	0.0138	0.0931	0.0049	7.9642	1.5185	0.068	0.0305
		2005	0.013	0.076	0.0057	8.0477	2.9609	0.053	0.0295
		2006	0.0121	0.0611	0.0056	8.1696	3.6092	0.056	0.0334
	2007	0.0126	0.0573	0.0041	8.2409	2.0274	0.063	0.0324	



	2008	0.0134	0.0524	0.0046	8.2926	5.4408	0.048	0.0295
	2009	0.0118	0.054	0.0051	8.3367	0.5833	-0.015	0.03
	2010	0.0137	0.0605	0.0043	8.3547	1.71	0.074	0.025
	2011	0.0141	0.0624	0.0034	8.3969	3.2	0.051	0.02
	2012	0.0142	0.0679	0.0014	8.4387	1.6554	0.056	0.0181
	2013	0.0134	0.0693	0.0016	8.4853	2.105	0.047	0.0103
<b>RHB</b>	2004	0.0056	0.0513	0.0153	10.7384	1.5185	0.068	0.0305
	2005	0.0035	0.05	0.0111	10.9538	2.9609	0.053	0.0295
	2006	0.0058	0.0586	0.0133	11.0141	3.6092	0.056	0.0334
	2007	0.0078	0.0673	0.0105	11.0218	2.0274	0.063	0.0324
	2008	0.01	0.075	0.0082	11.0193	5.4408	0.048	0.0295
	2009	0.0105	0.076	0.0086	11.0605	0.5833	-0.015	0.03
	2010	0.011	0.0771	0.0051	11.1117	1.71	0.074	0.025
	2011	0.0099	0.0751	0.0035	11.183	3.2	0.051	0.02
	2012	0.0095	0.0811	0.0014	11.2766	1.6554	0.056	0.0181
	2013	0.0096	0.0887	0.0037	11.2812	2.105	0.047	0.0103
<b>Ambank</b>	2004	0.0037	0.0679	0.0224	10.7816	1.5185	0.068	0.0305
	2005	0.0033	0.0773	0.0192	10.7916	2.9609	0.053	0.0295
	2006	0.0051	0.0849	0.0173	10.8589	3.6092	0.056	0.0334
	2007	-0.0006	0.0773	0.0318	10.8955	2.0274	0.063	0.0324
	2008	0.0097	0.0872	0.0098	10.9201	5.4408	0.048	0.0295
	2009	0.0098	0.088	0.006	10.9537	0.5833	-0.015	0.03
	2010	0.0108	0.0102	0.0088	10.9844	1.71	0.074	0.025
	2011	0.0129	0.0976	0.0069	11.0344	3.2	0.051	0.02
	2012	0.014	0.1029	0.0058	11.0487	1.6554	0.056	0.0181
	2013	0.0133	0.1034	0.0021	11.1038	2.105	0.047	0.0103

### Appendix 1.3 Result of Pooled OLS regression

Dependent Variable: ROA\_?

Method: Pooled Least Squares

Date: 08/16/14 Time: 00:31

Sample: 2004 2013

Included observations: 10

Cross-sections included: 5

Total pool (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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C	0.013598	0.003480	3.906866	0.0003
CA_?	0.056122	0.021598	2.598469	0.0128*
CR_?	-0.495840	0.064690	-7.664872	0.0000**
BS_?	-0.000756	0.000288	-2.621730	0.0120*
INF_?	-0.012924	0.025064	-0.515632	0.6088
GDP_?	0.032457	0.014211	2.284004	0.0274*
IRS_?	0.113718	0.055961	2.032098	0.0484*
R-squared	0.692052	Mean dependent var		0.010350
Adjusted R-squared	0.649082	S.D. dependent var		0.003653
S.E. of regression	0.002164	Akaike info criterion		-9.304670
Sum squared resid	0.000201	Schwarz criterion		-9.036987
Log likelihood	239.6168	Hannan-Quinn criter.		-9.202735
F-statistic	16.10562	Durbin-Watson stat		1.577049
Prob(F-statistic)	0.000000			

#### Appendix 1.4 Result of Poolability Test

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

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.464975	(4,39)	0.0163
Cross-section Chi-square	15.204170	4	0.0043

Cross-section fixed effects test equation:  
Dependent Variable: ROA?  
Method: Panel Least Squares  
Date: 03/13/15 Time: 15:20  
Sample: 2004 2013  
Included observations: 10  
Cross-sections included: 5  
Total pool (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.013598	0.003480	3.906866	0.0003
CA?	0.056122	0.021598	2.598469	0.0128
CR?	-0.495840	0.064690	-7.664872	0.0000
BS?	-0.000756	0.000288	-2.621730	0.0120

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INF?	-0.012924	0.025064	-0.515632	0.6088
GDP?	0.032457	0.014211	2.284004	0.0274
IRS?	0.113718	0.055961	2.032098	0.0484

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R-squared	0.692052	Mean dependent var	0.010350
Adjusted R-squared	0.649082	S.D. dependent var	0.003653
S.E. of regression	0.002164	Akaike info criterion	-9.304670
Sum squared resid	0.000201	Schwarz criterion	-9.036987
Log likelihood	239.6168	Hannan-Quinn criter.	-9.202735
F-statistic	16.10562	Durbin-Watson stat	1.577049
Prob(F-statistic)	0.000000		

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