

AN EMPIRICAL STUDY OF THE COMPARISON OF
BANK PROFITABILITY BETWEEN MALAYSIA AND
SINGAPORE DURING YEAR 2006-2011

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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 13,143 words.

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LIST OF ABBREVIATIONS

FEM	Fixed Effect Model
INF	Inflation Rate
INT	Interest Rate
LTA	Loan-to-Asset Ratio
OLS	Ordinary Least Square
REM	Random Effect Model
ROA	Return on Asset
SIZE	Bank Size

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PREFACE

Overall, the Bachelor of Administration (HONS) Banking and Finance degree lies in the assessment of Final Year Project (FYP) or also known as the research methodology and project that requires graduating students to conduct a paper in the final year.

This paper is conducted under the title of “AN EMPIRICAL STUDY OF THE COMPARISON OF BANK PROFITABILITY BETWEEN MALAYSIA AND SINGAPORE DURING YEAR 2006-2011.” It is to be accomplished within 28 weeks.

Banking activity has rooted itself in Malaysia and Singapore for so long but there are only few researches that talk about profitability determinants of commercial banks in these both countries. Thus, this is the reason why we conducted this paper, as it is essential to outline the profit determinants of commercial banks in Malaysia and Singapore.

In the content of banking application in this paper, students are expected to be able to enhance their knowledge in banking industry even more.

ABSTRACT

The banking industry in Malaysia and Singapore are growing rapidly. Financial institution is recognized as an important institution to promote the economic growth and development. A sound financial institution is crucial for the stable economy. Therefore, researchers examine the determinants of commercial banks' profitability in Malaysia and Singapore banking industry. The comparison of two countries has clearer understanding toward the effect of determinant on bank profitability. Researchers also examine the bank-specific as well as macroeconomic factors that affect the commercial bank's ability to generate profit in Malaysia and Singapore. In this research, the independent variables include bank size, loan-to-asset ratio, inflation and interest rate, whereas the dependent variable is return on asset. Based on the analysis result, implications and findings were interpreted in the last chapter. Furthermore, the limitations and recommendations have been discussed to help future researchers to conduct effectively in further studies which are related to this topic.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

A sound and effective financial system is essential for a stable and developing economy. The banking industry plays a crucial role in the financial system of any economy. Banks also serve as a financial intermediary in channeling funds from depositors to bank borrower, henceforth it has been recognized as an efficient financial market in the growth and development of the country. The present study was designed to examine the impact of bank specific as well as macroeconomic factors on the profitability of the Malaysia and Singapore banking industry. Comparison between two countries is to provide a clearer and better understanding of the impact of determinants towards bank profitability so as to discover the determinants of profitability of the banks in both countries to evaluate bank performance.

Profitability of the bank represents how well the operation of the bank. Olweny and Shipho (2011) have discovered the importance of bank performance in terms of national and international economies through the recent global financial crisis of 2007/2009, emphasizing the need to keep it under surveillance. Monitoring the bank performance by analyzing the profitability of bank is essential in eliminating the probability of bank failure in the country.

1.1 Research Background

1.1.1 Research Background in Malaysia

The financial system in Malaysia can be divided into two main categories namely banking system and non-bank financial intermediaries. Meanwhile the banking system can be further divided into commercial banks, investment banks, Islamic banks, Islamic investment banks and other financial institution. The figure 1.1 below shows the number of financial institution in Malaysia.

Figure 1.1: Total Number of Financial Institution in Malaysia

	Total	Malaysia- Controlled Institution	Foreign- Controlled Institution
Commercial Banks	25	8	17
Islamic Banks	16	10	6
International Islamic Banks	5	0	5
Investment Banks	15	15	0
Insurers	36	19	17
Takaful Operators (Islamic Insurers)	12	9	3
International Takaful Operators	1	0	1
Reinsurers	7	3	4
Retakaful Operators (Islamic Reinsurers)	4	1	3
Development Financial Institutions	6	6	0

Source: Malaysian Investment Development Authority (MIDA), 2012

Commercial banks, investments banks and Islamic banks are the main sources of fund and financing which supports economic activities in Malaysia. Nowadays banking sectors in Malaysia have become more competitive and are in the phases of dynamic growth, leading a more diversified path. However, when crisis took place during the 1997/1998, Malaysia's bank experienced extreme volatility in financial markets which led to the downgrading of sovereign rating from A+ to BBB-. Furthermore, Malaysia currency (MYR) depreciated by 40% against USD and stock market decreased over 70%. In this manner, Bank Negara Malaysia (BNM) took prudential regulatory reforms. Regulatory reforms introduced intent to strengthen the domestic bank survival and reshape domestic banking industry. In addition, Malaysian government started the implementation of the banking sector reformation in response to the 1997 financial crisis. Under the reforming plan, Malaysian government guided the merger activities in the banking sector through the central bank. Prior to that date, the banking sector was made up of 54 domestic deposit taking institutions which became ten large-capitalized banks by the end of 2002.

To ensure the financial soundness of local banks, bank profitability (return on asset, return on equity and net interest margin) in Malaysia is basically measured by their percentage of profitability. The profitability of banks represents the earnings and revenue growth. For the ROA, it measures how effective the banks took earning advantages of its base assets. It is commonly defined as net income over total assets. Increased of ROA indicates the rise of percentage of profit that a bank earns in relation to its assets. To compare the companies in the same industries, it is better to use ROA. For instance, the comparisons of profitability of banks in Singapore and Malaysia according to ROA. The higher the ROA, the better it is as the banks used its assets efficiently. In contrast, for the ROE, it measures how effective a bank is using shareholder's equity. ROE also represents the amount of money or return earned on each dollar invested. Nonetheless, knowledge of the underlying determinants that affect the performance of the banking industry is necessary not only for the senior executives of the

banks, but for numerous shareholders such as governments, central banks, bankers association as well as regulators of financial markets.

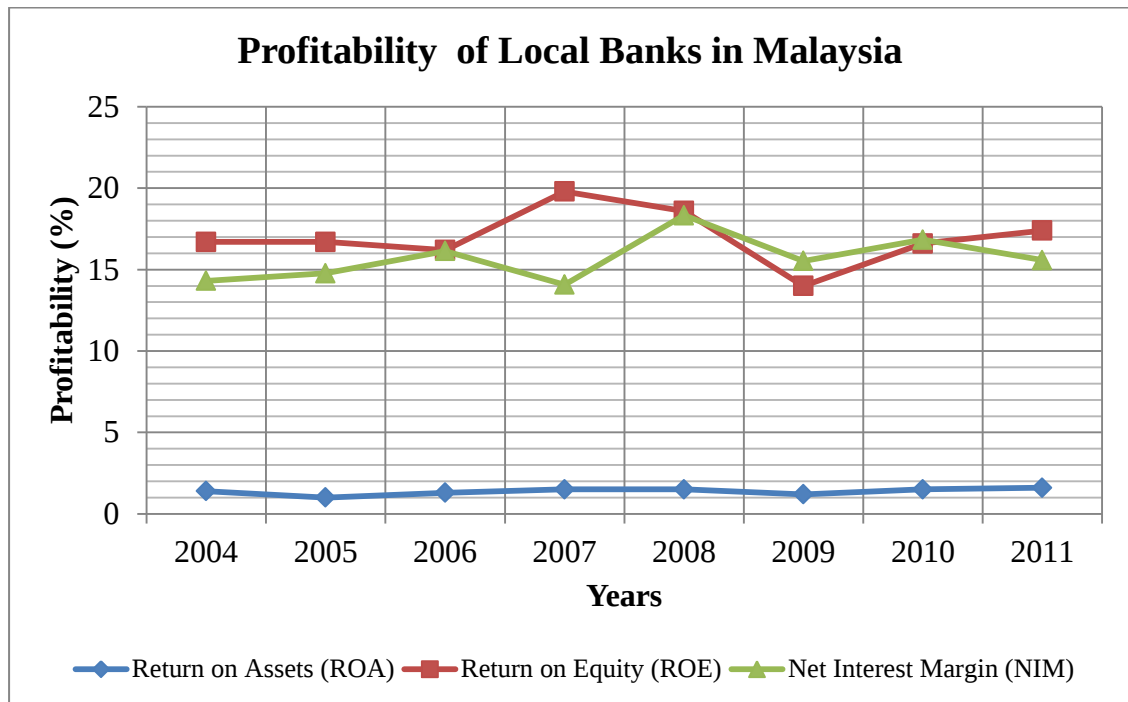
Figure 1.2 below shows the profitability of Malaysia's local bank, as measured by both return on asset (ROA) and return on equity (ROE). 1% of ROA represents the equilibrium of net income over the total assets in the local bank. Based on the table, ROA and ROE are inconsistent between 2004 and 2011. Likewise, the net interest margin of Malaysia's bank also fluctuates from year 2004 until year 2009. The higher NIM of bank indicates low-cost deposits and short-term debt. This will reduce its use of higher-cost long-term debt and lowering its funding costs more than the interest income on its loans and investments. However, decrease in NIM will incur higher expenses and credit costs.

Figure 1.2: Profitability data of Local Banks in Malaysia

Year	Profitability (%)		
	Return On Asset ROA (%)	Return On Equity ROE (%)	Net Interest Margin NIM (%)
2004	1.4	16.70	14.31
2005	1	16.7	14.78
2006	1.30	16.20	16.14
2007	1.50	19.80	12.07
2008	1.50	18.60	18.33
2009	1.20	14.00	15.53
2010	1.50	16.60	16.83
2011	1.60	17.40	15.58

Source: Bank Negara Malaysia, 2012

Figure 1.3: Profitability of Local Bank in Malaysia



Source: Bank Negara Malaysia, 2012

In recent years, studies on bank performance have taken into account asset quality, especially on non-performing loan. Non-performing loan has been an impediment or hindrance to the stability and growth of economies. Normally, many loans are non-performing after being default in three months or rely on the contract term. Non-performing loan will lead to inefficiency in the banking sector. Non-performing loan is a loan that is default or close to default. Based on figure 1.4, non-performing loans (NPL) decreased substantially since 2005. Decreasing in NPL ratio indicates that there is lower probability of borrowers' inability to repay their loans.

Figure 1.4: Non-performing Loan of Local Banks in Malaysia

Year	Non-performing Loan, NPL (%)
2005	9.6
2006	8.5
2007	6.5
2008	4.8
2009	3.6
2010	3.4
2011	2.9

Source: World Bank, 2012

1.1.2 Research Background in Singapore

Banking industry in Singapore is a famous international financial hub or a thriving international financial centre in the entire Asia Pacific region. Singapore's banking status is the third largest international financial centre in Asia, after Japan and Hong Kong. Over the decades, Singapore has built a prosperous and flourishing reputation worldwide. Singapore is strategically located in Asia Pacific and it is known as one of the world's fastest-growing regions. In order to be competitive, local banks started the merging and acquisition process after the liberalization of banking industry by Singapore government in year 2001. Singapore is well-regarded as triple-A rated economy with stable and strong growth potential as well as a sound and stable market for investments.

Singapore's Central Bank is known as the Monetary Authority of Singapore (MAS). It was founded in 1971 and it acts as a central bank of Singapore to regulate the banking and financial sectors. MAS plays a vital role in maintaining the stability of exchange rates, currency strength and liquidity rate. The top big three local banks in Singapore are Development Bank of Singapore Limited

(DBS), Oversea-Chinese Bank Corporation Limited (OCBC) and United Overseas Bank Limited (UOB).

Singapore's financial institution offers a wide range of services such as banking, insurance, investment banking and treasury services. Currently, the financial system in Singapore consists of commercial banks, merchant banks, capital market intermediaries, insurance, financial advisors, finance companies, trust companies as well as money changing and remittance businesses. Most of the banks in Singapore cater to different clients such as individuals, corporations and government agencies. These banks provide commercial banking, retail banking and private banking services. Banks can be classified into 2 main categories, which are local banks and foreign banks. There are 6 local banks and 115 foreign banks in Singapore. Foreign banks in Singapore consist of 26 full banks, 53 wholesale banks and 36 offshore banks. Figure 1.5 shows the number of financial institutions and relevant organizations in Singapore.

Figure 1.5: Total Numbers of Financial Institution and Relevant
Organizations in Singapore

Type of Institution	Number of Institutions
Banks	121
Merchant Banks	46
Representative Offices and Banks	38
Financial Holding Companies	2
Finance Companies	3
Insurance	281
Capital Markets	290
Exempt Entities	1251
Financial Advisers	66
Money Changers and Remittances	418
Money Brokers	9
Holders of Trust Business License	51
Institutions with Asian Currency Units	163
Singapore Government Securities Market	32
Relevant Associations and Organizations	17

Source: Monetary Authority of Singapore (MAS), 2012

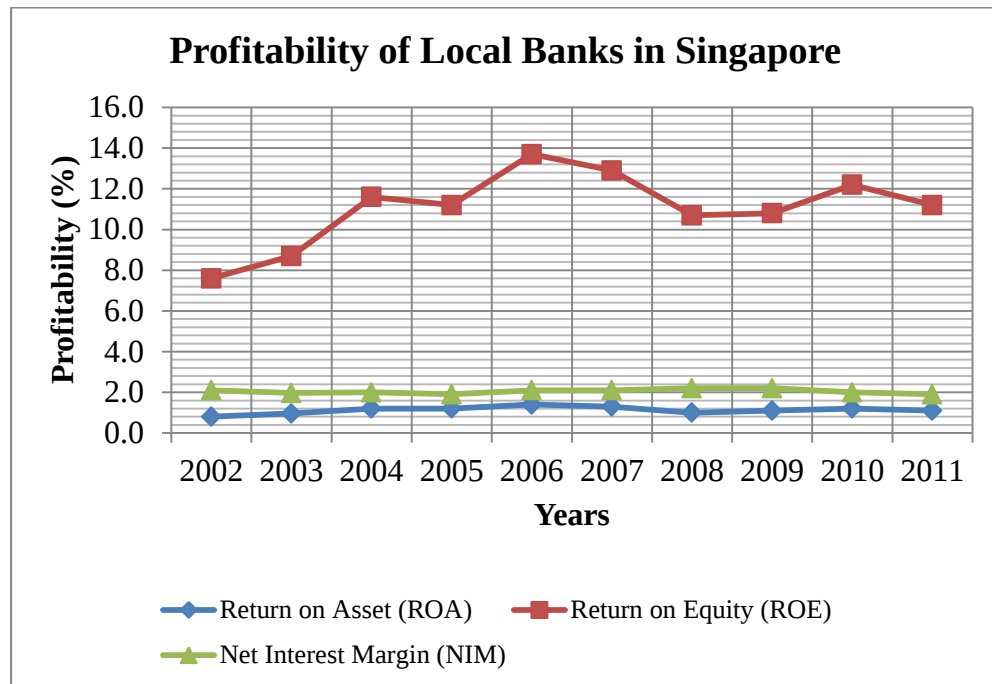
The data shown in figure 1.6 illustrates the profitability of Singapore's local banks, as measured by both return on asset (ROA) and return on equity (ROE), averaged 1.1% and 11% per annum respectively over the last ten years, from year 2002 to year 2011. Based on figure 1.6, after crisis, the profitability has improved in year 2002 to year 2006, as seen in the ROA and ROE. 1% of ROA represents the equilibrium of net income over the total assets in the local banks of Singapore. However, Singapore's banks' ROA and ROE fluctuated after year 2006. ROA and ROE decreases from year 2006 to 2008 and demonstrated growth during year 2010. Overall, the Singapore's local bank ROA and ROE is fluctuating. Furthermore, the net interest margin of Singapore's banks also fluctuates throughout the ten year period. Well-capitalized banks will have higher net interest margin and higher profit. According to Singapore Business Review, one of the top three big banks in Singapore, Development Bank of Singapore Limited (DBS) states that their net interest margin are improving and earnings are expected to rise more. Nonetheless, the data of profitability from central bank of Singapore, MAS shows that the NIM fluctuated over the last ten years.

Figure 1.6: Profitability data of Local Banks in Singapore

Years	Profitability (%)		
	Return on Asset (ROA)	Return on Equity (ROE)	Net Interest Margin (NIM)
2002	0.8	7.6	2.1
2003	1.0	8.7	2.0
2004	1.2	11.6	2.0
2005	1.2	11.2	1.9
2006	1.4	13.7	2.1
2007	1.3	12.9	2.1
2008	1.0	10.7	2.2
2009	1.1	10.8	2.2
2010	1.2	12.2	2.0
2011	1.1	11.2	1.9

Source: Monetary Authority of Singapore (MAS) Financial Stability Review, 2012

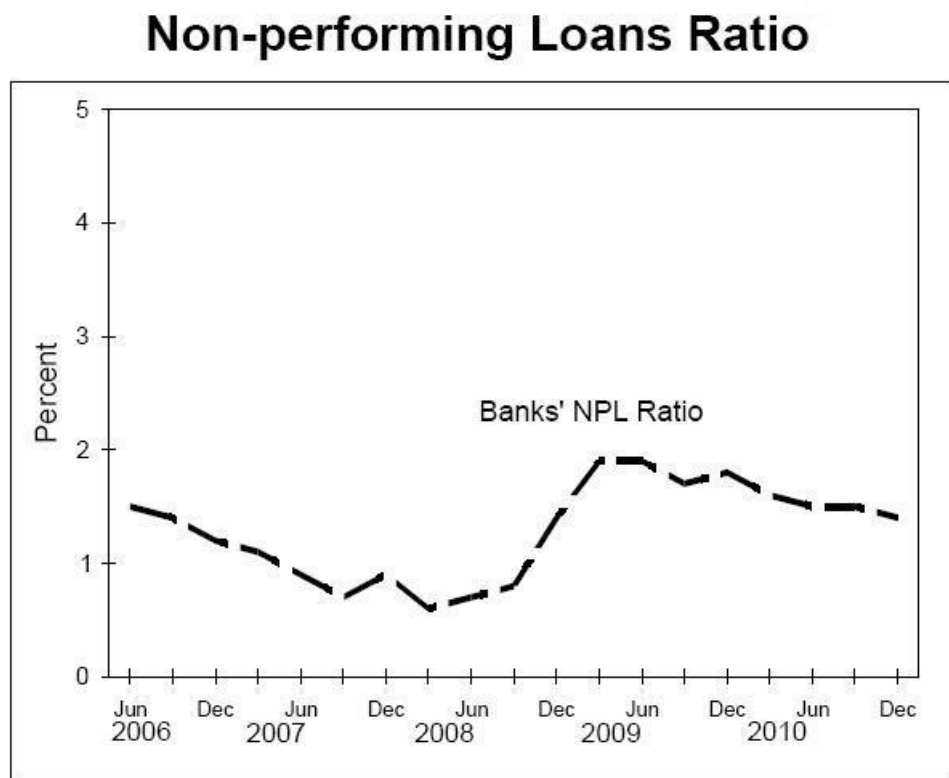
Figure 1.7: Profitability of Local Banks in Singapore



Source: Monetary Authority of Singapore (MAS) Financial Stability Review, 2012

In recent years, studies on bank performance have taken into account asset quality, especially non-performing loan. Non-performing loan has been an impediment or hindrance to the stability and growth of economies. Normally, many loans are non-performing after being default in three months or rely on the contract term. Non-performing loan will lead to inefficiency in the banking sector. Non-performing loan is a loan that is default or close to default. Based on figure 1.8, since the Asian Financial Crisis, net non-performing loan ratio has gradually decline from 1.5% to 0.5%. The non-performing loan increased from the end of year 2008 to the mid-year of 2009. Singapore, non-performing loan continue to improve (Karim, Chan & Hassan, 2010). Nevertheless, the net non-performing ratio decreases again recently, during year 2010.

Figure 1.8: Non-performing Loans of Banks in Singapore



Source: Monetary Authority of Singapore (MAS) Monthly Statistical Bulletin March 2011

1.2 Problem statement

Bank Negara Malaysia (BNM), established on January 1959 and Monetary Authority of Singapore (MAS), was set up in 1971 to claim the roles of providing the necessary reform and regulatory in the financial sector. Both institutions reviewed and acknowledged the operation and success of banks in their own country. Previous studies showed evidence that low profitability of banks are due to low performance of bank indicators, for example: high probability of credit risk, inadequate capitalization, poor loans quality, operational inefficient and so on. In the era of liberalization and globalization, banking sector in Malaysia and Singapore tend to broaden their outreach by establishing branches and subsidiaries or taking over foreign banks. Foreign banks play a vital role in the market, it may contribute to a better quality and availability of banking services in the host market. Anyhow, the entrance of foreign banks also brings a competitive pressure to domestic banks, which brings to an argument stating that the presence of foreign banks correlates with reductions of expenses, interest margin and profitability of local banks (Claessens, Demirguc-Kunt & Huizinga, 2001). In this context, the emergence of foreign banks could create issues to the banking markets in home country: (1) what effects may it bring to domestic banking sector and (2) disparity in competition and difference in profitability between Malaysia and Singapore. Governments in Malaysia and Singapore have recommended the consolidation of domestic banks to prepare them in confronting the threats from foreign competitors.

In this rapid developing environment, banking sectors are more likely to experience high level of competition. For this reason, it is significant to study commercial bank profitability, what determines it, how it differs between Malaysia and Singapore bank profitability and what are the possible efforts that can strengthen bank's management by optimizing these variables when making decisions. Furthermore, Kosmidou, Pasiouras and Tsaklanganos (2007) stated that bank owners or regulatory makers emphasize on the investigation of profitability determinants because they seek to review and regulate bank's performance and regulation to enhance bank profit. Also, there are some issues such as uncertainty of economic conditions, crisis, capital, competition and consolidation that were

found to be major drawbacks in the profitability of banks. Unfortunately, there are insufficient studies on the probability performance of commercial bank. Therefore, this research paper intends to fill the gap by analyzing the features that affect the profitability of commercial banks in Malaysia and Singapore.

In this regard, this research adopts the fundamental bank specific indicators and macroeconomic factors to examine bank profitability in Malaysia and Singapore during a period of 6 years, 2006 to 2011. Many similar reviews were inspired by previous studies. In general, this research analyzes the relation between the profitability of domestic commercial banks and bank specific factors including loan-to-assets ratio, bank size, as well as the macroeconomic factors including inflation rate and interest rate.

1.3 Research Objectives

This research is carried out to investigate and analyze the determinants of commercial banks' profitability in Malaysia and Singapore. Secondary data was collected from relevant sources in order to measure the bank performance by analyzing the bank's profitability for 6 years from the period of 2006 to 2011.

1.3.1 General Objective

The research is carried out to determine and analyze which factors might affect the bank profitability in Malaysia and Singapore after the financial crisis. Resources of study are obtained from secondary data from year 2006 until year 2011. This research utilizes both bank-specific as well as macroeconomic factors to measure bank profitability.

1.3.2 Specific Objective

The main objective of this research has been sub-divided as follows:

1. To determine and examine the bank-specific as well as macroeconomic factors that affect the commercial bank's ability to generate profit in Malaysia and Singapore
2. To study the relationship between each independent variables and dependent variable
3. To compare the determinants of commercial bank profitability between Malaysia and Singapore

1.4 Research Questions

The purpose of this research is to provide answers to these questions:

1. What are the factors that affect commercial banks profitability in Malaysia and Singapore?
2. Is/Are the independent variables show significant relationship to or well in explaining the bank's profitability?
3. What are the discrepancies in determinants of commercial banks profitability between Malaysia and Singapore?

1.5 Hypotheses of the Study

H₁: There is positive relationship between bank size and bank profitability in Malaysia but negative relationship in Singapore.

H₂ : There is positive relationship between loan-to-asset ratio and bank profitability in Malaysia and Singapore.

H₃ : There is positive relationship between inflation and bank profitability in Malaysia but negative relationship in Singapore.

H₄ : There is negative relationship between interest rate and bank profitability in Malaysia and Singapore.

1.6 Significance of Study

The importance of this study is to provide empirical evidence on the determinants of commercial bank in Malaysia and Singapore. The comparison of profitability determinants of the bank between these two countries gives a general idea of how the real economic condition of the country works and how bank performance are affected by different economic factors known as macroeconomic variable as well as internal bank specific factor. For example, an increase of inflation, it increases the price of goods, demand of money value decrease thus money will be depreciated. Government then will try to adjust money supply and interest rate as well. The crucial factor of conducting this study is to identify underlying determinants that affect the performance of the banking industry as compared to local or foreign investors.

The existing relative literatures give a general idea of what are the determinants of bank profitability. The purpose of this study is to extract the most affective variable and explore the existing new independence variable. Besides, empirical results of the studies could help the country's regulator in the formation of policy

in order to deal with unexpected change in economic conditions such as the changes in interest rate, inflation and other factors that might affect the profitability of banks. From the regulators perspective, this study intends to give a clearer picture of the most affective profitability determinants of bank and also provide them with guidance to monitor the capital adequacy standards and regulations in respond to changes in the global economy.

This study gives direction and sets the benchmark for the management of credit risk in order to get a perfect balance in their strategic planning and consideration. The top management could get some idea on how to manage the credit risk, in order to maintain a safe profitability ratio of the bank. This study of determinants of profitability for the bank provides a general guideline for the bank risk management and hence leads to effective bank supervision.

1.7 Chapter Layout

Chapter 1 consists of the description of the problem statement and research objective. The significance of the research is highlighted and the research scope is stated in this chapter.

Chapter 2 reviews the literature relating to profitability performance of the banks. These literatures have directly or indirectly inspired the researchers to study what factors determine profitability performance of banks.

Chapter 3 describes the data and methodology, how researchers describe the data and how researchers run multiple regression analysis of the independent variable.

Chapter 4 presents and discusses the finding, which includes the general discussion on the domestic banks performance and the specific discussion on the internal and the external macroeconomic factors that affects the bank's profitability.

Chapter 5 draws conclusion for the research findings and offer suggestion of some implications to future research on the performance of domestic commercial banks in Malaysia and Singapore.

1.8 Conclusion

In conclusion, this study aims to examine the significance of independent variables (macroeconomic factors and bank specific's factor) to the dependent variable, on 8 domestic commercial banks profitability in Malaysia and 4 domestic commercial banks profitability in Singapore which are measured by return on assets. The independent variables that researchers include in this study are bank size, loan-to-asset ratio, inflation and interest rate. This study will apply pooled regression analysis to detect the significance of each independent variable to the dependent variable.

Chapter 2: LITERATURE REVIEW

2.0 Introduction

In this chapter this study will review some literatures based on the previous studies. It should be noted that many reliable and high quality studies have been carried out on the topic of banks profitability over the last decade. Literally, there are two general approaches to explain the profitability of bank which are bank specific factors and macroeconomic factors. This chapter explores the prior researches related to the determinants of banks profitability. Furthermore, the theoretical framework and hypothesis development will be carried out to investigate the relationship between dependent variable (ROA-bank's profitability) and independent variables (bank size, loan-to-assets ratio, inflation and interest rate).

2.1 Literature Review

Previous research on the determinants of bank profitability has focused on return on assets, return on equity and net interest margin. The majority of the previous studies on bank profitability, such as (Athanasoglou, Brissimis & Delis 2008; Short, 1979; Guru, Staunton & Blashanmugam, 2002; Mamatzakis & Remoundos, 2003; Hasan & Marton, 2003) have postulated that both bank specific and macroeconomic indicators have provided a meaningful analysis on bank profitability. The studies done by (Naceur, 2003; Mamatzakis & Remoundos, 2003; Williams, 2003; Kosmidou, Tanna & Pasiouras, 2005; Berger, 1995) are based on in-depth investigation of a single country. Numerous studies have been conducted with the use of panel data set which includes multiple time period and cross-countries approach by (Molyneux & Thornton, 1992; Mendes & Abreu, 2003; Goddard, Molyneux & Wilson, 2004a; Bashir, 2000).

Basically, financial intermediaries gain profits from lending activities through the differences between the interest paid to the depositors and interest received from the borrowers. The major portion of a bank's profit is generated from the fees charged on services offered to its customers while the major expense is the interest paid on its liabilities. However, under the pressure of globalization, financial crisis and competitive environment in banking sectors, bank's value and its performance have been affected. Hence, the determinants of bank profitability have been widely studied and undertaken.

Traditional measures of bank profitability are Return on Asset (ROA), Return on Equity (ROE) and Net Interest Margin (NIM). This study denotes ROA as independent variable. Previous studies on bank profitability divided the determinants into two categories, which are internal and external factors (Goddard et al., 2004a; Khrawish, 2011; Olweny & Shipho, 2011; Rasiah, 2010). While internal factors focus on bank-specific features, external factors consider both macroeconomic and industry characteristics. Rasiah (2010) focused on the commercial banks' profitability and examined the factors that affect it in Malaysia, noted that ROA is an indicator of managerial efficiency because it indicates how capable the management of the bank converts the institution's assets into net earnings.

Staikouras and Wood (2004), done a similar research on the profitability of European banks during the period from 1994 to 1998. The researchers denote ROA as bank profit by constructing OLS and Fixed Effect Model and the result suggested that the profitability of European banks are influenced not only by factors relating to management decisions but also the changes in external macroeconomic environments. Flamini, McDonald and Schumacher (2009) conducted a research to study the profitability determinants of 224 commercial banks in Sub-Saharan Africa from 42 countries, for the period 1990-2006 by using ROA as the dependent variable. While, Goddard, Molyneux and Wilson (2004b) use ROE as their dependent variable to investigate the determinants of profitability in six major European banking sectors, which are Denmark, France, Germany, Italy, Spain and the UK, for the period 1992 to 1998.

2.1.1 Bank Size

Bank size is one of the important determinants of bank profitability, as well as bank performance. Bank size is determined by the total asset of the bank in the year. This study ought to measure the bank size by using the natural log of total asset. Syafri (2012) studied commercial banks profitability that measured by ROA stated that a large bank could create economies of scale, which reduce the costs of gathering and processing information thus lower average cost and has positive impact on bank profit. Goddard et al. (2004b) and Camilleri (2005) stated that bank size, the total asset of the bank is significant and has a positive correlation with the overall profitability of the bank. A similar result supports by indicating the relationship between Indian bank's profitability and bank size is positive (Sufian & Akbar, 2012), and clarify that bank size has a significant impact on Indian's bank profitability. Hauner (2005) and Alper and Anbar (2011) relate the positive influence of bank profitability to market power which explained that large banks usually pay less for their inputs, tend to increase profit. Yilmaz (2013) analyze with the data from 195 commercial banks in period of 2005-2010 by using panel data, result found that bank size has positive and significant relationship on ROA, suggest that increase bank size tend to increase profitability.

However, there is contradicting between bank size and bank profitability. The increasing of bank size limits cost savings, especially when the market develops (Berger, Hanweck, & Humphrey, 1987). Staikouras and Wood (2004) discovered that the relationship between size and bank profitability is negative, suggesting that diseconomies of scale exist from an increasing bank firm. The marginal return and average profit declined as banks grow. Other studies of commercial bank profitability in Indonesia measured by ROA with panel data of the period 2002-2011 which conducted by Syafri (2012), the sign of coefficient is negative and the result found that bank size is not important determinant of bank profit.

2.1.2 Loan-to-asset Ratio

Most recently, Sufian (2009) reported that loans to asset ratio as a proxy of liquidity ratio to measure the profitability of bank and stated there is a direct relationship between LTA ratios and bank profitability. Higher ratio proves that a bank is loaned up and it has a low liquidity and the higher the probability of bank to be default. After all, the loan performances significantly rely upon on the strong economy, the probability of default is very low and the bank is profitable. However, when there is a weak economy, the bank could adversely be affected and become less profitable. This is because borrowers are more likely to default on their loans when economy is weak. In turn, Bashir and Hassan (2003) clarified that high loan to assets ratio and high leverages are more profitable. This study shows that bank profitability is significant and positively relates to macroeconomic variables and stock market development. Dietrich and Wanzenried (2009) studied the determinants of commercial banks profitability in Switzerland which result found that bank's loan volume growing faster bring positive impact on profit. Sufian (2011) analyzes the profitability of banks in Korea, the result showed that loan-to-asset ratio is positively related to the profitability of Korean banks, it may be supporting the efficient market hypothesis, since market power in the loan markets could be result of efficient operations. In addition, due to the ability of the banks to manage operations more productively, relatively efficient banks might have lower production costs, which enable them to offer more reasonable loan terms and at the end gain larger market shares as compared to others. To examine the profitability of 16 banks in Pakistan over the period of 2000 to 2010, Khan et al. (2011) used loan-to-asset ratio as one of the independent variables to estimate bank profitability whether the relationship between variables are significant. The result shows that there is positive relationship and significant impact between loan-to-asset ratio and bank profitability indicates that bank's capacity to earn more in the market enhances.

In the contrary, Alper and Anbar (2011) studied determinants of commercial bank profitability in Turkey, the relationship between loan-to-assets ratio and bank profit is negative which shows significant negative impact on profitability of banks. Atemnkenf and Joseph (2006) used ROA as indicator to measure bank profitability of commercial banks in Cameroon during year 1987 to 1999. The result shows a negative relationship between the loan-to-asset ratio and ROA. This argument was supported by Molyneux and Thornton (1992) who had also found a negative relationship between bank profitability and loan-to-assets ratio. The possible reason of these conflicting outcomes may be due to the disparity of loans demand and qualification of demanders.

2.1.3 Inflation Rate

One of the macroeconomic factors that affect the profitability of the bank is inflation. Inflation is the overall increase in price level of goods and services and it depreciates the value of currency. Kosmidou et al. (2005) points out that the effect of inflation on bank performance is positive if the rate of inflation is anticipated and stated that the relationship between inflation and bank performance depends on whether the inflation is anticipated or not. For the anticipated inflation, banks have the time to adjust interest rates, which consequently results in revenues that increase faster than costs, therefore anticipated inflation brought with a positive impact on profitability to the bank. For unanticipated inflation, banks may be slow in adjusting their interest rates resulting in bank cost overtaking bank revenue. Therefore, unanticipated inflation has a negative impact on bank profitability. The relationship between inflation and profitability are contradicting.

Gul, Irshad and Zaman (2011) stated that the macroeconomic factor such as inflation, it brought a significant impact to the profitability of the bank. In the research done in Macau, Vong and Chan (2006) discovered that the

inflation rate bring positive impact on the profitability of the bank. The researchers postulated that the banks in Macao tend to be more profitable in inflationary environments. Sufian and Akbar (2012) stated that inflation is significant and positively related to Indian banks profitability, the levels of inflation have been anticipated by banks operating in the Indian banking sector. Gul et al. (2011) had examined that inflation had brought positive impact to the profitability of the bank in Pakistan. Mendes and Abreu (2003) suggested inflation brings along higher costs and also income, thus bank revenue is greater than bank cost. However, the studies of Guru et al. (2002) in Malaysia stated that inflation and bank concentration are not statistically significant to determining profitability of bank.

2.1.4 Interest Rate

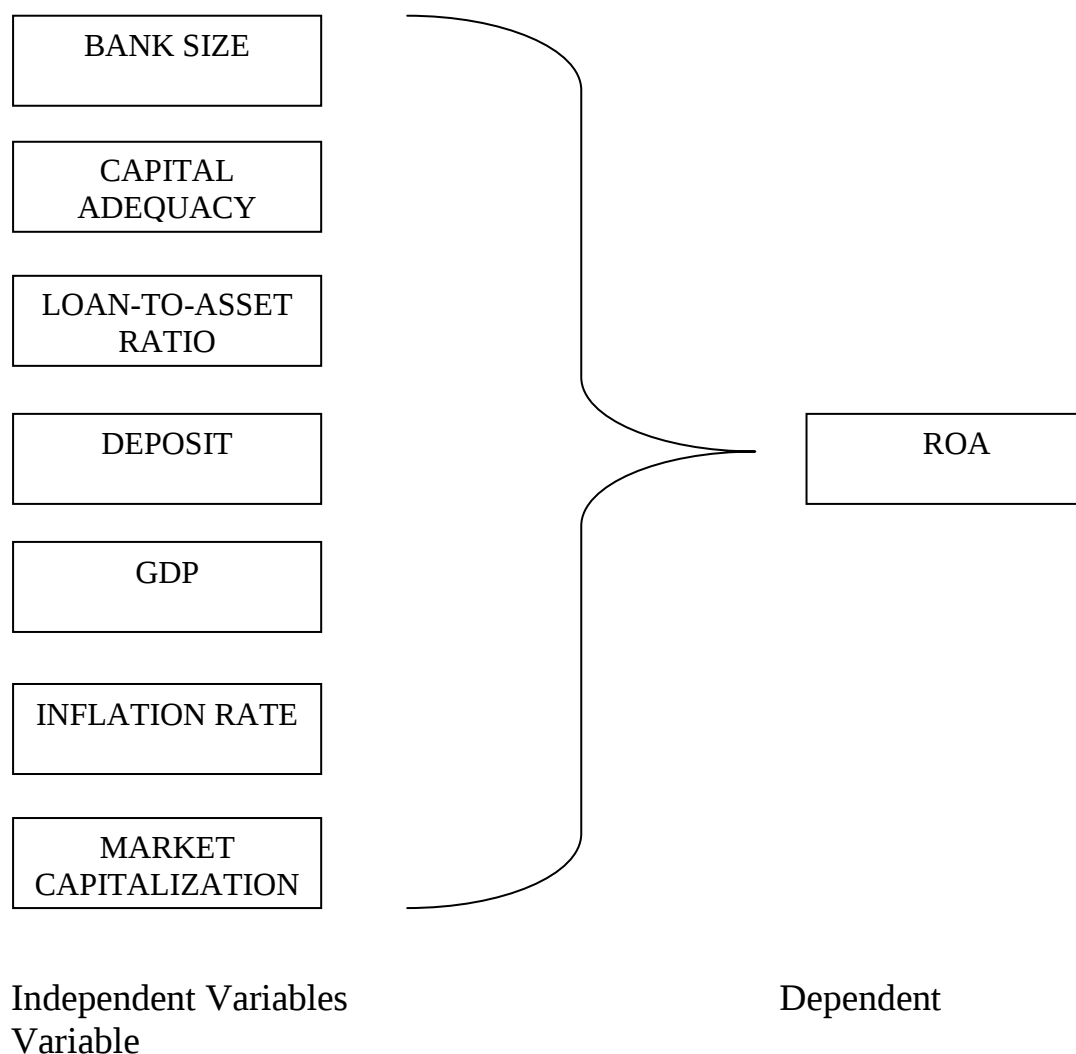
Much of the previous studies provide evidence to show that bank sector specifics as well as macroeconomic factors largely influence bank profitability. As showed in previous studies by Ismail and Sulaiman (2002), asserted that interest rate is one of the main determinants to measure banks profitability. According to Demirguc and Huizinga (1999), bank profitability will increase when interest rate increase simultaneously especially in developing countries. This may reflect the fact that demand deposits often pay zero or below market rates in developing countries. Samuelson (1945) noted the exits of significant positive effect of interest rates on bank profits which explained that the profitability of bank increases with increasing interest rate.

Maudos and Fernández (2004) explained that the volatility of interest rate indicate higher interest margins because banks will tend to transfer the higher risk to their client. Thus, in line with Molyneux and Thornton (1992) argument, interest rate level can be expected to have a significant positive relationship with bank profitability (ROA). In terms, the impact of bank profitability is influenced by different long term and short term implication

with any given changes in rates of the maturity. However, other studies by Gambacorta and Mistrulli (2004) argued that sharp changes in interest rates might be negatively impact on profitability of banks. They explained that this relation can be caused by the mismatch on combination of maturity and repricing frictions.

2.2 Review of Relevant Theoretical Model

Figure 2.1 Review of Relevant Theoretical Model



Adopted from: Gul, S., Irshad, F., & Zaman K. (2011). Factors affecting bank profitability in Pakistan. *Romanian Econ. Journal*, 14(39), 61-87.

There are few independent variables that will influence firm profitability such as bank size, capital adequacy ratio, deposits, GDP, inflation rate and market capitalization as suggested by Gul et al. (2011). They used pooled ordinary least square (OLS) to estimate the model above. The results show that this model has a significant impact to bank profitability.

2.2.1 Efficient Structure Theory

Efficient structure theory has become a new trend about structural effects on bank profitability. Banks can earn high profits because they are more efficient than others. Within the efficient structure theory, there is one approach called the scale-efficiency which emphasizes economies of scale (size) rather than in management or production technology. The key benefit is where through economies of scale, banks can obtain cost advantage. Hence, the consequence is that the banks can gain more market shares at lesser expense, which will increase concentration and then make profit.

Studies by Yu and Neus (2005) noted that under the scale-efficiency version of efficient structure theory, the banks which locate on more efficient scale are assumed to gain more market shares that may result in higher concentration and thus profitability. Olweny and Shipho (2011) stated that large bank size is expected to promote economies of scale and reduce the cost of gathering and processing information. They have the advantage of providing more financial services to their customers, and hence mobilize more funds.

However, there is contrast with few previous studies which found that scale economies is positively related to profit, and that smaller banks are more profitable than larger banks. Another study from Berger and Humprehy (1997) also found that large banks are more efficient on average but there is less evidence to show whether large banks significantly benefit from scale economies. Overall, bank size is

considered as one of the factors and it will be discussed how it impacts banks profitability.

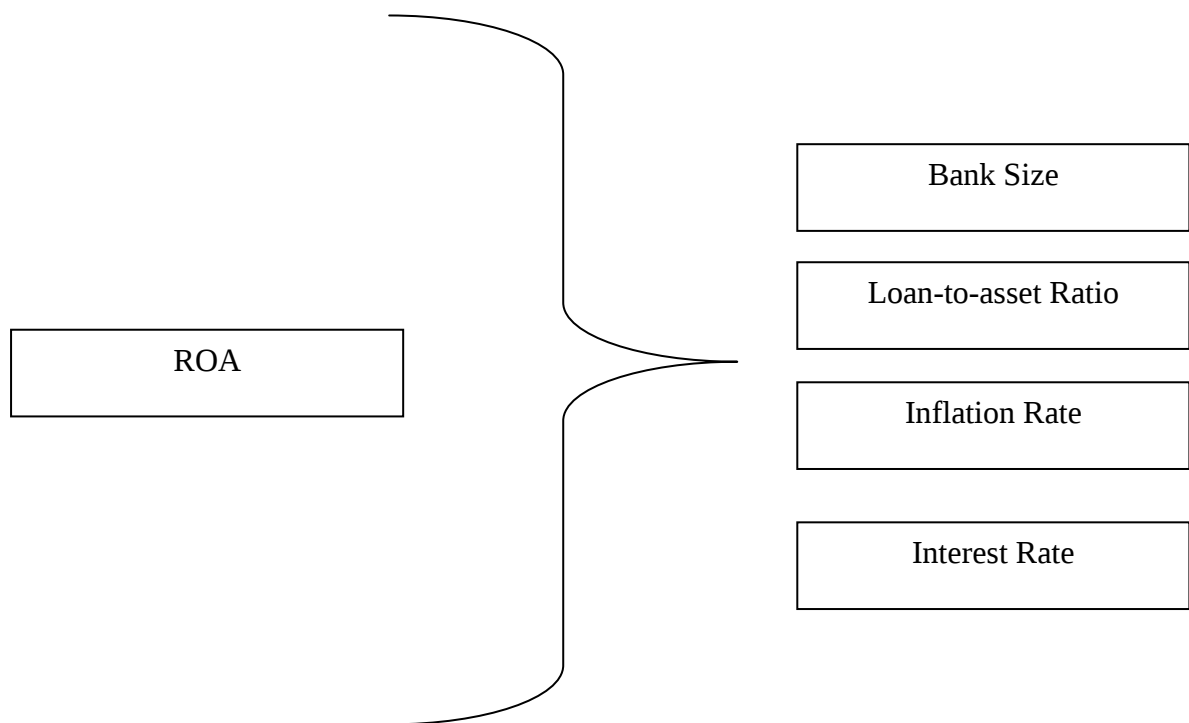
2.2.2 Efficient Wage Theory

One of the most significant determinants of bank's profitability is the expenses management. Efficiency in expense management will affect the bank's profitability. Efficient wage theory states that the productivity of employees increases with wages rate. The key point of efficient wage theory is that it may benefit firms to pay employees a wage higher than their marginal revenue product. Therefore, the consequence of paying employees with a higher wage is the increasing productivity of employees. In other words, if one pays more wages to employee, the employee will work harder and produce more output. This is due to the loyalty and devotion of employees to the firms. In short, the increase of salary and wage expenditures will result in higher profit earned by the banking institution (Guru et al., 2002). The basic efficiency wage hypothesis shows that productivities depend positively on wages.

Efficient wage theory states that the productivity of workers in firms depends positively on their wages. This finding is supported by the studies from Tunisia (Naceur, 2003). The efficient expenses management is one of the most important determinations of high bank profitability. The variation in total amount of wages and salaries will affect the bank's costs and profitability.

However, according to Vong and Chan (2006), the higher the expenses of the bank, the lesser will be the profitability. This is the negative relationship between profitability and expense. In addition, profitable banks are still able to operate under a lower cost. Expense control is the most important factor in achieving high profitability of the banks.

2.3 Proposed Theoretical / Conceptual Frameworks



Dependent Variables

Independent Variables

Naceur (2003) explained that ROA is a ratio that net income divided by total asset. ROA is used to measure the profit earned by bank and reflect how well bank management can generate profit by using real investment resources in bank. However, Staikouras and Wood (2004) stated that there is a negative relationship between bank size and bank profitability because larger size bank does not guarantee earning. A medium-sized and small-sized bank have a more positive relation to bank profitability as compared to larger bank because they can earn higher return compared to larger bank.

Bashir and Hassan (2003) clarified that higher loan-to-assets ratio and higher leverages are more profitable. This study shows that loan-to-assets ratio positively related to bank profitability.

Staikouras and Wood (2004) mentioned that inflation rate causes direct and indirect effect. For direct effect, inflation rate will cause an increase in the price of labour while indirect effect will cause changes in interest rates and asset prices on bank profitability.

Molyneux and Thornton (1992) stated that there is a positive relationship between interest rate and bank profitability. Increase in interest rate will cause higher bank profitability, by increasing the difference between the saving and the borrowing rates. Besides that, smaller banks will face difficulty maintaining profits when interest rates drop.

2.4 Hypothesis of study

2.4.1 Bank size influenced the ROA in Malaysia and Singapore

Kosmidou, Pasiouras and Tsaklanganos (2007) and Gul et al. (2011) stated that bank size, the total asset of the bank is positively related with the overall profitability of the bank.

H_0 : Bank size will not influence the ROA in Malaysia and Singapore

H_1 : Bank size influences the ROA in Malaysia and Singapore

2.4.2 Loan-to-asset ratio influenced the ROA in Malaysia and Singapore.

Bashir and Hassan (2003) clarified that high loan-to-assets ratio and high leverages are more profitable.

H_0 : Loan-to-asset ratio will not influence the ROA in Malaysia and Singapore.

H₁: Loan-to-asset ratio influence the ROA in Malaysia and Singapore.

2.4.3 Inflation rate influenced the ROA in Malaysia and Singapore

Sufian and Akbar (2012) stated that inflation is positively related to banks profitability has been anticipated by banks operating in the banking sector.

H₀: Inflation rate will not influence the ROA in Malaysia and Singapore.

H₁: Inflation rate influences the ROA in Malaysia and Singapore.

2.4.4 Interest rate influenced the ROA in Malaysia and Singapore

According to Demirguc and Huizinga (1999), bank profitability will increase when interest rate increase simultaneously especially in developing countries.

H₀: Interest rate will not influence the ROA in Malaysia and Singapore.

H₁: Interest rate influences the ROA in Malaysia and Singapore.

2.5 Conclusion

In conclusion, previous literatures provided a guideline for this study as the independent and dependent variables are explained well in their research. The empirical research can consider these independent and dependent variable according to previous studies. These results can be used to compare and contrast with the outcome of the research study to determine the profitability determinants of commercial banks in Malaysia and Singapore. Besides, this research purposely analyzes the effects of these determinants on the banks and is able to check the consistency of the result with the previous studies.

CHAPTER 3: METHODOLOGY

3.0 Introduction

Research methodology describes how the research is carried out in terms of research design, data collection methods, sampling design, operational definitions of constructs, measurement scales, techniques of data analysis and also econometric treatment.

This research is conducted to evaluate the independent variables which are bank size, loan-to-asset ratio, inflation and interest rate that pose significant effect on dependent variable which is bank profitability (ROA).

There are eight of Malaysia domestic commercial banks included in the study which is Maybank, Public Bank, CIMB Bank, RHB Bank, Hong Leong Bank, Affin Bank, Am Bank and Alliance Bank. And also, this study includes four of Singapore domestic commercial banks which are OCBC Bank, DBS Bank, Far Eastern Bank and UOB Bank. The study period chosen is from year 2006 to year 2011, a total of 6 years.

3.1 Research Design

This study is a quantitative research that is concerned with the collection and analysis of the data in numeric form. Quantitative research consists of studies in which the data concerned can be analyzed and its results are more readily interpreted. The research is conducted through exploratory methods that study the relationship with the external and internal factors with bank profitability between Malaysia and Singapore.

3.2 Data Collection Methods

Secondary data is used to extract the data in this research. The data can be categorized as two different types of features which are internal determinants and external determinants. Internal determinants consist of bank size and loan-to-asset ratio. While for external determinants, interest rate and inflation rate are included.

The information of internal determinants is extracted from the annual report of the Malaysia and Singapore commercial banks from year 2006 to 2011. The data are extracted mainly from their income statement and also balance sheet. On the other hand, the data relating to external determinants is taken from World Bank.

3.3 Sampling Design

3.3.1 Target Population

According to Malhotra and Peterson (2006), target population is the collection of elements or objects that possess the information the researcher is seeking. The target populations included in this study are domestic commercial banks in Malaysia and Singapore, to determine the relationship between bank size, loan-to-asset ratio, inflation rate and interest rate that affect the domestic commercial bank profitability.

3.3.2 Sampling Frame and Sampling Location

Malhotra and Peterson (2006) described sampling frame as the representation of elements of the target population which consist of a list or set of directions for identifying the target population. Sampling frame in this study included 8 domestic commercial banks in Malaysia and 4 domestic commercial banks in Singapore.

3.3.3 Sampling Elements

The respondents include 8 domestic commercial banks in Malaysia and 4 domestic commercial banks in Singapore that affect the bank profitability.

3.3.4 Sampling Techniques

According to Malhotra and Peterson (2006), sampling method can be divided into two parts which is probability sampling and non-probability sampling. In this study, Stata version 12.0 is used to conduct the bank profitability by ratio and run the regression analysis.

3.3.5 Sampling Size

A total of 8 domestic commercial banks in Malaysia (Maybank, Public Bank, CIMB Bank, RHB Bank, Hong Leong Bank, Affin Bank, Am Bank and Alliance Bank) and 4 domestic commercial banks in Singapore (OCBC Bank, DBS Bank, Far Eastern Bank and UOB Bank) are included in this study in order to examine the relationship between bank size, loan-to-asset ratio, inflation rate and interest rate that affect the domestic commercial banks profitability.

3.4 Research Instrument

In this research, Stata version 12.0 is used to measure the bank profitability in Malaysia and Singapore. The purpose of using Stata version 12.0 is to evaluate the accuracy of bank profitability by measuring whether individual independent variables towards dependent variables (bank profitability) are significant or not, multicollinearity and model specification problems happened or not.

In addition, this research also uses macroeconomic measurements such as inflation rate and interest rate in terms of percentage. Data of inflation rate and interest rate are taken from World Bank. Other independent variables such as bank size and loan-to-asset ratio are taken from annual report in domestic commercial banks of Malaysia and Singapore.

3.5 Construct Measurement

This research measures individual independent variables towards dependent variables (bank profitability) to identify which independent variables have significant impact on bank profitability. Multicollinearity measures how independent variables itself correlated with each other. If highly correlated, it means the model has difficulties telling which independent variables are influencing the dependent variables. Omission relevant variables, inclusion irrelevant variable and incorrect functional forms of dependent variable and independent variables will lead to model specification happening which means that the model is unable to explain or convey its purpose.

For testing the research hypothesis, the most suitable tool to be used in this research to determine the profitability of banks in Malaysia and Singapore is panel data. Panel data gives more informative data, more variability and more efficient. It can help to detect and measure effects that simply cannot be observed in pure cross-sectional or pure time series data. In addition, to study the relationship of internal factors such as bank size and loan-to-asset ratio as well as external factors such as inflation and interest rate on banks profitability, this research has used panel data regression models. In addition to cross sectional data, this research also takes time series into consideration, and acquired accounting data of 8 Malaysia domestic commercial banks and 4 Singapore domestic commercial banks in the time period of 2006 to 2011. Panel data analysis is a method of studying a particular subject within multiple sites, periodically observed over a defined time frame. With repeated observations of enough cross-sections, panel analysis permits the researcher to study the dynamics of change within a short time series.

3.6 Data Processing

Data processing is a series of operations on data, especially by computer, to retrieve, extract, transform or classify the information as well as restore the files. It is also a sequence of operations performed on data, either converting the data into information or converting information into data. Data processing represents the procedure of transforming any data from one format to another.

First at all, find and review relevant journals from Google Scholar, Science Direct, EBSCOhost and Scopus. After that, summarize and decide which data and methodology that are need in this study. In this research, secondary data has been collected as the main reference. The internal data are collected from annual reports of the domestic commercial banks in Malaysia and Singapore, while the secondary data has been compiled from financial reports relating domestic commercial banks of the two countries. The data are extracted mainly from balance sheet and income statement. The annual reports are downloaded from each domestic commercial bank's main website. This process has been approved by supervisors as the collection of primary sources is time consuming and this research must be done on time. The external data such as interest rate and inflation rate in Malaysia and Singapore can be collected from World Bank.

After collection of data, computation of the ratio is preceded, then subsequently with the process of labeling the data. The dependent variable remains as ROA which is bank profitability. The independents variables are labeled as following: bank size as SIZE, loan-to-asset ratio as LTA, inflation rate as INF and interest rate as INT.

The performance of a bank can be measured by numbers of indicators. Profitability is the most important indicator as it gives a broad insight of capability of bank to increase its earnings. For measuring the profitability of banks, the present study employs two methods, Ratio Analysis and Average Analysis. Once data has been computed, Stata version 12.0 is used to establish regression model to examine the linear relationship between the independent variables and their

effect on dependent variables. After all, this study will continue to explain all the results computed from Stata version 12.0 and also analyze the significance between variables.

3.7 Data Analysis

3.7.1 Scale of measurement

3.7.1.1 Normality Test

In order to get a best fit model, normality test has been done to test whether the error term is normally distributed. Jarque-Bera (JB) test of normality is conducted to test the normality assumption of error term of the estimated model.

The OLS estimators are still BLUE although the errors term are not normally distributed. The estimators are still unbiased and in minimum variance. Since the error term is not normally distributed, a few implications could be done to overcome this problem. One of the implications is to increase the sample size of the model. As the sample size increases, the normality assumption will be approximately valid, the error term would be normally distributed. A larger sample size could lead the estimated model to fulfill the normality assumption. According to data collected, the sample size is large enough therefore less possibility of encountering not normally distributed of error term.

Equation 3.1: Jarqua-Bera Test Formula

$$JB = n \left[\frac{s^2}{6} + \frac{(k-3)^2}{24} \right]$$

Where,

N= Number of year

S= Skewness

K= Kurtosis

3.7.1.2 Multicollinearity

Multicollinearity arises when some or all the explanatory variables are highly correlated with each others. If there is multicollinearity, the regression model has difficulty telling which independent variables are influencing the dependent variables. There is no standard test to test multicollinearity problem, the correlation between independent variables can be tested via regression analysis. The regression analysis is done for the highly correlated pair of independent variables to get the r-squared. Correlation measures the strength of relationship between two variables regardless whether the variables are independent or dependent. The range of correlation is between -1 to 1. Generally, the negative sign of the correlation means the slope of variables is downward sloping and it is a inverse relationship between the variables. However, positive sign of correlation reflects the slope of variables is upward sloping and both variables are moving toward same direction. Zero correlation mean there is no relationship between two variables.

Next, Variance Inflation Factor (VIF) is used to test the speed which variances and covariances increases. The VIF factor is used to check how serious the multicollinearity problem is. VIF shows how the variance of an estimator is influenced by the presence of multicollinearity. If VIF is undefined, it shows perfect multicollinearity. When VIF is greater than 10, there is a serious multicollinearity problem; less than 10 indicates no serious multicollinearity problem; equal to 1 is considered no multicollinearity.

Equation 3.2: VIF Formula

$$VIF = \frac{1}{1 - R_{x_1, x_2}^2}$$

Where,

R^2 = R-square of the model

3.7.1.3 Model Specification Test

To ensure the model does not suffer from model specification error, we perform the Ramsey RESET Test to test whether model specification is correct or incorrect. The model specification problems happen probably because of omission relevant variable, inclusion irrelevant variable, wrong functional form of dependent or independent variables, as well as wrong unit measurement. If the p-value is less than 0.1, reject null hypothesis, the model is incorrectly specified. If the p-value is greater than 0.1, do not reject null hypothesis since the model is correctly specified.

Equation 3.3: Ramsey RESET Test Formula

$$F = \frac{(R^2_{\text{UNRESTRICTED}} - R^2_{\text{RESTRICTED}})/(k_{\text{UNRESTRICTED}} - k_{\text{RESTRICTED}})}{(1 - R^2_{\text{UNRESTRICTED}})/(n - k_{\text{UNRESTRICTED}} - 1)}$$

Where,

$R^2_{\text{unrestricted}}$ = R-squared of the unrestricted model

$R^2_{\text{restricted}}$ = R-squared of the restricted model

$k_{\text{unrestricted}}$ = number of independent variables under unrestricted model

$k_{\text{restricted}}$ = number of independent variables under restricted model

n = number of observations

3.7.1.4 Hausman Test

Hausman test is used to decide whether Fixed Effects Model (FEM) or Random Effects Model (REM) is the best tool to be used. The purpose of

FEM is to examine the individual's characteristics for each observation in the sample based on intercept term regardless of time effect. On the other hand, the purpose of REM is to examine the individual characteristic for each observation in the sample based on random error terms. The different characteristics for different observations at certain time are captured by random error terms in REM. In the empirical analysis, the null hypothesis always states that REM is efficient and consistent, it shows that REM is more preferable than FEM. In addition, a selection of the appropriate model plays a vital role in ensuring the various statistics are correctly estimated.

Equation 3.4: Hausman Test Formula

$$H = (\hat{\beta}^{FE} - \hat{\beta}^{RE})[\text{Var}(\hat{\beta}^{FE}) - \text{Var}(\hat{\beta}^{RE})]^{-1}(\hat{\beta}^{FE} - \hat{\beta}^{RE})$$

Where,

$\hat{\beta}^{FE}$ = Coefficient of FEM

$\hat{\beta}^{RE}$ = Coefficient of REM

$\text{Var}\hat{\beta}^{FE}$ = Variance coefficient of FEM

$\text{Var}\hat{\beta}^{RE}$ = Variance coefficient of REM

3.7.2 Inferential Analysis

Ordinary least-squares (OLS) regression is a generalized linear modeling technique that may be used to model a single response variable which has been recorded on at least an interval scale.

Based on previous studies, Hasan and Marton (2003) used OLS regression analysis in determining the profit efficiency of the Hungarian bank. Another study conducted by Maudos and Fernandez (2004) using OLS regression in determining the factors explaining the interest margin of the

European Union. In this empirical study, Pooled OLS regression analysis is selected in order to examine the relationship between the bank profitability with its determinants in Malaysia and Singapore.

Equation 3.5: Pooled OLS Regression

$$Y_{it} = \beta_0 + \beta_1 \text{SIZE}_{it} + \beta_2 \text{LTA}_{it} + \beta_3 \text{INF}_{it} + \beta_4 \text{INT}_{it} + \varepsilon_{it}$$

Where,

Y	= the profitability of the banks (ROA); (dependent variables)
β_0	= the intercept of the model
$\beta_1, \beta_2, \beta_3, \beta_4$	= the partial regression coefficients
SIZE	= Bank Size
LTA	= Loan-to-Asset Ratio
INF	= Inflation
INT	= Interest Rate

3.8 Conclusion

In conclusion, the methodology of this research has been described in terms of research design, method of collecting data, sampling design, operational definitions of constructs, measurement scales, and methods of data analysis. This study is a quantitative research and is conducted through exploratory methods that study the relationship of the external and internal factors with bank profitability between Malaysia and Singapore. Secondary data is used to extract the data in this research by using Stata version 12.0 to run the regression analysis and perform the tests which are normality test, multicollinearity, model specification test and Hausman Test. To examine the relationship between the bank profitability with its determinants, pooled OLS regression analysis is selected. For the next section, this research will further explain in details regarding the tests, presenting the patterns and analyze the results by using the data that had been collected.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

Researchers provided an overview of the research methodology in previous chapters which included research design, data collection method, sampling design, research instrument, construct measurement, data processing and data analysis. To run the result of the output, researchers used Stata version 12.0. The purpose of chapter 4 is to determine and present the results of the model which are relevant to the research.

Data is collected from World Bank, annual reports from commercial banks in Malaysia and Singapore. Diagnostics test that researches used to run the model include multicollinearity test, Ramsey RESET test, normality test and Hausman test. Inferential analysis is used to examine the relationship between the independent variables and other variables and individual variables. The results of analysis were further explained in this chapter.

4.1 Descriptive Analysis

Table 4.1: Mean, Standard deviation and Variance in Malaysia and Singapore

	Mean	Standard Deviation	Variance
Malaysia	24.5	14	196
Singapore	12.5	7.071068	50

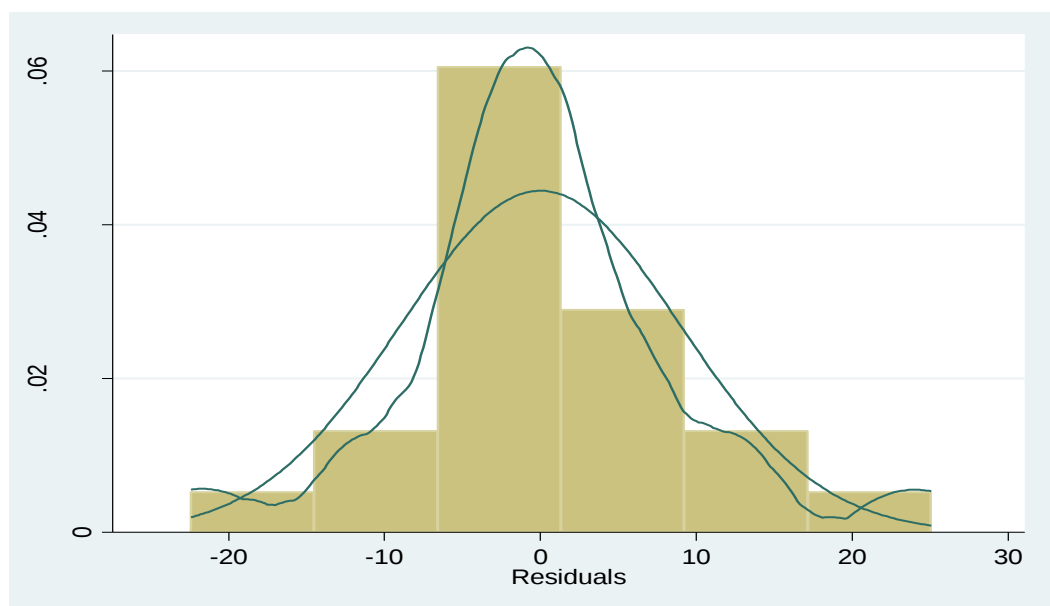
Table 4.1 shows that the mean for Malaysia is 24.5 and Singapore is 12.5. The standard deviation is 14 and 7.071068 for Malaysia and Singapore respectively. Variance in Malaysia is 196 while for Singapore is 50.

4.2 Scale Measurement

4.2.1 Normality Test

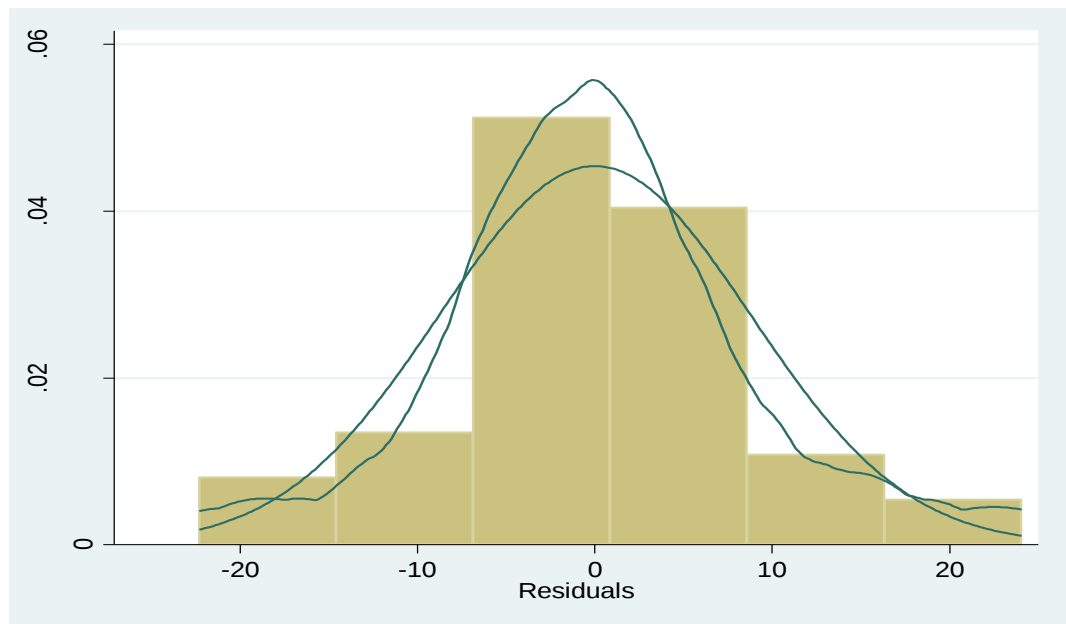
The normality assumptions are important to test whether the error term is normally and independently distributed, if the error is normal, researchers can assume that all the parameters are also normal.

Graph 4.1: Normality Test in Malaysia



Based on Graph 4.1, the skewness curve of Malaysia is at the centre with the density 0.06. Thus, researchers can conclude that the normality test for error term in Malaysia is normally distributed.

Graph 4.2: Normality Test in Singapore



Based on Graph 4.2, the skewness curve of Singapore is at the centre with the density 0.05. Thus, researchers can conclude that the normality test for error term in Singapore is normally distributed.

4.2.2 Multicollinearity

Multicollinearity problem arises when some or all of the explanatory variables are highly correlated with one another. The estimated model will have difficulties telling which explanatory variables are influencing the dependent variables when there multicollinearity problem is present. From Table 4.2 and 4.3, it shows the correlation, r , between independent variables in the estimated model. According to Gujarati (2009), it claims that $-1 < r < 1$, where values closer to these extremes indicate high correlation between independent variables

Table 4.2: Multicollinearity in Malaysia

	ROA	SIZE	LTA	INF	INT
ROA	1.0000				
SIZE	0.0107	1.0000			
LTA	0.2533	0.5778	1.0000		
INF	0.0317	0.0837	0.0969	1.0000	
INT	0.1154	0.0176	0.0854	0.1429	1.0000

Based on Table 4.2, the correlations between ROA with other independent variables (SIZE, LTA, INF and INT) are 0.0107, 0.2533, 0.0317 and 0.1154 respectively. The correlations between SIZE and other independent variables (LTA, INF and INT) are 0.5778, 0.0837 and 0.0176 accordingly. The correlations between LTA and other independent variables (INF and INT) are 0.0969 and 0.0854 severally. Lastly, the correlation between INF and INT is 0.1429.

Table 4.3: Multicollinearity in Singapore

	ROA	SIZE	LTA	INF	INT
ROA	1.0000				
SIZE	0.1661	1.0000			
LTA	0.7348	0.0461	1.0000		
INF	0.0493	0.0070	0.0282	1.0000	
INT	0.2150	0.0634	0.1198	-0.3143	1.0000

Based on Table 4.3, the correlations between ROA with other independent variables (SIZE, LTA, INF and INT) are 0.1661, 0.7348, 0.0493 and 0.2150 respectively. The correlations between SIZE and other independent variables (LTA, INF and INT) are 0.0461, 0.0070 and 0.0634 severally. The correlations between LTA and other independent variables (INF and INT) are 0.0282 and 0.1198 accordingly. Lastly, the correlation between INF and INT is -0.3143.

In conclusion, correlation between SIZE and LTA (0.5778) in Malaysia and correlation between ROA and LTA (0.7348) are considered medium high correlation between each other.

Table 4.4: VIF in Malaysia

Variable	VIF	1/VIF
SIZE	32.96	0.030344
_Ibank_7	9.00	0.111155
_Ibank_4	8.59	0.116379
_Ibank_6	6.64	0.150615
_Ibank_8	4.95	0.202190
_Ibank_5	3.28	0.304458
LTA	2.82	0.354295
_Ibank_2	2.78	0.359405
_Ibank_3	1.98	0.504156
INF	1.21	0.823528
INT	1.05	0.952670
Mean VIF	6.84	

Table 4.5: VIF in Singapore

Variable	VIF	1/VIF
_Ibank_4	4.13	0.241920
LTA	4.13	0.242112
_Ibank_2	1.79	0.559457
_Ibank_3	1.77	0.566246
BS	1.39	0.718629
INT	1.19	0.840817
INF	1.11	0.899567
Mean VIF	2.22	

Based on Table 4.4, the VIF of in Malaysia is 6.84 while VIF in Singapore is 2.22 based on Table 4.5. If VIF is less than 10, researchers can consider that there is no serious multicollinearity problem in this model. Table 4.4 and 4.5 show that the VIF between independent variables in Malaysia and Singapore are less than 10, which mean there is no serious multicollinearity problem.

4.2.3 Model Specification

Ramsey RESET test is performed to identify the model specification problem which includes omission relevant variable, inclusion irrelevant variable and incorrect functional form and unit measurement.

Table 4.6: Ramsey RESET Test

	P-value	Decision
Malaysia	0.1320	Do not reject
Singapore	0.1773	Do not reject

Decision: since p-value=0.1320 (Malaysia) and 0.1773 (Singapore) > 0.1, do not reject H_0 .

Conclusion: Researchers have enough evidence to conclude that the model is correctly specified.

From the results, researchers can conclude that the functional form of Model 1.1 and Model 1.2 are correctly specified.

4.2.4 Hausman Test

Hausman test is used to decide whether FEM or REM is to be used. Hausman test was also used to test whether the unique errors are correlated with regressors. The null hypothesis states that REM is more preferable.

Table 4.7: Hausman Test in Malaysia

	Coefficients			
	(b)	(B)	(b-B)	Sqrt {diag(V_B-V_B)}
	Fixed	Random	Difference	S.E
SIZE	1.387421	.0467599	1.340661	.5382553
LTA	.2526033	.3988322	-.146229	.0605336
INF	1.617073	.7925188	.8245542	.1823554
INT	-1.539946	-1.331945	-.2080006	.
chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
= 5.84				
Prob>chi2 = 0.2118				

Table 4.8: Hausman Test in Singapore

	Coefficients			
	(b)	(B)	(b-B)	Sqrt {diag(V_B-V_B)}
	Fixed	Random	Difference	S.E
SIZE	-.2744878	-.1080694	-.1664184	.0592948
LTA	.6569498	.7670328	-.110083	.2134703
INF	-.5204667	-.5453526	.0248858	.
INT	-1.283511	-1.387595	.1040835	.
chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
= 9.76				
Prob>chi2 = 0.0447				

Decision: since p-value= 0.2118 (Malaysia) > 0.10, do not reject H₀ while p-value= 0.0447 (Singapore) < 0.10, reject H₀.

Conclusion: Researchers have enough evidence to conclude that the REM efficient and consistent in Malaysia while REM is inefficient and inconsistent in Singapore.

4.3 Inferential Analysis

Model 4.1: Pooled OLS in Malaysia

$$Y_{it} = -1.3283 + 1.3874\text{SIZE}_{it} + 0.2526\text{LTA}_{it} + 1.6170\text{INF}_{it} - 1.540\text{INT}_{it}$$

Table 4.9: Pooled OLS in Malaysia

Dependent Variable= ROA		
	Coefficient	P-value
SIZE	1.387421	0.030
LTA	.2526033	0.099
INF	1.617073	0.076
INT	-1.539946	0.092
_Cons	-1.3283	
Prob > F	0.0002	
R-squared	0.5887	

There is a 58.87% of variation of ROA that can be explained by the variation of independent variables (SIZE, LTA, INF, INT) in Malaysia.

H_0 : Bank size will not influence the ROA in Malaysia

H_1 : Bank size influences the ROA in Malaysia

Since $p\text{-value} = 0.030 < 0.1$, reject H_0 and there is enough evidence to conclude that bank size influences ROA in Malaysia. The empirical findings provided support to the previous studies conducted by Goddard, Molyneux and Wilson (2004b) showed that bank size is positive correlation and statistically significant impact on the overall profitability of the bank.

Model 4.2: Pooled OLS in Singapore

$$Y_{it} = 1.4609 - 0.2745\text{SIZE}_{it} + 0.6569\text{LTA}_{it} - 0.5205\text{INF}_{it} - 1.284\text{INT}_{it}$$

Table 4.10: Pooled OLS in Singapore

Dependent Variable= ROA		
	Coefficient	P-value
SIZE	-.2744878	0.079
LTA	.6569498	0.019
INF	-.5204667	0.058
INT	-1.283511	0.033
_Cons	1.4609	
Prob > F	0.0007	
R-squared	0.7533	

There is 75.33% of variation of ROA can be explained by the variation of independent variables (SIZE, LTA, INF, INT) in Singapore.

H_0 : Bank size will not influence the ROA in Singapore

H_1 : Bank size influences the ROA in Singapore

Since p-value= 0.079 < 0.1, reject H_0 and providing enough evidence to conclude that the bank size influences ROA in Singapore. The findings support previous studies by Alper and Anbar (2011) which found that bank size has a significant impact on ROA.

Table 4.11: FEM in Malaysia

Dependent Variable= ROA		
	Coefficient	P-value
SIZE	1.387421	0.030
LTA	0.2526033	0.099
INF	1.617073	0.076
INT	-1.539946	0.092

H_0 : Loan-to-asset ratio will not influence the ROA in Malaysia

H_1 : Loan-to-asset ratio influence the ROA in Malaysia

Since $p\text{-value} = 0.099 < 0.1$, reject H_0 , we can conclude that there is enough evidence to show that the loan-to-asset ratio influences ROA in Malaysia which is consistent with previous studies by Khan et al. (2011) used loan-to-asset ratio as independent variables to estimate bank profitability and found that there is a significant and positive relationship between loan-to-asset ratio and ROA.

Table 4.12: FEM in Singapore

Dependent Variable= ROA		
	Coefficient	P-value
SIZE	-.2744878	0.079
LTA	.6569498	0.019
INF	-.5204667	0.058
INT	-1.283511	0.033

H_0 : Loan-to-asset ratio will not influence the ROA in Singapore.

H_1 : Loan-to-asset ratio influence the ROA in Singapore.

Since $p\text{-value} = 0.019 < 0.1$, reject H_0 , so there is enough evidence to conclude that the loan-to-asset ratio influences ROA in Singapore. The findings provide support to the similar results which are found by Sufian (2009), portraying a significant positive relation between loan-to-asset ratio and bank profitability as well as a significant influence between them.

Table 4.13: REM in Malaysia

Dependent Variable= ROA		
	Coefficient	P-value
SIZE	0.0467599	0.874
LTA	.3988322	0.018
INF	.7925188	0.398
INT	-1.331945	0.150

H_0 : Inflation rate will not influence the ROA in Malaysia

H_1 : Inflation rate influences the ROA in Malaysia

Since $p\text{-value} = 0.398 > 0.1$, and we do not reject H_0 , we can conclude that inflation rate will not influence ROA in Malaysia. It is consistent with the findings

by Sufian and Chong (2008), the empirical findings show that inflation does not significantly affect Malaysia bank's profitability.

Table 4.14: REM in Singapore

Dependent Variable= ROA		
	Coefficient	P-value
SIZE	-0.1080694	0.420
LTA	0.7670328	0.000
INF	-0.5453526	0.339
INT	-1.387595	0.016

H_0 : Inflation rate will not influenced the ROA in Singapore.

H_1 : Inflation rate influences the ROA in Singapore.

With p-value= 0.339 > 0.1, we do not reject H_0 and there is enough evidence to conclude that inflation rate will not influence ROA in Singapore. The findings support the study by Guru et al. (2002) stating that inflation is not statistically significant in determining profitability of bank

4.4 Conclusion

The results of descriptive analysis, scale measurement and inferential analysis have been discussed in this chapter. Independent variables such as bank size, loan-to-asset ratio, inflation rate and interest rate significantly influences the bank profitability that is ROA. Other diagnostic test such as multicollinearity, normality test and model specification error show that the model for Malaysia and Singapore are correctly specified.

Next chapter will discuss about the summary of descriptive analysis, inferential analysis, discussion of major finding, policy implication, limitation of study and recommendation of future research.

CHAPTER 5 DISCUSSION, CONCLUSION AND IMPLICATION

5.0 Introduction

This chapter consists of the overall conclusion of the entire research. The objective of the research has been achieved as the factors that determine the key profitability performance of Malaysia and Singapore commercial banks has been discovered. In addition, this chapter includes the interpretation of statistical analysis that was showed and discussed in chapter 4. It is also presents the discussion of the implication and major findings of the research. Finally, this research will suggest some recommendations for further study, based on the findings, limitations and conclusion.

5.1 Summary of Statistical Analyses

5.1.1 Descriptive Analyses

Through overall descriptive statistics, the result showed that domestic commercial banks in Malaysia has the highest mean (24.5) as compared in Singapore (12.5). Standard deviation for Malaysia is higher (14) as compared to Singapore (7.071068). Malaysia has the higher variance (196) while Singapore has the lowest variance (50).

5.1.2 Inferential Analyses

5.1.2.1 Pooled OLS in Malaysia and Singapore

In this analysis, R-squared for Singapore (75.33%) is higher as compared to Malaysia (58.87%). It shows that there is 0.5887 or 58.87% of variation of bank profitability (ROA) can be explained by the variation of bank size, loan-to-asset ratio, inflation and interest rate in Malaysia. For Singapore,

R-squared indicated that 0.7533 or 75.33% of variation of bank profitability (ROA) can be explained by variation of bank size, loan-to-asset ratio, inflation and interest rate in Singapore.

Besides that, this study examines each independent variable that affects domestic commercial banks profitability in Malaysia and Singapore. The result in Malaysia, p-value of bank size (0.030), loan-to-asset ratio (0.099), inflation (0.076) and interest rate (0.092) which are lower than 0.1 significance level, thus it shows that each of independent variables are valid predictors in explaining and influencing bank profitability (ROA) in Malaysia. While for the result in Singapore, it showed that p-value of bank size (0.079), loan-to-asset ratio (0.019), inflation (0.058) and interest rate (0.033) which are lower than 0.1 significance level, hence each independent variable are valid predictors to explain and influence the bank profitability (ROA) in Singapore. Accordingly, bank size, loan-to-assets ratio, inflation and interest rate are significantly and statistically affect bank profitability in both countries which is Malaysia and Singapore.

5.1.2.2 FEM in Malaysia and Singapore

In Malaysia, bank profitability is significantly affected and influenced by four independent variables which the result provided that p-value of bank size (0.030), loan-to-assets ratio (0.099), inflation (0.076) and interest rate (0.092) which are lower than 0.1 significance level. In Singapore, bank profitability is significantly affected by all independent variables which are bank size, loan-to-asset ratio, inflation and interest rate. The result provided that p-value of bank size (0.079), loan-to-asset ratio (0.019) and inflation (0.058) and interest rate (0.033) which lower than 0.1 significance level, shows that they are significantly in explaining bank profitability in Singapore by using FEM.

5.1.2.3 REM in Malaysia and Singapore

In this analysis, REM is using and the result showed that in Malaysia, p-value of bank size (0.874), inflation (0.398) and interest rate (0.150) which are greater than 0.1 significance level provided that bank size, inflation and interest rate are not significantly in explaining bank profitability. While p-value of loan-to-asset ratio (0.018) which lower than 0.1 significance level, the result show that it is significant effect on bank profitability by using REM. However, the result provided in Singapore that the p-value of bank size (0.420) and inflation (0.339) are greater than 0.1 significance level. Thus, it is found that bank size and inflation are not significantly affecting and influencing bank profitability in Singapore by using REM.

5.2 Discussions of Major Findings

There are four hypotheses testing to analyze the relationship between bank profitability (ROA) and its independent variables which are bank size (SIZE), loan-to-asset ratio (LTA), inflation (INF) as well as interest rate (INT).

H₁: There is positive relationship between bank size and bank profitability in Malaysia but negative relationship in Singapore.

The relationship between bank size and bank profitability of domestic commercial banks in Malaysia is positive. Large size of bank might result in economies of scale that can reduce the costs of gathering and processing information thus it is positive impact on bank profitability (Hauner, 2005). It is same findings with the research by Goddard et al. (2004a) and Camilleri (2005) stated that bank size, the total asset of the bank is significant and positive correlation with the overall profitability of the bank. Alper and Anbar (2011) relate the positive influence of bank profitability to market power which explained that large banks usually pay less for their inputs, tend to increase profit. A study done by Davydenko (2010)

shows that relation between size of bank and profitability of bank is positive. Economies of scale and then is suggested, higher profit can be generated. Besides, Davydenko (2010) also noted that it is a closely relation of bank size to the bank's reputation and perceived reliability under an economy of instability.

However, there is negative relationship between bank size and bank profitability in Singapore domestic commercial banks. It is consistent with research by Berger et al. (1987), noted that the increasing of bank size will limit the cost savings, especially when market develops. Staikouras and Wood (2004) discovered that the relationship between size and bank profitability is negative, suggesting that diseconomies of scale exist from an increasing bank firm. The marginal return and average profit declined as banks grow. Similar studies on the determinants of banks' profitability (ROA) based on panel data by Vong and Chan (2006) found that there is a negative sign on bank size provided that smaller bank will generally achieve higher bank profitability while larger banks may get to achieve lower bank profitability. The researcher subsequent cited that it is competitive and efficient in interbank market since large retail deposit taking network do not always enjoy a cost advantage against other banks. Thus, efficiency is playing more important rather than size in affecting bank profitability. Another study done by Aburime (2008) and the result showed that bank size is not significantly determined bank profitability which suggests that smaller banks enjoyed more economies of scale as compared to larger banks. But in the fact that there is a negative coefficient to be said that bank size is negative relation to and adversely affects bank profitability. Bank size is inverse relationship to bank profitability may be due to the poorly and inefficient in managing assets which supported by the research of the effects of internal and external determinants on commercial banks profitability over the period of 2000 to 2011 (Amare, 2012).

H₂ : There is positive relationship between loan-to-assets ratio and bank profitability in Malaysia and Singapore.

According to the statistical results, the loan-to-assets ratio shows a positive relationship with the bank profitability. It is consistent with previous research, Sufian (2009) reported that loans to asset ratio as a proxy of liquidity ratio to measure the profitability of bank, whereby the results shows the loan-to-assets

ratio have positive impact to the bank profitability. On the study conducted by Dietrich and Wanzenried (2009), the result showed that there is significant positive relation between bank profitability and loan-to-assets ratio. Masood and Ashraf (2012) had done a research on Islamic bank in various countries, the empirical results also shows a positive and significant relationship between loan to assets ratio and bank profitability.

Based on previous studies, Bashir and Hassan (2003) and Khan et al. (2011) clarified that high loan to assets ratio are more profitable, and shows that the larger loan-to-assets ratio leads to higher profit margin of the bank. Therefore, the results clearly revealed the positive relationship between the bank profitability and loan-to-assets ratio. Olson and Zoubi (2011) discovered that the loan to assets ratio have positively affected the bank profitability in Middle East and North Africa (MENA) countries. There are similar findings which done by Sufian (2011) analyzes the profitability of banks, the result showed that loan-to-asset ratio is positively related to the ROA.

H₃ : There is positive relationship between inflation and bank profitability in Malaysia but negative relationship in Singapore.

The relationship between inflation and bank profitability of domestic commercial banks in Malaysia is positive. Kosmidou et al. (2005) points out that the effect of inflation on bank performance is positive if the rate of inflation is anticipated. Banks have the time to adjust interest rates, which consequently results in revenues that increase faster than costs, therefore anticipated inflation brings positive impact on profitability to the banks. According to Davydenko (2010), a research on determinants of bank profitability during the study period of 2005-2009 which result found out that inflation is positively related to bank profitability, and said that the management of the banks may anticipated or predicted the level of inflation. Correctly predicting inflation provides the banks an opportunity and time to adjust the interest rate accordingly and get higher return or profits in consequence. It is also consistent with previous research by Flamini et al. (2009) found that inflation has positive effect on bank profitability in the study of commercial banks profitability in Africa, provided that in which the banks predict

the changes of inflation in future correctly and promptly to adjust interest rate and margins. Rao and Lakew (2012) also suggested that an anticipated inflation enables bank managers to adjust the interest rate timely, in return banks able to increase revenues which is greater than costs.

It is negative relationship between inflation and bank profitability in Singapore domestic commercial banks. The studies by Guru et al. (2002), result showed that inflation and bank concentration are not positive and statistically significant to determine profitability of banks. Relationship between inflation and banks profitability can depend on whether the inflation is anticipated or unanticipated. For unanticipated inflation, banks may be cant promptly in adjusting their interest rates and subsequently result in a faster increase of bank costs than banks revenues. Therefore, unanticipated inflation has a negative impact on bank profitability (Kosmidou et al., 2005).

H₄ : There is negative relationship between interest rate and bank profitability in Malaysia and Singapore.

The relationship between interest rate and bank profitability in both Malaysia and Singapore is negative which had similar results with some of the previous research. In the previous studies, Gambacorta and Mistrulli (2004) argued that sharp increase in interest rates have negatively impact on profitability of banks where this negative relationship can be caused by the mismatch on combination of maturity and repricing frictions and discovered that the market interest rates have a negative significant impact on the bank profitability.

Kanas, Vasiliou and Eriotis (2012) states that decrease in the short-term interest rate brought a significant effect upon bank profitability and findings had discovered the negative relationship between bank profitability and the short term interest rate. Bolt et al. (2012) has found that the long-term interest rate is important determinants of bank profit in order to get high economic growth. Based on their major findings, there are negative relationship between the long term interest rate and bank profitability whereas the short term interest rate does not bring significant effect to the bank profitability.

5.3 Implication of Study

This research provides commercial bank managers with understanding of determinants that would enhance their banks profitability. The empirical findings from this study imply that all the determinants variables have statistically significant impact on commercial banks profitability. It might be significant for the bank management to take all the required decisions to strengthen the financial positions of commercial banks.

Knowledge of the underlying factors that influence bank's profitability is essential, not only for the senior managers of the banks but also for numerous stakeholders for instance the central banks, bankers associations and researcher. The need to enhance the profitability of commercial banking is vital as it will consequently boost country economy. Based on the results getting in this study, the finalize results obtained can be a part of benchmark for both Malaysia and Singapore bank. Through the benchmark, interbank relationships may occur. For instance, the bank of Malaysia can get loan from the bank of Singapore since they know and understand the financial situation and background of each other very well.

Bank size, loan-to-asset, inflation, interest rate are significant variable in determining the profitability in commercial banks. Banks can raise their total asset by increasing the loan to customers or investors. Therefore, the implication of significant relationship in this study acts as a benchmark for the investors to get their loans. Investors can evaluate banks performance easily and make investment decision wisely. In short, this research has met the objectives of analyzing and comparing the determinants of commercial banks' profitability in Malaysia and Singapore.

5.4 Limitation of the study

There are several limitations were encountered in this study. First of all, the major limitation confronted in this study the difficulties to get the benchmark of the bank's profitability. This is because the study only focuses on the commercial

banks that operated in Malaysia and Singapore. There is insufficient number of banks that is related to the determinants of profitability in Malaysia and Singapore commercial banks. Hence, this has restricted the literature review of this study.

Secondly, the study is facing the obstacles while doing the analysis is to collect an adequate data and relevant materials. This may due to the research only investigate the bank's profitability in Malaysia and Singapore. Therefore, this had become one of the limitations while conducting the research. Thirdly, the study used only four independent variables in measures of banks profitability which are bank size, loans to asset, interest rates and inflation. The coverage of the study is insufficient and becomes a limitation in this research study.

Lastly, the findings of this study were obtained from the sample data that only covered six financial years. So, this model may encounter in econometric problems for instance multicollinearity, autocorrelation and heteroscedasticity problems. Moreover, Bank Negara Malaysia, Bursa Malaysia or Monetary Authority of Singapore does not have complete data for a longer period of time such as fifteen years. Some commercial banks only have 4-6 years financial statement. Thereupon, this study remains less convincing unless that the data covered longer than a six year period. Even though the limitations are acknowledge but it is not eliminate from the significant of findings for the purpose of further research.

5.5 Recommendation for Future Research

This study is basically focused on a comparison of the profitability performance between commercial banks of Malaysia and Singapore. Future research should expand their study by analyzing the subsidiaries of foreign banks or Islamic banks rather than just examined the performance of profitability in commercial banks. To this extent, a comparative analysis of profitability performance of commercial banks and Islamic banks could be carried out.

Besides that, future research is also recommended to increase the coverage of study in terms of countries. The future study is recommended to enlarge their research countries to other neighbor countries, such as Indonesia, Thailand and China. This will allow an interesting comparison of profitability performance amongst banks in different countries.

Furthermore, this study has examined the relationship between dependent variable (return on asset) and independent variables (bank size, loan-to-asset, inflation, interest rate). Therefore, future research is recommended to carry out the test on other independent variables, such as expense management, credit risk, capital adequacy ratio and GDP. Future researchers should also study on the determinants that were not studied by any researchers before. Hence, future researchers are recommended to add more variables in their future research so that a valuable research can be produced.

Other than that, the period of six years used in this study is a very small sample. Therefore, a comprehensive data set should be used. A longer period is recommended for the analysis to increase the degree of freedom and obtain a more symmetrical distribution of data. Future researchers can collect more data and have bigger sample size for analysis. Hence, more conclusive findings can be drawn to explain the comparative profitability performance of the commercial banks in these two countries. This will also lead to higher accuracy of results.

5.6 Conclusion

In a nutshell, the study shows that all variables tested-bank size, loans-to-asset, inflation and interest rate are significant. Each variable significantly affected relative banks profitability. Besides, there are some limitations that could affect the result in this research which are included the limitation of journal, data collection and so on. Lastly, this study have provided some recommendation to future research which are included increase the sample size and test on other independent variables.

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