DETERMINANTS OF LOCAL COMMERCIAL BANK'S PROFITABILITY: EVIDENCE FROM MALAYSIA

BY

CHEN MEI KEI
ELAINE WONG EE TENG
LEE SAU YIN
TAN HUI SHI

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DECLARATION

We hereby declare that:

1) This undergraduate research project is the end result of our work and that due acknowledgement has been given in the reference 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 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 for this research report is 12,776 words.

Name of Student:	Student ID:	Signature
1. Chen Mei Kei	09ABB04857	_____
2. Elaine Wong Ee Teng	09ABB02993	_____
3. Lee Sau Yin	09ABB04661	_____
4. Tan Hui Shi	09ABB03098	_____

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DEDICATION

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LIST OF ABBREVIATIONS

ROA   Return on Assets

NPA   Non Performing Assets

NPL   Non Performing Loans

ROE   Return on Equity

NIM   Net Interest Margin

CIT   Corporate Income Tax

VAT   Value Added Tax

ROAA   Return on Average Assets

SAFTA   South Asian Free Trade Agreements

CPI   Consumer Price Index

GLS   Generalized Least Square

FEM   Fixed Effect Model

REM   Random Effects Model

OLS   Ordinary Least Square

GMM   Generalized Method of Moments

GDP   Gross Domestic Productions

POLS   Pooled Ordinary Least Square

PROFIT   Bank's Profitability

CRE   Credit Risk

LIQ   Liquidity Risk

TAX   Tax Rate

INF   Inflation rate

INT   Interest Rate

BAFIA   Banking and Financial Institution Acts

BNM   Bank Negara Malaysia

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PREFACE

This research project has been conducted in accordance to the need of accomplish the research methodology and project subject by our university within the final year of Bachelor of Business Administration (HONS) Banking and Finance.

This research paper is carried out under the title of "Determinants of Local Commercial Bank's Profitability: Evidence from Malaysia" which is needed to accomplished within the time span of 28 weeks.

Commercial bank's profit is derived from their main business which is taking the short term deposits and transforming them into long term loans. Therefore, it is essential to outline the profitability determinants. Local commercial banks have rooted in Malaysia for many years. However, there is still limited number of research that study on the factors that affect bank's profitability. Hence, this research is significant to carry out in order to examine the relationship between the bank's profit and the profitability determinants.

It is hope that this research paper will contribute to the increase of awareness of local commercial banks' management on how the bank's profitability is affected by the profitability determinants and provide a better decision making by taking consideration of all risks.

ABSTRACT

This research paper is carried out to examine the determinants of bank profitability (ROA). The five determinants are credit risk, liquidity risk, tax rate, inflation rate and interest rate risk. Five local commercial banks have been chosen to represent the commercial banks in Malaysia. The duration for this study is from 2001-2010 and is collected based on annual basis. Pooled OLS and sensitivity analysis are carried out to run the data. In the findings, all the independent variables shown that they are statistically significant to the ROA. All the exogenous variables are consistent with our expected outcome except the tax rate.

Key words: Determinants of Bank's Profit, Local Commercial Banks, Malaysia.

CHAPTER 1: RESEARCH OVERVIEW

1.0   Introduction

Historically, the main functions of commercial bank are accepting demand deposits and making commercial loans. Nowadays, commercial bank has grown stronger and strives to offer a wide range of products and services such as checking accounts, savings accounts and safe deposit boxes. The five Malaysia's local commercial banks with largest asset size and market capitalization in year 2010 are CIMB Bank, MayBank, Public Bank, RHB Bank and Hong Leong Bank. Banks need to know the types and levels of risk that they are exposing to and try to minimize the uncertainty. Knowledge on risk is important as it enable the bank officers to decide whether it is worth to loan out the funds. Inappropriate level of risk taking by the banks will lead to bankruptcy. Therefore, a proper evaluation on the risks which faced by the banks is needed. This chapter introduces the risk, types of risk faced by the banks and other factors that will have impact on bank's profitability. Problem statement, objectives, research questions, significance of the study and chapter layout will be included in this chapter as well.

1.1   Research Background

Risk is the chance that actual return from the investment may be different from what it is expected. In other words, risk is the possibility of getting losses. Risk is composes of two components which are uncertainty and exposure. Standard deviation is used to measure the dispersion of returns around the expected return of the assets. Higher value of standard deviation indicates higher risk.

Each transaction that the bank made will change the risk profile of the bank. Banks faced many kinds of financial and non-financial risk such as credit risk, interest rate risk, foreign exchange risk, legal risk, reputational risk and operational risk when they act as the financial intermediary. These risks are highly interdependent, for instance, it will reduce the bank's reputation when the bank is exposed to high credit risk since consumers will reduce their confident levels towards the bank. In addition, regulation, economic growth, tax rate and inflation rate are the non-risk factors that affect bank's profitability. However we only focus on the credit risk, interest rate risk, liquidity risk, inflation rate and tax rate. According to Raghavan (2008), the operational environment was not favorable to risk taking due to all the activities of the banks were regulated. Therefore we need to understand the risks faced by bank and ensure that the risks are well managed. That is why risk management becomes crucial for a bank.

Credit risk is one of the largest risks that the bank will face. Credit risk is the potential variation in the net income and market value of the equity resulting from loans and securities default. It is associated with the assets quality and the chances of default. Credit risk can be measured quantitatively or non-quantitatively. In the credit scoring model, the loan officer will assign points according to the characteristic of the prospective borrower. Whereas for the judgmental procedures, the loan officer will interpret the information based on bank's lending guidelines. The loan officer will collect the information about the borrower's character, capacity and collateral in both of the methods.

Liquidity risk is the risk that the bank could not convert into cash at a reasonable cost. Cash and due from banks in excess of requirements, federal funds sold and reverse repurchase agreements are the assets that provide bank liquidity. When the bank is lack of liquidity, it may have to borrow at a higher cost. This will reduce the earnings of the bank and thus influence the profit of the bank.

Interest rate risk is fall under market risk. It is the potential loss from the changes in the interest rates movement. It will vary the bank profit and market value of equity. Asset and Liability Management Committee is responsible in interest rate risk

management by coordinating the bank's strategies to achieve the optimal trade-off between risk and return. This risk arises due to repricing risk, basis risk, yield curve risk and option risk. Samuelson (1945) claimed that the increase in interest rates will benefit the banking system rather than hindered by it.

The inflation rate in Malaysia is 2.0% in December 2010. Inflation is the rapid increase in the price of goods and services. Pat (2012) found that inflation will slow down the economy due to prices of goods and services increase while the individual's incomes remain constant. It will cause inflation when the market is too liquid as money supply more than money demand. Besides, high national debt in the country will lead to inflation as well. It is due to government will try to increase taxes or print more money. This can be seen when the government increase taxes, corporate will tend to increase their price of goods in order to offset the increased in tax. On the other hand, printing more money will increase the money supply which in turns increases the inflation rate.

Apart from the factors above, banks are also subjected to direct taxation through corporate tax and other taxes. As stated by Caminal (2004), bank taxation is a significant source of tax revenue in many countries. Tax rate does impact the profitability of the banks. Banks can transfer the tax to the third party which is the consumers in order to reduce the tax rate. It can be done as the demand for banking services is inelastic to the consumers.

1.2 Problem Statement

Risky business such as lending and investment is the primary business for the banks (Yap, Ong, Chan, and Ang, 2010). This means banks are exposed to uncertainties and risk. Sydney and Ng (2007) revealed that there is a positive tradeoff between risk and return, meaning that high risk, high return. Therefore, analyzing the determinants of bank profitability becomes a vital issue for a bank. In order to manage those determinants of bank profitability effectively, banks should know and understand

well the impact of the determinants on bank profitability. In addition, banks with strong and sound banking system will be able to improve the financial stability and capture the negative economic shocks (Fauziah, Zarinah, Ahamed and Mohd, 2009). This topic poses the challenges and be able to attract the interest of researchers and bank management for further exploration.

Credit or default risk is the major concern for the bank where low quality of asset will cause bank failures which can influence the whole economy badly. However, in the study of Kithinji (2010), the researcher stated that there is no relationship between credit risk and bank profitability. Besides, banks with low level of liquidity are not able to obtain sufficient funds which will trigger the bank performance. Therefore, liquidity risk is also one of the financial risks that bring much influence to the bank profitability. Fauziah et al. (2009) as well as Said and Tumin (2011) found that liquidity variable does not have any influence on the bank profitability. Therefore, in this particular study, the inconsistency findings of these two variables with the past studies will be investigated. In addition, interest rate, inflation, and tax variables will be studied in this research as well.

This paper seeks to examine the potential determinants of bank profitability and explain the relations between the determinants and bank profit. The analysis is based on a sample of the top five largest local commercial banks in Malaysia during the period 1990 to 2010. This research follows an extensive literature that linear function will be used in order to design the empirical model.

1.3   Research Objectives

Once this study is completed, the research objectives will be achieved and will have a more in-depth knowledge on the purposes of this research. This is to meet the motives of the researchers.

1.3.1 General Objective

Every local commercial bank in Malaysia is facing some factors affecting its profitability. Therefore, this research is conducted to determine the five potential determinants of bank profitability such as credit risk, liquidity risk, interest rate, inflation rate and tax rate. This research examines also the effect of the five determinants on the profitability of banks.

1.3.2 Specific Objectives

Since there are eight local commercial banks in Malaysia, this research has narrowed down the scope to only focus on the five largest local commercial banks in term of their asset size. Thus, the specific objectives of our research are:

- To examine the relationship between credit risk and profitability of the banks.
- To examine the relationship between liquidity risk and profitability of the banks.
- To examine the relationship between tax rate and the profitability of the banks.
- To examine the relationship between inflation rate and the profitability of the banks.
- To examine the relationship between interest rate risk and profitability of the banks.

1.4   Research Questions

- Does the credit risk significantly affect the bank profitability?
- Does the liquidity risk significantly affect the bank profitability?
- Does the tax rate significantly affect the bank profitability?
- Does the inflation rate significantly affect the bank profitability?
- Does the interest rate risk significantly affect the bank profitability?

1.5   Hypothesis of the Study

1.5.1   Credit Risk

H_0: There is no relationship between credit risk and bank's profitability.

H_1: There is a relationship between credit risk and bank's profitability.

1.5.2   Liquidity Risk

H_0: There is no relationship between liquidity risk and bank's profitability.

H_1: There is a relationship between liquidity risk and bank's profitability.

1.5.3   Tax Rate

H_0: There is no relationship between tax rate and bank's profitability.

H_1: There is a relationship between tax rate and bank's profitability.

1.5.4 Inflation Rate

H_0: There is no relationship between inflation rate and bank's profitability.

H_1: There is a relationship between inflation rate and bank's profitability.

1.5.5 Interest Rate Risk

H_0: There is no relationship between interest rate and bank's profitability.

H_1: There is a relationship between interest rate and bank's profitability.

1.6 Significance of the Study

The concept of risk in banking industry is defined as the uncertainty faced by the commercial bank during its operation period or in other word the probability of facing losses. This study helps the banks to examine the five potential determinants of bank profitability in Malaysia. These determinants include credit risk, liquidity risk, interest rate, inflation rate and tax rate.

Generally, banks prevent the risks during their daily transaction because they worry the risks will affect their profitability. Hence, the current study is targeted at the relationship between risks with the profitability of bank. Throughout the study, it will provide the management of bank on how the bank's profitability is affected by the risks.

Besides, this study is important for the banks since it can help to create awareness of hazards and risks in order to reduce risk and also provide a better decision making in regards to all the risks faced. Consequently, bank can ensure their profitability will not be affected by the risks.

On the other hand, this study also benefit to the customers of the banks. Through this study, customers can determine the rate of default faced by the banks. This is due to the customers can have a view on the level of risks facing by the bank. If the level is high, it indicates that the particular bank has higher probability to default compared to the bank with lower rate of risks.

Moreover, this study also beneficiary to students, the educators and the future researchers who wish to know further about the relationship between the risks and the profitability of bank in Malaysia. It gives them a clearer idea about the sequence and procedures of how to carry out the research and also provides them a sufficient way in order to lead them to discover or bring out something that is still an unknown. Hence, the used of this paper as reference, hopefully can encourage more people to discover more about our country's commercial banks.

1.7   Chapter Layout

The followings are the five main chapters in this research project:

Chapter 1- Research Overview
In this chapter, the research is to deal with the overall concept of the research project which included introduction, problem statement, research background, research questions, objective and significance of the research studies.

Chapter 2- Literature Review
In this section, it involves all the literature review of the journals selected, which related to the theoretical analysis. It contains the purpose, method conducting research, findings, summary and limitations of the past researchers who conducted similar topic as this working paper.

Chapter 3- Methodology

This chapter mainly about the method use to conduct this research which in terms of research design, data collection, data processing and data analysis.

Chapter 4- Data Analysis

This chapter can be considered the climax part of this research project. It is about dealing with the interpretation and analysis of the data by using financial and statistical tools.

Chapter 5- Discussion, Conclusion and Implications

Last but not least, this chapter is the preparation for the summary and discussion on the major findings, and also the limitations and suggestions for future studies.

1.8 Conclusion

Referring to the previous empirical results done by other researchers, there is still limited number of research that discuss on the factors that affect bank profitability. This indicates that there are still a number of the researchers providing different result with different perspectives and views. Therefore, it is crucial to examine on the determinants of bank profitability in Malaysia. Moreover, it is also important to understand the specific factor that contributes the largest effect to the local commercial banks. The following chapter will further investigate the previous empirical results to identify determinants of bank profitability with the aim to provide better insight and ensure all relevant variables are included in this research.

CHAPTER 2: LITERATURE REVIEW

2.0   Introduction

This chapter is to review the previous researches that related to this research which is the determinants of bank's profitability. According to what have been discussed in the earlier chapter, there are a number of variables will affect the changes in bank's profit. Those variables encompassed both the internal and external factors. The internal factors included credit risk and liquidity risk; whereas the external factors included interest rate risk, tax rate and inflation rate risk. Thus, the related journals have been reviewed in this chapter in order to provide a clearer picture on the determinants of bank's profitability. Based on the previous researches, most of the researches only focused on western countries such as Europe. Therefore, a theoretical framework is formulated in this research paper to examine the determinants of Malaysia's commercial banks profitability from year 2001 to year 2010. In order to strengthen the reliability of the theoretical model and to determine the relevant variables of this research, a number of empirical researches have been reviewed comprehensively. Moreover, this section also aimed to ensure that no important and relevant variables are ignored. Besides, this chapter provides this research paper a foundation to develop a better conceptual framework to continue with further investigation and hypothesis testing.

2.1   Review of the Literature

2.1.1 Bank's Profitability

Bank's profitability has been a popular research topic for several decades and the empirical literature on determinants of bank profitability is broad. Hence, there are many studies around the world. Some of prior literatures have focused their analyses either on a specific country or different countries.

The empirical literature on bank profitability that focus on one single country such as Australia (William, 2003), Greece (Athanasoglou, Brissimis and Delis, 2008), Jordan (Mashharawi and Al-Zu'bi, 2009), Kenya (Kithinji, 2010), Korea (Sufian, 2011), Macao (Vong and Chan, 2006), Malaysia (Fauziah et al., 2009), Switzerland (Dietrich and Wanzenried, 2011), Taiwan (Ramlall, 2009), United State (Hoffmann, 2011) and Pakistan (Ali, Akhtar and Ahmed, 2011; Gul, Irshad, and Zaman, 2011).

By contrast, Bourke (1989) has focused on twelve countries in Europe, North America and Australia; Staikouras and Wood (2004) focus on thirteen countries in Europe; Demerguc-Kunt and Huizingha (2000) conduct their studies on bank interest margin and profitability of eighty countries; Goddard, Molyneux and Wilson (2004a) focus on the six major European banking sectors; Said and Tumin (2011) concentrate on the banking sector in Malaysia and China. Due to the variation of datasets and environment, the empirical results are not constant across countries or within the same country.

The literature mentioned above, the researchers usually explain the bank profitability as a function of internal and external factors. The internal factors focus on bank-specific features which is management controllable while external factors consider both macroeconomic and industry characteristics which are beyond the control of bank management.

2.1.2 Bank's Profitability and Credit Risk

Banks have to bear a degree of risk when loans are granted while credit risk is one of the variables that can explain banking profitability. Credit risk is

aroused as the borrowers default in loan repayments and causes the bank profit decrease (Kithinji, 2010). The non performing loan and provision of non performing loan have positive relationship with ROA. The use of risk based supervision will increase the risk aversion and thus reduce the bank's profitability. However, with adequate and proper provisioning will foster bank's profit. This statement is concluded by Toby (2011).

Credit risk of banking system is affected by non-performing asset (NPA) or non-performing loans (NPL) which directly related to the bank performance (Thiagarajan, Ayappan and Ramachandran, 2011). In other words, the probability of a large number of credit defaults will be high when the NPA of a bank increase and thus lower the bank profit. The worst case is that having large proportions of NPL can lead to bank insolvency (Berger and DeYoung, 1997).

A study from Cooper, Jackson and Patterson (2003) also revealed that the changes in credit risk may reflect changes in the health of a bank's loan portfolio which may affect the performance of the institution. Credit risk is positively related to the bank's profitability is shown by Bukhari and Abdul Qudous (2012). An increased in credit risk will increase the bank's profitability.

In addition, researches from Fauziah et al. (2009), Miller and Noulas (1997) as well as Said and Tumin (2011) present evidence that credit risk is statistically significant and negatively impact on profitability. This negative relationship indicates that the more the banks exposed to high risk loan, the higher the accumulation of unpaid loans which in turns to lower returns.

Liu and Wilson (2010) found that credit risk is negatively related to ROA and ROE. Banks with higher credit risk are less profitable. When the researchers used NIM to estimate the bank profit, it is found that credit risk and NIM are positively related in most of the banks. Banks are required to adopt a risk premium to the interest rates charged for their operations. Banks may incur

extra expenses to strengthen their loan monitoring when banks want to better in managing the high credit risk. Therefore, banks will require a higher NIM to compensate for the higher credit risks.

2.1.3 Bank's Profitability and Liquidity Risk

According to Fauziah et al. (2009), there is no relationship between the liquidity risk and profitability of the banks. Said and Tumin (2011) also found that liquidity risks do not impact the bank performance. The results are mixed and there is no significant impact of liquidity on bank profits indicated by Li (n.d.), Molyneux and Thorton (1992) and Guru, Staunton and Balashanmugam (1999) found there is negative relationship between liquidity and profitability while Bourke (1989) and Kosmidou and Pasiouras (2005) found there is positive relationship between liquidity and bank profitability. Therefore the author recommends to carry out further research as the relationship remains ambiguous.

It is crucial for commercial banks in maintaining the ability to meet the short term obligations when they become due, otherwise bank will fail or become insolvent. Kosmidou and Pasiouras (2007) has investigated how bank's specific features and overall banking environment affect the profitability of domestic commercial banks in fifteen European Union countries from 1995-2001. This paper found that the ratio of net loans to customer and short term funding is statistically significant and has positive impact on the domestic bank profitability. This indicates that there is negative relationship between bank profitability and the level of liquid assets.

Bordeleau and Graham (2010) examined the impact of liquid assets holdings on bank profitability in large U.S. and Canadian banks. There is a positive non-linear relationship between liquid assets ratio and bank profitability. However, on average, holding excess liquid assets will reduce the bank

profitability. The banks should hold more liquid assets in weak economic growth or when the banks maintain a less traditional business model. This finding is consistent with the finding in Shahchera (2012).

Shen, Chen, Kao and Yeh (2009) employed alternative method to measure liquidity risk which is the financing gap ratio. This paper also investigated the impacts of liquidity risks on bank performance. In the findings, liquidity risk is significant and negatively affects bank performance in terms of return on average asset and return on average equities. Large banks tend to hold more loans, therefore will have larger financing gap ratio. This shows that banks with greater financing gap are less stable and hence will depend on external funding. This will cause rigorous liquidity problem due to high funding cost and thus reduce the bank performance. However, liquidity risk is significant and positively affects the net interest margin. This shows that banks with high levels of illiquid assets will receive higher interest income compared to banks with less illiquid assets.

Goddard, Molyneux and Wilson (2004a) have used the capital assets ratio or liquidity ratio to examine the level of European's bank profitability during the mid of 1990s. The authors found that banks which obtain a high capital assets ratio or high liquidity ratio tend to have modest profitability in an average. Besides, there is also some proven on the positive relationship between the concentration and bank's profit.

2.1.4 Bank's Profitability and Tax Rate

Chiorazzo and Milani (2011) used the bank-level data for a panel of European banks during year 1990 to 2005 as the sources of data to carry out this research. This paper analyzes the incidence on taxation on bank's activities. The core aim of this analysis is to evaluate, empirically, how explicit taxation affects bank profits and the main individual income statement's component.

Corporate income tax (CIT) and value added tax (VAT) have become the independent variables to determine the performance of banks. The results of this research found that CIT and VAT have positive effect on the profitability of banks in European country. In some recent studies, the Corporate Income Tax was computed as the ratio of tax expenses to total assets (Chiorazzo and Milani, 2011).

Besides, banking sector play a crucial role in allocation of resources and likely have economy-wide effect. So, this has motivated a large body of research mainly devoted to the analysis of banking industry liberalization, privatization and regulation. Albertazzi and Gambacorta (2010) have conducted a research to determine the effect of corporate income tax (CIT) on the performance of bank. This paper studies the link between bank profitability and taxation using data for ten industrialized countries (Austria, Belgium, France, Germany, Italy, The Netherlands, Portugal, Spain, United Kingdom, and United States) over the period 1981−2003. The researcher has come out with a result shows that. The effect of Corporate income tax (CIT) on the net interest margin is ambiguous because it tends to be positive (negative) at relatively low (high) level of CIT rate.

2.1.5 Bank's Profitability and Inflation Rate

Kosmidou and Pasiouras (2007) were doing a research on the factors that influencing the profitability of foreign and domestic commercial banks in fifteen European Union during year 1995-2001. The factors can be categorized under two categories which is internal factors and external factors. Internal factors are referring to the bank's characteristics while the external factors include the macroeconomics and financial structure. The researcher has included the inflation rate in the macroeconomics factors to determine the

bank's performance which measure in term of return on average assets (ROAA). The result shows that inflation rate has significant effect on ROAA.

Besides, Kanas, Vasiliou and Eriotis (2012) also has included inflation rate as one of the macroeconomics factor to determine the bank's profitability. This show there is statistically significant to the bank's profitability which measure in return on assets (ROA) and return on equity (ROE). The main source used is data from Quarterly Reports for U.S. commercial banks of the Federal Insurance Deposit Incorporation while the data for macroeconomics factors is obtained from Global Financial Database and DataStream. Similarly, Garcia-Herrero, Gavila, and Santabarbara (2009) evidenced that increased in inflation rate will increase the bank's ROA.

Research should carry out with more internal and external factors on the bank profitability's. Therefore, a research has carried out by Gul et al. (2011) in Pakistan to assess the impact of South Asian Free Trade Agreements (SAFTA) and general globalization of markets on banking system. Inflation rate has become one of the external factors to determine the profitability of bank. Top fifteen banks have been selected as the sources of data collection. The researchers state that inflation rate has direct relationship with bank's profitability as their hypothesis. The result also shows that inflation rate has significant effect on the bank's performance.

On the other hand, inflation rate is found to have no important effect on the profitability of bank based on the research carried out by Alper and Anbar (2011). They include inflation rate as one of the macroeconomic factor to determine the profitability of bank. Consumer Price Index (CPI) is employed in this research to measure the inflation rate in the country because the real value of costs and revenues will be affect by the inflation rate in the particular country.

Dharmendra (2010) claimed that there is negative relationship between the inflation rate and the bank's profitability. Inflation rate has been included as

one of the macroeconomic factor which plays an important role to determine the profitability of bank. He found that there is an insignificant relationship between inflation rate and bank's profitability.

2.1.6 Bank's Profitability and Interest Rate Risk

Fauziah et al. (2009) studied the relationship between financial risks which are credit risks, interest rate risks and liquidity risks and profitability of the conventional banks in Malaysia during 1996 to 2005. Interest rate risks will positively affect the return on assets (ROA) but negatively affect the return on equity (ROE) if estimated individually. The researchers found that the integration of credit risk and interest rate risk will have no significant impact on ROA of conventional bank but is positively related to ROE of conventional bank. These risks are highly interdependent. An increase in interest rate will lead to credit risk and liquidity problems

Based on the research carried out by Albertazzi and Gambacarta (2009), they included interest rate as of the important macroeconomic factor to determine the profitability of bank. The result show that the bank's profitability in Italy, Spain and Portugal is less affected by long term interest rate and they are more affected by the short term interest rate. In conclusion, interest rate has significant effect on the profitability of bank.

There is another review on the integration of credit risk and interest rate risk. Credit risk and interest rate risk are the most important risks faced by commercial banks and are highly interdependent. Drehmann, Sorensen and Stringa (2010) argued that pure interest rate risk alone will decrease the net interest income since margins are packed together. However, it would underestimate the negative impact of interest rate risk if estimated alone. Therefore, interest rate and credit risk should be tested together.

Kanas et al. (2012) found that short term interest rate do not affect bank profitability when using the linear model but will positively affect bank when using the semi-parametric model. Li (n.d.) also indicated that the impact of interest rate on return on assets is not significant.

According to Hancock (1985), the profitability of bank is determined by the market interest rate. The researcher set the hypothesis testing as bank will not have high profitability with the higher level of interest rate. But as the result from the test, it shows that there is a positive relationship between the bank's profitability and interest rate. In other word, the profitability of bank will increase due to the increase of interest rate.

Flannery (1981) tested on the hypothesis that market rate fluctuations negatively affect commercial bank profits. A change in market interest rates will not have large impact on the bank earnings in the long run either permanently or temporarily as indicated by Flannery (1981). This is due to large banks can effectively hedge themselves against the market interest rate risk by matching the asset and liability portfolio with the same maturities. However, Garcia-Herrero et al. (2009) shown that higher real interest rates on loan tend to increase the bank's ROA which means there is a positive relationship between them.

2.2 Review of Relevant Theoretical Models

2.2.1 Generalized Least Square (GLS)

Profitability of bank can be measured in different method among studies but the determinants of profitability still can be well examined (Vong and Chan, 2006). For instance, return on assets (ROA), and return on equity (ROE) are

the common measurements of profitability to determine the relationship between dependent and independent variables. ROA is the ratio of net income over total assets while ROE is the ratio of net income to equity. Previous studies from Ali, Akhtar and Ahmed (2011), Akhtar et al. (2011), Kanas et al. (2012) and, Sufian (2011) used the similar statistical regression approach to determine the effect of the determinants of profitability.

According to Athanasoglou et al. (2008), linear models are used in the majority of studies on bank profitability to explain the profits. Generalized least square is one of the linear regression models. There are two models in GLS which are GLS model with fixed effects (FEM) and GLS model with random effects (REM). FEM also known as least square dummy variable which assumed that the coefficients are constant and time invariant whereas the REM known as error components model which assumed that the individual error terms are not correlated with each other and not autocorrelated across panel data.

For instance, Athanasoglou et al. (2008), Berger and De Young (1997), Vong and Chan (2006), Demerguc-Kunt and Huizingha (2000), Fauziah et al. (2009), Goddard et al. (2004a), Ramlall (2009) and Sufian (2011) are using the panel data which gives more informative data and is able to reduce multicollinearity problems and the method of analysis is GLS models with fixed effects and random effects.

In the study of Fauziah et al. (2009), they used the ratio of maturity gap to total capital to measure the interest rate risks. Maturity gap is measured by rate sensitive assets minus the rate sensitive liabilities. Hausman test is carried out to spot which model is the most suitable. Moreover, Fauziah et al. (2009) argue that GLS regression is better than ordinary least square (OLS) system because GLS will turn out to be asymptotically more efficient than OLS system under certain assumptions.

Kosmidou and Pasiouras (2007) estimated the variables by using fixed effects regression as Hausman test suggested them to use this model. Ratio of net loans to customer and short term funding is used to measure the liquidity level.

Ratio of liquid assets to total liabilities and the ratio of loan loss provision to total loans are used by Fauziah et al. (2009) to measure the liquidity risk and credit risk respectively. Said and Tumin (2011) impose the panel data fixed effect model in this study. They measured the liquidity risk and credit risk by using the ratio of banks liquidity assets to total assets and the ratio of loan loss provision to net interest revenue respectively.

Li applied fixed effect regression in doing this research as Hausman test suggests her to do so. Instrumental variable regression is included in this research as well. It takes time effect into account. Li (n.d.) used the ratio of liquid assets to deposits and borrowings to measure the liquidity. Higher ratio indicates the more liquid the bank is.

In Kosmidou and Pasiouras (2007)'s research paper, they have used fixed effect regression model to determine the effect of external factor (inflation rate) on the bank return on average asset (ROAA). They have used two types of test to carry out research on this fixed effect regression model which is Hausman test and Breusch-Pagan test. Based on the significant level and the result of the test, it shows inflation rate is positively related to domestic banks due to the level of inflation were anticipation by the domestic banks during the period of this study. On the other hand in the case of foreign banks inflation brought a higher increase in costs than revenues as the negative relationship between inflation and foreign banks profits indicates. These mixed results could be attributed to different levels of knowledge of country macroeconomic conditions and expectations concerning inflation rate between domestic and foreign banks.

2.2.2 Generalized Method of Moments (GMM)

Shahchera (2012) used Generalized Method of Moments (GMM) to test for the variables incorporated. This method considers the first differences and uses the lags of independent variables as instruments. Hausen test is carried out to test for the validity of instruments. Loan asset ratio, liquid assets to customer deposits and short term funds ratio are the liquidity measures. Short term fund ratio is measured by using the liquid asset dividend divide by customer deposit and short term funds.

Bordeleau and Graham (2010) used panel two-step GMM procedure with bank and time fixed effects to measure relationship between liquid assets and profitability. Liquid asset ratio is being employed to measure the liquidity. The liquid assets ratio is equal to the sum of cash, government issued and government guaranteed securities and interbank deposits divide by total assets of the bank.

Besides, Liu and Wilson (2010) also employed two-step System GMM and fixed effects model to run the regression. GMM is used in the situation of small time periods, large sample sizes and dependent variable is dynamic. Fixed effect model for some banks as the sample size is not large enough. It is valid only when there is no serial correlation the error terms. Credit risk is estimated by the ratio of impaired loan to gross loans granted. Higher impaired loans will increase the credit risks. On the other hand, Liquidity risk is measured by loan to assets ratio which is net loans divided by total assets. High loan to assets ratio indicates low liquidity. High loans allowed the banks reduce the need to meet unexpected contingencies and incur more losses for the fire-sale assets.

Garcia-Herrero et al. (2009) employed GMM in their research. This methodology accounts for endogeneity and is able to control the unobserved

heterogeneity and the persistence of dependent variable. The data on real interest rate on loans and inflation are obtained from the CEIC database.

Hoffmann (2011) suggests that the GMM system estimator is an efficient tool to overcome the problems of endogeneity and constant heterogeneity. Therefore, in the study of Athanasoglou et al. (2008) Hoffmann (2011) and, Goddard et al. (2004a) on determinants of profitability, they take one step further in looking at the dynamic effects using the generalized method of moments (GMM) model. However, some of the empirical literature adopt more than two regression model in one study. The Hoffmann (2011) adopts GMM, FEM, and OLS; Goddard et al. (2004a) adopt OLS and GMM; Nguyen (2011) adopts GMM and FEM for comparison purpose.

Panel data of fifteen European countries during period of 1990 to 2005 has been used by Albertazzi and Gambacorta (2010) to conduct the research on determining the effect of tax rate on the performance on bank. Two steps estimator which is system-GMM has been used to carry out the robustness tests. The results found that the tax will shift in three different ways which are (i) it finds implications for financial stability that are useful in the phase of rethinking international financial regulations following the crisis that started in 2007; (ii) it provides estimates of the impact of VAT paid on bank inputs on bank profits – whose effects, to our knowledge, have not been empirically tested in previous studies; (iii) it provides further evidence on the topic of the pass-through effect of corporate income taxes on final prices, based on a different econometric approach (dynamic panel model). In conclusion, the effect of Corporate income tax (CIT) on the net interest margin is ambiguous because it tends to be positive (negative) at relatively low (high) level of CIT rate.

2.2.3 Parametric and non-parametric model

Parametric model is the restricted model while the non-parametric model is the unrestricted model. These two models are used by Kanas et al. (2012) to test the relationship between the credit risk, interest rate risk, inflation and bank profitability. The calculation of inflation rate is percentage change in GDP deflator while credit risk is the ratio of loan loss provisions to total loans. This research shows that the credit risk, short-term interest rate and inflation rate are statistically significant to the bank's profitability. This means that semi-parametric model is superior to linear model as the adjusted R-squared of semi-parametric model is higher. It is impossible to reveal the effects of short term interest rate and effect arising from capital and financial structure on bank profitability if semi parametric model was not adopted.

2.2.4 Pooled Ordinary Least Square (POLS)

Pooled ordinary least square (POLS) is where pooling the observations across banks and apply the regression analysis on the pooled sample. Gul et al. (2011) stated that pooling can obtain more reliable estimates of the parameters in the model. In addition, when the relationship between the variables is stable across cross-section units, it is considered as a valid procedure.

POLS is being used in the study of Gul et al. (2011) and Mashharawi and Al-Zu'bi (2009) to investigate the impacts impact of determinants of bank profitability on bank's profitability. Both the studies used consumer price index as the indicator of inflation rate. Inflation is one of the important factors in determining the profitability of banks because it can influence the cost and revenue of the banks. In particular, inflation affects companies' pricing behavior.

2.2.5 Zellner method

In the research carried out by Flannery (1981), seemingly unrelated regression of Zellner's method is used to estimate total operating expenses, total nominal revenue and net current operating earnings. He realized that Zellner's method provides better estimation than ordinary least squares and able to provide a more accurate comparisons of the revenue and cost adjustments to market interest rate changes as the standard errors are smaller than standard errors in Ordinary Least Square. Flannery (1981) employed an alternative framework to evaluate the impact of market interest rates on bank profits. The formula is current market value of the firm's equity equal to gross after tax revenues exclusive of capital gains or losses on existing assets and liabilities in the portfolio minus sum of after tax cost incurred in period t divide by one plus discount rate in period t. The total after tax costs is interest paid on liabilities add operating costs. This framework is useful for reported bank data only. He measured the variability by using three ways which are standard deviation of weekly rate around the annual average, range of weekly rates each year, exclude the five highest and five lowest rates and standard error from the regressing each week's interest rates on the lagged rate and constant rate.

2.2.6 Term-structure model

Drehmann et al. (2009) employed term-structure model with three underlying factors (level, slope and curvature of yield curve) and three observable macroeconomic variables (output gap, inflation and bank rate). This model enables researchers to predict the default-free yield curves across maturities up to ten years conditional on a given macro scenario. Libor is forecasted by assuming a stable spread over the default-free term structure of 30 basis points. This type of model is based on standard regression analysis concerning the

sum of default probabilities to macroeconomic variables. Interest rate sensitivity gap is employed to measure the interest rate risk.

2.2.7 Panel data instrumental variables regression

Shen et al. (2009) apply panel data instrumental variables regression to examine the relationship between liquidity risks and bank performance. It will provide a way to obtain consistent parameter estimates as denoted by Dunning (2008). Two stages least squares is used to test the determinants of bank performance as the instrumental variables exceed endogeneous variables. Liquidity risk is calculated by using financing gap to total assets ratio. Banks with higher financing gap ratio tend to face higher liquidity risk as banks need to use cash to fund the gap.

Goddard et al. (2004a) have used the dynamic panel and cross-sectional regressions to examine the profit and growth of the commercial, savings and co-operative banks in European Union countries. The paper also attempted to combine the growth and profit strands by evaluating the European banks performance at 1990s. Capital assets or liquidity ratio are employed to estimate the bank profitability in this research.

2.2.8 Monti-klein model

Chiorazzo and Milani (2011) used monti-klein model to conduct this research. They take into account about the effect of corporate income taxation on the bank's profitability and behavior. Profits obtained by banks through their traditional lending activity are positively correlated to business cycle indicators like GDP and the slope of the interest rate structure. Indeed a steeper yield curve increases bank profits because of the typical maturity

transformation function performed by banks (their assets have a longer maturity than their liabilities). Moreover, profits are higher in those countries where both the financial markets and the banking sector are more developed and bank management is more efficient. The result of this research shows that the corporate income tax has positive effect on bank's profitability.

2.3   Proposed of Theoretical / Conceptual Framework

Figure 2.3 Independent Variables Used in This Study to Examine
Their Relationship with the Dependent Variable
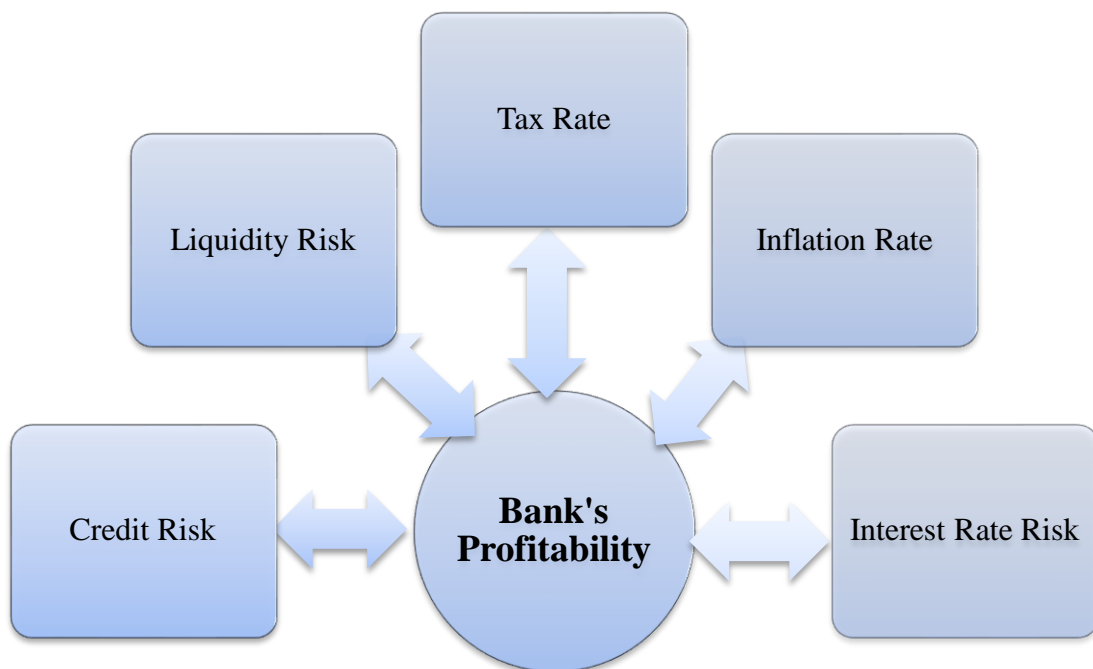
Figure 2.3 has displayed the independent variables (credit risk, liquidity risk, interest rate risk, inflation rate and tax rate) that used to examine the dependent variable (bank's profitability). Based on the issues which have been

mentioned earlier, this research is trying to investigate the correlation between the above mentioned factors that affect the profit of the banks. Therefore, the discussion will focus on credit risk, liquidity risk, interest rate risk, inflation rate and tax rate.

2.3.1   Credit Risk

Credit risk is one of the important determinants of a bank's profit. Basically, credit risk is the probability which some of the bank's assets, especially its loans, decrease in value and perhaps become worthless.

2.3.2   Liquidity Risk

In fact, liquidity risk remains as a debatable key indicator of a bank's profitability. It indicates the profitability of a bank run out of cash and borrowing capacity to meet the short term obligations such as deposit withdrawals, loan demand and other cash needs.

2.3.3   Tax Rate

Generally, all banks are subjected to tax rate. The tax rate charged by the government will affect the cost of lending of the bank. When the cost of lending is affected, it will then cause the bank's profitability to vary.

2.3.4   Inflation Rate

Inflation is generally defined as a sustained increase in prices for goods and services. It will influence the sources and uses of bank's financial resources. Thus, inflation rate will hereafter affect the profit of the banks.

2.3.5 Interest Rate Risk

Interest rate also acts as a crucial role in determining the profit of the banks. Interest rate risk is actually one of the components under market risk. It represents the impact of changing in interest rate on a bank's margin of profit.

2.4 Hypotheses Development

2.4.1 Credit Risk

H_0: There is no relationship between credit risk and bank's profitability.
H_1: There is a relationship between credit risk and bank's profitability.

2.4.2 Liquidity Risk

H_0: There is no relationship between liquidity risk and bank's profitability.
H_1: There is a relationship between liquidity risk and bank's profitability.

2.4.3 Tax Rate

H_0: There is no relationship between tax rate and bank's profitability.

H_1: There is a relationship between tax rate and bank's profitability.

2.4.4 Inflation Rate

H_0: There is no relationship between inflation rate and bank's profitability.

H_1: There is a relationship between inflation rate and bank's profitability.

2.4.5 Interest Rate Risk

H_0: There is no relationship between interest rate risk and bank's profitability.

H_1: There is a relationship between interest rate risk and bank's profitability.

2.5 Conclusion

In a nutshell, different sets of independent variables have been hypothesized in order to investigate the elements that can affect bank's profit. There are a lot of frameworks to test the relationship of the explanatory variables and the profitability of the bank. Generally, the models that have been used in the previous researches are Generalized Least Square, Generalized Method of Moments, Parametric and non-Parametric Model, Pooled Ordinary Least Square, Zellner Method, Term-Structure Model, Panel Data Instrumental Variables Regression and Monti-Klein Model. According to the review of relevant theoretical models, the most popular framework used is the Generalized Least Square. In addition, different models or framework used provide ambiguous findings to the researchers. Thus, the actual methodology for this research paper which included the research design, measurement scales, methods of data analysis and others will be discussed in the next chapter.

CHAPTER 3: METHODOLOGY

3.0   Introduction

This chapter is describing the overall research methodology. The research designs are then created to state the population being selected from a group precisely. Quantitative data is used to test the relationship between the credit risk, interest rate risk, liquidity risk, inflation rate, tax rate with the profitability of bank in the year 2001 to 2010. In addition, the instruments used to measure the data also being discussed. Besides, this chapter is to determine the model and methodology used to carry out the objective of the research. This section also aimed to ensure the results obtained from the econometric test are accurate and no important data are being ignored.

3.1   Research Design

This research used quantitative data in the form of exploratory statistic to analyze the determinants of bank profitability. This is due to secondary data is employed in this study. This research is used to test how and why the credit risk, interest rate risk, liquidity risk, inflation rate and tax rate will affect the bank profitability. Hypothesis testing is generated to examine the relationship among the variables. The duration of the study is from year 2001 to 2010. Panel data is employed in this paper where the cross-sectional data consist of CIMB Bank, MayBank, Public Bank, RHB Bank and Hong Leong Bank and is collected based on the yearly basis. The reason behind is these banks have the largest assets size and market capitalization. Thus, this research comprises of fifty observations. Panel data is used instead of cross-sectional data and time series data respectively due to it gives more informative data, less collinearity

among the exogeneous variables and higher degree of freedom. Moreover, the sensitivity analyses are used to interpret the data.

3.2   Data Collection Method

The details about the methodology adopted in assist to achieve the research objectives are included in this chapter. It includes the approaches adopted to examine the determinants of bank profitability, the type of data used, the techniques employed to collect data, the method utilized to manage the data and the process to construct empirical model with measurement of its components. The secondary data is gathered for the purpose of completing this research. The secondary data composed of the journals of previous studies and annual reports of the five banks which are CIMB Bank, MayBank, Public Bank, RHB Bank and Hong Leong Bank. In order to obtain some mathematical data for this research, the "DataStream" software is also used.

3.2.1 Secondary Data

Secondary data is chosen to carry out this research which is obtained from the secondary information sources like internal data sources. Sample banks' (CIMB Bank, MayBank, Public Bank, RHB Bank and Hong Leong Bank) financial data such as annual reports are retrieved from theirs official web. In addition, statistics data is also obtained from "DataStream" database (for the year 2001-2010) and journals from JSTOR, PROQUEST and EBSCOHOST.

3.2.1.1   Bank's Profit

Return on assets (ROA) is an indicator that determines how much revenue a bank can generate by using its total assets. In other words, it shows how efficient can the bank management use their assets to generate earnings. ROA is a useful and widely used indicator in comparing the business performance especially in banking industries. The higher the ROA, the better is it because it indicates that the bank can generate more revenues with fewer assets.

$$ROA = \frac{Net\ Profit\ After\ Tax}{Total\ Assets}$$

3.2.1.2   Credit Risk

Credit risk is the risk that borrower unable to make payment on loan. Credit risk is calculated based on the borrowers' overall capability to repay. There are many ways to calculate credit risk such as non-performing loan, and risk weighted assets. However, loan loss provision to total loans is used to assess credit risk in this research. It is the allowance that set aside for bad loans. Bank need to increase the amount for loan loss provision when it is exposed to high risk loan. This is due to there is high growth of unpaid loans. Higher loan loss provision ratio will reduce the net income and earnings per share. The lower the ratio, the better it is for banks.

$$Credit\ Risk = \frac{Loan\ Loss\ Provision}{Total\ Loans}$$

3.2.1.3   Liquidity Risk

Liquidity risk is the probability a bank will not have sufficient cash and borrowing capacity to meet deposit withdrawals, loan demand and other cash needs. It is also the inability to manage changes in funding resources. Basically, liquidity risk also come from the failure to recognize changes in market conditions that affect the ability to liquidate assets quickly with the minimum losses. Thus, liquidity risk can said to be a crucial measure for bank's profitability. The current ratio is chosen to represent the liquidity risk of the banks in this paper. Current ratio is the most popular measure of liquidity risk. It is the ratio which indicates the efficiency of a bank operating cycle to turn its assets into cash. The higher the ratio, the more capable the bank is of paying its obligations.

$$Current\ Ratio = \frac{Current\ Assets}{Current\ Liabilities}$$

3.2.1.4   Tax Rate

Banks are subject to direct taxation through corporate tax and other taxes which may affect their operations. The relationship between bank profitability and bank corporate income tax (CIT) reflects to the portion that a bank can shift its tax burden to its customers, depositors, lenders or otherwise.

$$Tax\ rate = \frac{Taxation}{Total\ Assets}$$

3.2.1.5   Inflation Rate

Inflation rate is defined as the percentage change in the prices of goods and services (as indicated by a price index) and is usually calculated in annual basis. Besides that, inflation rate can also determine how fast a currency can appreciates or depreciates its value. It is important to industries that offer fixed income securities such as fixed deposit offer by a bank because the returns on these securities may be vary along the changes of inflation rate. The data of inflation rate is obtained from the DataStream.

3.2.1.6   Interest Rate Risk

Interest rate risk is the changes in asset value due to unexpected changes in interest rate. The real interest rate risk is used to evaluate the interest rate risk for this research. The reason is because the real interest is a more accurate indicator than nominal interest rate and it does not take into account of the inflation rate. It reflects the real cost of borrowing to the borrower and the real return to the lender. The real interest rate figures in this research are taken from the World Bank Indicators website.

3.3   Data Analysis

3.3.1 Pooled Ordinary Least Squares (Pooled OLS)

The panel regression analysis is used to represent the dependent and independent variables in this paper.

The panel regression model is regressed as below:

$$PROFIT_{it} = \alpha + \beta_1 CRE_{it} + \beta_2 LIQ_{it} + \beta_3 TAX_{it} + \beta_4 INF_{it} + \beta_5 INT_{it}$$

Where α = constant and β_{1-5} = coefficient of independent variables

$PROFIT_{it}$ = Bank's Profit of Bank i for year t (Return on Assets / ROA)

CRE_{it} = Credit risk of Bank i for year t

LIQ_{it}= Liquidity Risk of Bank i for year t

TAX_{it} = Tax Rate of Bank i for year

INF_{it} = Inflation Rate of Bank i for year t

INT_{it} = Interest Rate Risk of Bank i for year t

Panel data is used in this paper because the data comprised of cross sectional data (the five banks) and time series data (year 2001 to 2010). Panel data is also known as pooled data, micropanel data or longitudinal data. In addition, panel data can provide a more informative data, more variability, less collinearity among variables and more efficiency. It also can better judge and detect the effects that cannot be figured out in pure cross section data or pure time series data. Moreover, panel data enable the study of more complicated behavioral models and minimizing the bias of the result. Therefore, Pooled OLS method is used to estimate the above panel data / panel regression model. The Pooled OLS is the best measure for the panel data. Furthermore, the Pooled OLS is ran by Eviews to examine the relationship between the variables mentioned above.

3.3.2 Normality of residuals

In order to check for the normality of error term, Jarque-Bera test is conducted. The null hypothesis is the error term is normally distributed and the alternative hypothesis is the error term is not normally distributed. The null hypothesis will be rejected if the p-value for Jarque-Bera test statistic is less than 0.10; otherwise do not reject the null hypothesis. In other words, when the p-value is greater than 0.10, the error term is normally distributed and vice versa.

3.3.3 Sensitivity Analyses

The sensitivity analysis is used in this research paper to determine how different figures of an independent variable will impact the dependent variable. It means to find out the impact of actual outcome of a particular variable will have if it differs from what previously assumed. Sensitivity analysis is also a method to forecast the outcome of a decision involved.

3.4 Conclusion

In conclusion, the measurements and statistical tests have been determined in this chapter. Basically, financial ratios are the major element used to indicate the bank's profit. The ratios are implemented in the credit risk, liquidity risk and tax rate. In addition, the empirical model which is the panel regression models is employed to examine the relationship between all the explanatory variables with the dependent variable. Thus, all the dimensions of bank's profit independent variables have been analyzed theoretically and empirically to obtain a clearer picture in this bank profitability research. The following chapter will discuss on the statistical result and to confirm the result whether consistent with the hypotheses stated in the previous

chapter earlier. Subsequently, the results of the normality test of residuals and the sensitivity analyses will be brought out in the next chapter. The purpose of conducting the normality test is to analyze the behavior of the error term for the panel model. On the other hand, the sensitivity analysis is to figure out the validity of the research model above.

CHAPTER 4: DATA ANALYSIS

4.0　Introduction

This chapter shows the empirical results and interpretation of the study on the factors affecting bank profitability of the first five largest local banks which stated in previous chapter. In the first section, a brief general description of summary statistics on the dependent and independent variables will be included. Panel date is used in this paper and hence Pooled Ordinary Least Square (Pooled OLS) method will be employed. Followed, the E-views result will attached in this chapter. The E-views result included the coefficient, t-statistic, probability, standard error of each variable, the R-squared, adjusted R-squared and other relevant information. The last section is formed from the inferential analysis of the variables as well as the conclusion.

4.1　Descriptive Analysis

4.1.1　Normality Test of Residuals

Panel Regression Model:

$$PROFIT_{it} = \alpha + \beta_1 CRE_{it} + \beta_2 LIQ_{it} + \beta_3 TAX_{it} + \beta_4 INF_{it} + \beta_5 INT_{it} + \varepsilon_{it}$$

Where α = constant; β_{1-5} = coefficient of independent variables

Figure 4.1.1 Normality Test of Residuals
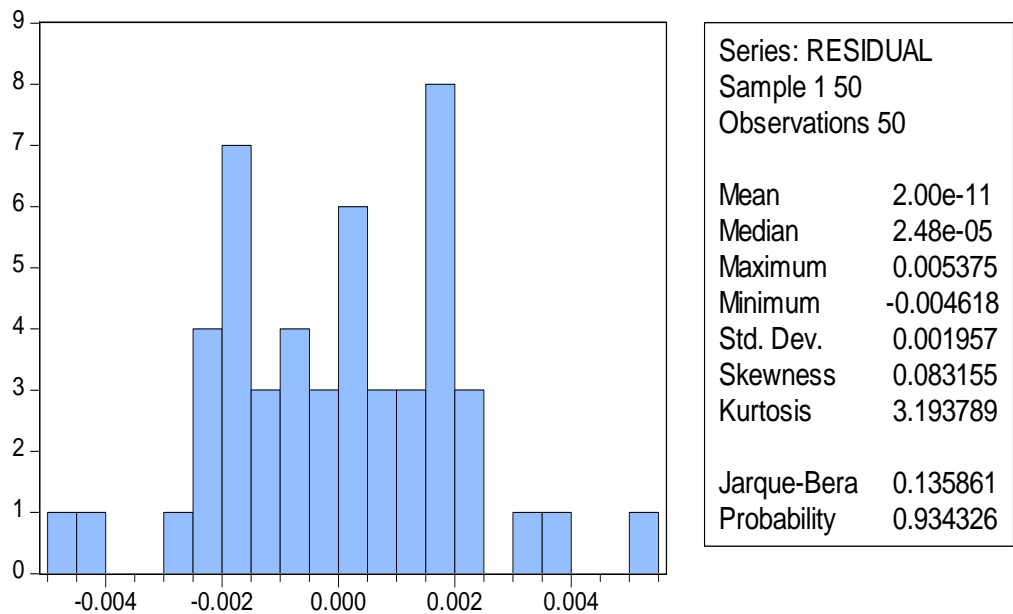
The null hypothesis (H_0) is the error term is normally distributed and the alternative hypothesis (H_1) is the error term is not normally distributed. The significant value (α) used is 5 percent or 0.05. According to the theory, the decision rule is to reject null hypothesis if the p-value is less than 0.05. Otherwise, do not reject null hypothesis. The p-value from the result is 0.934326. Therefore, do not reject the null hypothesis since p-value (0.934326) is greater than 0.05. In conclusion, there is sufficient evidence to conclude that the error term is normally distributed. Thus, the specification model is correct based on the result. Besides, it also enables the using of t-statistical tests for the regression model in this paper.

4.1.2 Pooled Ordinary Least Square (Pooled OLS)

Panel Regression Model:

$$PROFIT_{it} = \alpha + \beta_1 CRE_{it} + \beta_2 LIQ_{it} + \beta_3 TAX_{it} + \beta_4 INF_{it} + \beta_5 INT_{it} + \varepsilon_{it}$$

Where α = constant; β_{1-5} = coefficient of independent variables

Table 4.1.2   Estimation of Pooled OLS model (E-views Result)

Variables	Coefficient	t-statistic	Probability	Standard Error
CRE (X1)	-0.018206	-2.093291	0.0421**	0.008697
LIQ (X2)	0.002515	2.089694	0.0425**	0.001203
TAX (X3)	2.404101	13.44741	0.0000***	0.178778
INF (X4)	-0.058948	-1.808678	0.0773*	0.032592
INT (X5)	-0.023715	-2.392060	0.0211**	0.009914
C	0.001324	0.814362	0.4198	0.001626
R Squared			0.825051	
Adjusted R Squared			0.805170	
Durbin-Watson Test			1.391274	

Note: *significant at 10 percent **significant at 5 percent ***significant at 1 percent

The Table 4.1.2 above showed the Pooled Ordinary Least Squares (Pooled OLS) method used to examine the panel regression model for the five banks.

The panel data is gathered to run the Pooled OLS. The E-views results stated that all coefficients have the expected sign except for Tax Rate which is X3 variable. Moreover, all the coefficients are individually significance at 0.05 (5 percent) of significance level except for in X4 variable (Inflation Rate) which only significance at 0.10 (10 percent) of significance level.

The results from the Table 4.1.2 explained that with an additional one percentage point increase in the X1 variable (Credit Risk), on average, the bank profitability (ROA) for the five banks will decrease by 1.8206 percent, holding other variables constant. On the other hand, when there is one percentage point increase in the X2 variable (Liquidity Risk), on average, the ROA for all the banks will increase by 0.002515 percent, holding other variables constant. Moreover, with an additional one percentage point increase in the X3 variable (Tax Rate), on average, the bank profitability (ROA) for the five banks will increase by 2.404101 percent, holding other variables constant. Besides, when there is one percentage point increase in the X4 variable (Inflation Rate), on average, the ROA for all the banks will decrease by 0.058948 percent, holding other variables constant. Similarly, an additional one percentage point increase in the X5 variable (Interest Rate Risk), on average, the bank profitability (ROA) for the five banks will decrease by 0.023715 percent, holding other variables constant.

The Table 4.1.2 above stated the X1 variable (Credit Risk) is negatively related to the bank's profit (ROA) since its coefficient is equal to -0.018206. It is a significant at the 5 percent of significance level with a probability of 0.0421 which is lesser than 0.05. Moreover, the X2 variable (Liquidity Risk) is positively related to the bank's profit (ROA) with the coefficient value of 0.002515 based on the Table 4.1.2. It is statistically significant at 5 percent of significance level with a probability equal to 0.0425. Furthermore, the result from Table 4.1.2 shows that X3 variable (Tax Rate) is statistically significant at 1 percent significance level with a probability of 0.0000. Besides, it is

positively related to the bank's profit (ROA) since it has 2.404101 of coefficient value. In addition, the X4 variable (Inflation Rate) is negatively related to the profitability of banks (ROA) with a coefficient value of -0.058948. Although it is insignificant at 5 percent of significance level, it is still a significant variable as it has a probability of 0.0773 which is lesser than 0.10. This means that it is only significant at 10 percent of significance level which is acceptable. Followed, the coefficient of X5 variable (Interest Rate Risk) is equal to -0.023715 so it has a negative relationship with the bank profitability (ROA) according to the Table 4.1.2 above. It is also statistically significant at 10 percent significance level as it has a probability of 0.0211 which is lesser than 0.10.

The R-squared of the model is 0.825051 or 82.51 percent which is considered high. It means that there is 80.52 percent of the dependent variable (banks profitability) can be explained by all the independent variables (X1 to X5). On the other hand, there is a high Durbin-Watson statistic value (1.391274) which indicates that there is no mis-specification error. Thus, it can assume that the possibility of autocorrelation problem in the model is extremely low.

4.2   Sensitivity Analyses

First of all, there are an independent variables chosen to run for the sensitivity analysis which is X5 (Interest Rate Risk). The results are presented in a graphical way with plotted line graphs. The confidence interval used in this technique is 95 percent. There are all five banks in this research and the banks are dropped one by one in order to compare the values respectively.

Figure 4.2 Sensitivity Analysis for X5 (Interest Rate Risk)
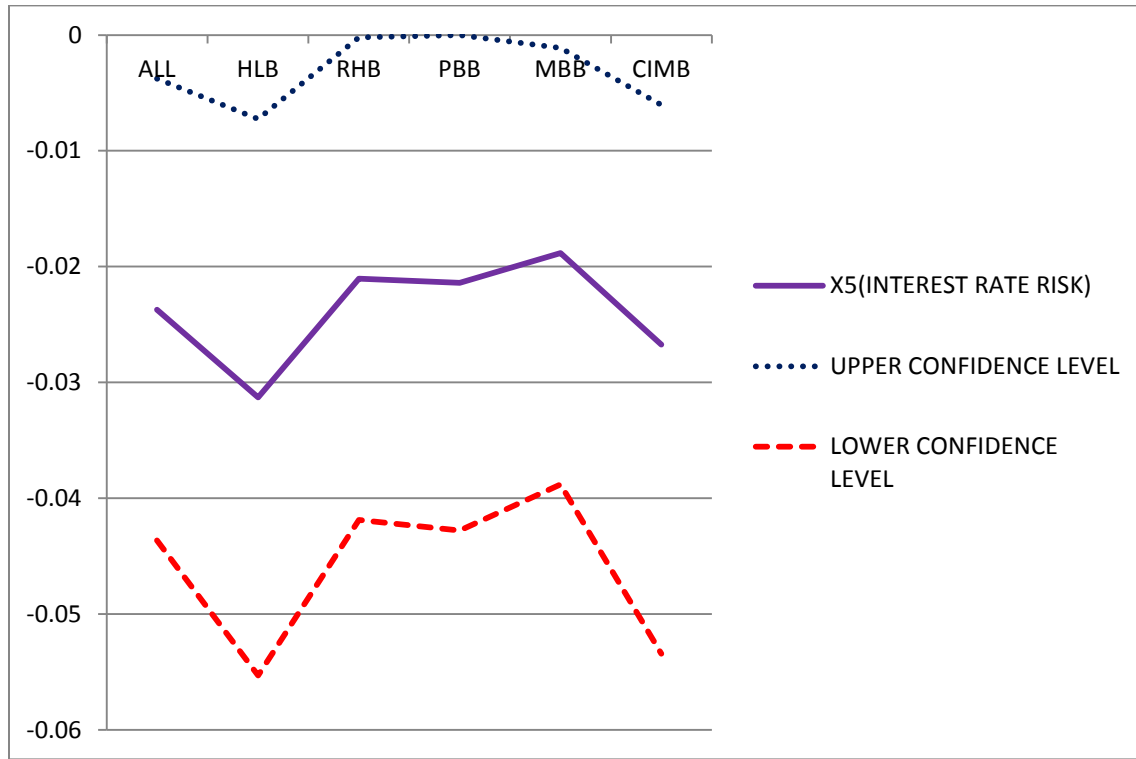
Note:

ALL = All banks

HLB = Hong Leong Bank

RHB = RHB Bank

PBB = Public Bank

MBB = MayBank

CIMB = CIMB Bank

The Figure 4.2 above clearly showed the pattern of the X5(interest rate risk) variables. The value or range of the X5 variables is felled in between the lower confidence interval and upper confidence interval. Moreover, the values for the X5 variables are floating consistently with minor changes in value. Therefore, it can be concluded that the possibility of econometrics problem (autocorrelation, heteroscedasticity and

multicollinearity problems) in the model is low. In other words, the panel model for the research is valid.

4.3   Conclusion

In conclusion, the panel regression model in this paper has passed the normality test and the sensitivity test. On the other hand, the E-views result showed all of the independent variables which are X1 (Credit Risk), X2 (Liquidity Risk), X3 (Tax Rate), X4 (Inflation Rate) and X5 (Interest Rate Risk) has showed that they are statistically significant to the bank's profitability (ROA). Thus, the result in this chapter is valid and creditable. However, it also showed some inconsistencies of results as compared to the researches done by previous researchers. This may cause by several reasons which will be discussed in Chapter 5. In conjunction with this, the limitations and recommendations of the model will also be attached in the following chapter.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

This chapter summarizes the results in the previous chapter and provides discussions on the major findings. Major findings are used to compare with the hypotheses testing that had set on the first chapter. Besides, summary of statistical analyses comprise on the descriptive and inferential analyses presented and discussed in the previous chapter. Moreover, implication of the study is also included in this chapter. This will include the practical implications for policy makers and professionals. Limitations of the study will be included and the methodologies to improve the study will be recommended. The conclusion section will provide the overall summary of the whole research project.

5.1 Discussion of Major Findings

Table 5.1 Summary of E-views Results

INDEPENDENT VARIABLES	RESULTS
CREDIT RISK (X1) HYPOTHESIS	Significant** ✓
LIQUIDITY RISK (X2) HYPOTHESIS	Significant** ✓
TAX RATE (X3) HYPOTHESIS	Significant*** ✓

INFLATION RATE (X4)	Significant*
HYPOTHESIS	✓
INTEREST RATE (X5)	Significant**
HYPOTHESIS	✓

Significant at * 10 percent, **5 percent and *** 1 percent

"✓" indicates results consistent with hypothesis

The X1 variable (Credit Risk) is found significant and consistent with the hypothesis stated in the earlier chapter. It has the negative relationship to the bank's profit. This result is consistent with the study of Bukhari and Abdul Qudous (2012) who claimed that the credit risk tends to be a significant variable in the research. However, this study proved that it has positive relationship with the probability of the banks. It may be due to their research is based on the determinants for the banks of Pakistan only. The research by Fauziah et al. (2009) revealed that there is negative relationship between ROA and credit risk which is tallied with this research. The banks need to increase the amount of loan loss provision when they have exposure on those high risk loans. As a result to this, the banks' profit will be reduced. Said and Tumin (2011) also shown that the credit risk is statistically significant and negatively affect the bank profitability.

Besides, the X2 variable which is the Liquidity Risk also consistent with the hypothesis in this research and found to be a significant variable to the bank's profit. There is a positive relationship between the liquidity risk and the bank's profitability. This is proved by Kosmidou and Pasiouras (2005) who found there is a positive relationship between liquidity risk and bank profitability. In addition, the research done by Goddard, Molyneux and Wilson (2004b) also stated that the high liquidity ratio brought a modest bank's profitability on average. However, Guru et al. (1999) and Kosmidou and Pasiouras (2007) found out there is a negative relationship between liquidity and bank profitability. The inconsistent of findings may due to the

reasons of studying a different time period. As for instances, Kosmidou and Pasiouras (2007) were doing research from year 1995 to year 2001 which the time range is different with this research paper. The previous research done by Fauziah et al. (2009) and Shahchera (2012) found that the liquidity risk is negatively affected the bank's profit. The dissimilar may due to the previous researchers used a different measurement for bank profitability and liquidity ratio which are the Return on Equity (ROE) and Loan-Asset Ratio respectively. In addition, Bordeleau and Graham (2010) also stated that the liquidity and the bank's profit are negatively related to each other which are not tally with this research. This may be due to the state of economy and the vary bank's business model in the different country.

Similarly, the X3 variable (Tax Rate) is found significant and consistent with the earlier mentioned hypothesis in this paper. The relationship between the tax rate and the profit of the banks is found to be positive. Thus, the finding is in line with the previous findings of Demirguc-Kunt and Huizinga (2000) and Chiorazzo and Milani (2011) who found that Corporate Income Tax (CIT) has a positive effect on bank profitability. This means the higher the tax rate, the higher the bank profitability. This is maybe due to the banks are able to fully pass the tax burden to the bank customers. Albertazzi and Gambacorta (2010) found also the CIT is significantly influences the bank profitability but the result is ambiguous. It is because the effect tends to be positive (negative) at relatively low (high) level of CIT rate which mean the bank's profit strongly depend on the tax rate charged on the banks.

Subsequently, the X4 variable (Inflation Rate) is also significant to the bank's profitability and tally with this research hypothesis. The inflation is found to be negatively affected the bank's profitability. This can be proved by Dharmendra (2010) who have got the same findings. Generally, the research done by Kosmidou and Pasiouras (2007) concluded that inflation rate in have significant effect on bank's profitability which is in line with this research. Moreover, inflation rate has a significant effect on the profitability of banks also has been showed in the research done by Kanas et al. (2012). The researchers have included inflation rate as one of the macroeconomic factors in their researches. Besides, Gul et al. (2011) research also

has come out a conclusion that the inflation rate in a country will have significant effect on the profitability of bank.

Moreover, the X5 variable (Interest Rate Risk) is found significant and in line with the hypothesis stated in the previous chapter. This result is similar with the findings by Albertazzi and Gambacarta (2009) which concluded that interest rate has significant effect on the profitability of bank. The interest rate risk is tend to be negatively affected the bank's profit in this paper. This result is inconsistent with the study on Fauziah et al. (2009). According to their studies, the interest rate risk is positively affecting the ROA. This may be due to different measurement in the interest rate risk. However, this research is against with the study of Li (n.d.) because the researcher presented that interest rate risk is an insignificant variable to the ROA. The inconsistency may due to the reasons of studying from different countries. As for example, Li (n.d.) only focus on the research from United Kingdom. Flannery (1981) shown that there is not much effect of market interest rate on bank profitability in the long run as large banks able to hedge themselves effectively. Therefore, the research done by Flannery (1981) is not tally with this research.

5.2   Implications of the Study

In Malaysia, all banking industry is supervised under the act of Banking and Financial Institution Acts (BAFIA) 1989. Therefore, they have same principles, concepts, and operations. Banks act as financial intermediaries that bring together the demanders of fund and the suppliers of fund. Furthermore, based on BAFIA, the central bank of Malaysia which is Bank Negara Malaysia (BNM) has the right to control over all the flow of money and operations under each individual bank and also other financial institutions.

The result of this paper show important information to public and it is useful to economy especially for stock market investors. Policy maker, central bank (Bank Negara Malaysia), economist, and stock market participants should have more

understand the situation in the bank of Malaysia. This research is useful for the investor in order to let them know which bank they should invest in. Besides, they can clearly identify which bank is facing higher risk as compare to other banks.

In addition, BNM also has the power to enhance banking operation systems within the banking industry in Malaysia to make sure all the banks do not violate the act of BAFIA 1989. In this study, the major difference between five of the banks which is CIMB Bank, MayBank, Public Bank and RHB Bank and Hong Leong Bank is the benefits that they offer to their respective customers. Thus, the comparison of credit risk and liquidity risk has made based on the group of customers the bank has.

Moreover, Bank Negara Malaysia and the bank itself can clearly know the strength and weaknesses within the particular bank. The bank can take advantage on the strength to earn higher profit and attempt to improve the weaknesses. On the other hand, BNM can control the bank's activity based on the relationship between the risk and the bank's profitability. As an illustration, the BNM can manipulate the interest rate to increase the profit of the banks.

Furthermore, based on the research on bank's profitability, banks can clearly know about their efficiency level in the bank's operation. The top level of management in the bank can determine the best solution to allocate all their available resources to achieve the maximum level of efficiency. Each of the banks can also determine the crucial factors that will affect their profitability and provide a scheme to prevent the particular risk. Although the risk cannot be fully prevented, it still can be reduced to the minimum or optimum level. Thus, the banks can easily achieve their goal in the future.

The followings are the managerial implication for this research paper. Firstly, the future researcher will know the type of policy should be carried out in order to justify the current and certain condition in Malaysia. Once there are changes in the value of independent variables such as credit risk, liquidity risk, tax rate, inflation rate and

interest rate risk, the future researchers should be more careful when implementing the relationship between the variables with the profitability of bank.

5.3   Limitations of the Study

Throughout the studies, there are some limitations which affecting the flow of the research for further improvement.

5.3.1 Limited Time Range

In this research, the period of studied is not sufficient and adequate. The most time range that can be extracted is limited to only ten years, which is from 2001 to 2010. It is due to some of the sample banks only disclose their most recent years' annual report. Moreover, data available in "DataStream" more than this timeframe is incomplete. The data constraint might lead to distorting and less accurate result as compared to longer study period.

5.3.2 Lack of Empirical Research on Tax Rate towards Bank's Profit

Tax rate is one of the independent variables in this research to determine the bank's profit. However, with the available databases, there are limited empirical researches on tax rate towards bank's profit. Hence, it is not strong enough to prove that tax rate is relatively a significant determinant towards bank profit.

5.3.3 Number of Sample Bank

There are total of eight licensed local commercial banks located in Malaysia. However, this research only focuses on the first five largest local commercial banks in term of asset size and market capitalization for the year 2011. The incapability to comprise all the eight local commercial banks are due to the resources constrain. Thus, the result might not fully reflect the whole situation of the Malaysian commercial banking sector.

5.4   Recommendations for Future Research

As mentioned in the previous section, this study is constrained by various drawbacks. In order to make a more precise and exact research, a few recommendations or guidelines are given for future scholars who are interested in conduct the similar topic of this study.

Firstly, the time period of study should be lengthened in order to capture a more accurate and precise result. It is because bank profit might change over time due to new regulation and liberalization. The year of coverage in this study is from year 2001 to 2010 which is not considered as a long period (as local commercial banks are operated for a long period of time in Malaysia.)

Further research using tax rate as a determinant of bank profit is highly recommended since there are less researches being done in this sector. Based on the empirical analysis from this research, the result has shown that tax rate is positively related to the bank profit. Thereby, more research based on tax rate as a determinant of bank profit should be carry out in order to gain more evidence that tax rate is relatively a significant determinant towards bank profit.

Last but not least, future researchers are highly encouraged to include all of the eight local commercial banks to conduct the similar study. Furthermore, this research can be extended to those foreign banks that have subsidiaries in Malaysia, rather than just focus on domestic-based banks. It can widen the scope of investigation in term of the impact of determinants and capture bank-based differences precisely. Moreover, it enhances the comprehension on bank performances and stability.

5.5 Conclusion

In a nutshell, every commercial bank in Malaysia is facing the same risk especially inflation rate, interest rate risk and tax rate. This is because liquidity and credit risk can be controlled by the bank management while the other three risks are based on government regulation and also the economic condition. Malaysia is still a developing country nowadays, it tries to build a strong banking and financial sector, thus the relationship between bank's profitability and five types of risks should be carried out in a deeper way in order to have more improvement.

There are eight commercial banks in Malaysia, but only five largest commercial banks are taken in this study. Test has been carried out on bank's profitability-return on assets (ROA) with credit risk, liquidity risk, tax rate, inflation rate and interest rate. The result shows that all of the five independent variables have significant result on the profitability of banks. The results might have some differences with the research carried out by the previous researchers. This may be due to the different of country and also the time period used in the study. The different country might have different level of risk as the economic condition is unpredictable and unstable.

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APPENDICES

Appendix 3.2.1: Workings/Data for Variables of the Five Local Commercial Banks

CIMB Bank

YEAR \ RATIOS	2001	2002	2003	2004	2005
Y (**ROA**)	$\frac{RM342097}{RM74370323}$ =0.0046	$\frac{RM558478}{RM91185749}$ =0.0061	$\frac{RM782300}{RM97933977}$ =0.0080	$\frac{RM752227}{RM111970661}$ = 0.0067	$\frac{RM447598}{RM70418921}$ = 0.0064
X1 (**Credit Risk**)	$\frac{RM952367}{RM42214908}$ = 0.0226	$\frac{RM809282}{RM48771610}$ = 0.0166	$\frac{RM631916}{RM54496898}$ = 0.0116	$\frac{RM1122435}{RM62603030}$ = 0.0179	$\frac{RM670385}{RM45932971}$ = 0.0146
X2 (**Liquidity Ratio**) (**Current Ratio**)	$\frac{RM73736498}{RM65836687}$ = 1.1200	$\frac{RM90521759}{RM80716880}$ = 1.1215	$\frac{RM97258437}{RM86346998}$ = 1.1264	$\frac{RM111191169}{RM97877606}$ = 1.1360	$\frac{RM69738708}{RM64454599}$ = 1.0820
X3 (**Tax Rate**)	$\frac{RM137408}{RM74370323}$ = 0.0018	$\frac{RM153392}{RM91185749}$ = 0.0017	$\frac{RM285006}{RM97933977}$ = 0.0029	$\frac{RM144027}{RM111970661}$ = 0.0013	$\frac{RM125091}{RM70418921}$ = 0.0018

YEAR / RATIOS	2006	2007	2008	2009	2010
Y (ROA)	$\dfrac{RM955435}{RM127779828}$ $= 0.0075$	$\dfrac{RM1178487}{RM139987541}$ $= 0.0084$	$\dfrac{RM1678036}{RM147069901}$ $= 0.0114$	$\dfrac{RM1469073}{RM160221618}$ $= 0.0092$	$\dfrac{RM1912556}{RM170823022}$ $= 0.0112$
$X1$ ($Credit\ Risk$)	$\dfrac{RM858583}{RM72965410}$ $= 0.0118$	$\dfrac{RM888867}{RM73011777}$ $= 0.0122$	$\dfrac{RM569733}{RM84922177}$ $= 0.0067$	$\dfrac{RM400486}{RM84456367}$ $= 0.0047$	$\dfrac{RM275433}{RM90816549}$ $= 0.0030$
$X2$ ($Liquidity\ Ratio$) ($Current\ Ratio$)	$\dfrac{RM127309035}{RM114267162}$ $= 1.1141$	$\dfrac{RM139513868}{RM126270939}$ $= 1.1049$	$\dfrac{RM146505854}{RM132815715}$ $= 1.1031$	$\dfrac{RM159657132}{RM142929359}$ $= 1.1170$	$\dfrac{RM170281467}{RM152350852}$ $= 1.1177$
$X3$ ($Tax\ Rate$)	$\dfrac{RM245788}{RM127779828}$ $= 0.0019$	$\dfrac{RM589452}{RM139987541}$ $= 0.0042$	$\dfrac{RM506660}{RM147069901}$ $= 0.0034$	$\dfrac{RM467996}{RM160221618}$ $= 0.0029$	$\dfrac{RM453312}{RM170823022}$ $= 0.0027$

MayBank

YEAR / RATIOS	2001	2002	2003	2004	2005
Y (**ROA**)	$\frac{RM901111}{RM111473480}$ = 0.008084	$\frac{RM987161}{RM116823173}$ = 0.00845	$\frac{RM2055052}{RM127654327}$ = 0.016099	$\frac{RM2092071}{RM143551149}$ = 0.014574	$\frac{RM3809643}{RM175434713}$ = 0.021715
X1 (**Credit Risk**)	$\frac{RM1312210}{RM4667212}$ = 0.281155	$\frac{RM1142985}{RM75000154}$ = 0.01524	$\frac{RM784121}{RM80160354}$ = 0.009782	$\frac{RM437996}{RM86718412}$ = 0.005051	$\frac{RM1296231}{RM115481632}$ = 0.011225
X2 (**Liquidity Ratio**) (**Current Ratio**)	$\frac{RM110488577}{RM100372127}$ = 1.100789	$\frac{RM115846376}{RM104897993}$ = 1.104372	$\frac{RM126617531}{RM114730079}$ = 1.103612	$\frac{RM142514511}{RM129636166}$ = 1.099342	$\frac{RM174245787}{RM157115031}$ = 1.109033
X3 (**Tax Rate**)	$\frac{RM534349}{RM111473480}$ = 0.004794	$\frac{RM456234}{RM116823173}$ = 0.003905	$\frac{RM682610}{RM127654327}$ = 0.005347	$\frac{RM791057}{RM143551149}$ = 0.005511	$\frac{RM1507735}{RM175434713}$ = 0.008594

YEAR ⟋ RATIOS	2006	2007	2008	2009	2010
Y (**ROA**)	$\dfrac{RM2520198}{RM197057006}$ = 0.012789	$\dfrac{RM3051461}{RM227337240}$ = 0.013423	$\dfrac{RM2303965}{RM219172485}$ = 0.010512	$\dfrac{RM331165}{RM238277142}$ = 0.00139	$\dfrac{RM3552685}{RM248392266}$ = RM0.014303
X1 (**Credit Risk**)	$\dfrac{RM946798}{RM127848395}$ = 0.007406	$\dfrac{RM489057}{RM118557035}$ = 0.004125	$\dfrac{RM658823}{RM138985721}$ = 0.00474	$\dfrac{RM1065839}{RM144431798}$ = 0.00738	$\dfrac{RM309867}{RM151469585}$ = 0.002046
X2 (**Liquidity Ratio**) (**Current Ratio**)	$\dfrac{RM195877508}{RM178219775}$ = 1.099078	$\dfrac{RM139513868}{RM126270939}$ = 1.098383	$\dfrac{RM218110102}{RM198053096}$ = 1.101271	$\dfrac{RM237162002}{RM212513340}$ = 1.115986	$\dfrac{RM247314669}{RM219679573}$ = 1.125797
X3 (**Tax Rate**)	$\dfrac{RM1055173}{RM197057006}$ = 0.005355	$\dfrac{RM1096823}{RM227447240}$ = 0.004822	$\dfrac{RM814610}{RM219172485}$ = 0.003717	$\dfrac{RM714244}{RM238277142}$ = 0.002998	$\dfrac{RM1233859}{RM248392266}$ = 0.004967

Public Bank

YEAR \ RATIOS	2001	2002	2003	2004	2005
Y (**ROA**)	$\dfrac{RM412998}{RM40578125}$ =0.0102	$\dfrac{RM612610}{RM46428980}$ =0.0132	$\dfrac{RM1049991}{RM58010145}$ =0.0181	$\dfrac{RM2237637}{RM88855454}$ = 0.0252	$\dfrac{RM1280892}{RM107364902}$ = 0.0119
X1 (**Credit Risk**)	$\dfrac{RM57033}{RM19653271}$ = 0.0029	$\dfrac{RM38418}{RM22540540}$ = 0.0017	$\dfrac{RM92796}{RM27327764}$ = 0.0034	$\dfrac{RM453696}{RM53856112}$ = 0.0084	$\dfrac{RM310346}{RM64579905}$ = 0.0048
X2 (**Liquidity Ratio**) (**Current Ratio**)	$\dfrac{RM40075038}{RM34565649}$ = 1.1594	$\dfrac{RM45910427}{RM40111591}$ = 1.1446	$\dfrac{RM5745987}{RM49649884}$ = 0.1157	$\dfrac{RM88288353}{RM79132202}$ = 1.1157	$\dfrac{RM106794231}{RM98068089}$ = 1.0890
X3 (**Tax Rate**)	$\dfrac{RM155321}{RM40578125}$ = 0.0038	$\dfrac{RM227007}{RM46428980}$ = 0.0049	$\dfrac{RM359151}{RM58010145}$ = 0.0062	$\dfrac{RM677425}{RM88855454}$ = 0.0076	$\dfrac{RM452139}{RM107364902}$ = 0.0042

YEAR ╲ RATIOS	2006	2007	2008	2009	2010
Y (ROA)	$\dfrac{RM1789435}{RM134267022}$ = 0.0133	$\dfrac{RM2103197}{RM158471100}$ = 0.0133	$\dfrac{RM2272736}{RM166698854}$ = 0.0136	$\dfrac{RM2181665}{RM176576601}$ = 0.0124	$\dfrac{RM2931561}{RM186409862}$ = 0.0157
$X1$ ($Credit\ Risk$)	$\dfrac{RM344516}{RM75891397}$ = 0.0045	$\dfrac{RM354134}{RM89805707}$ = 0.0039	$\dfrac{RM394189}{RM93174291}$ = 0.0042	$\dfrac{RM321237}{RM107962807}$ = 0.0030	$\dfrac{RM383940}{RM125062183}$ = 0.0031
$X2$ ($Liquidity\ Ratio$) ($Current\ Ratio$)	$\dfrac{RM133717470}{RM124339051}$ = 1.0754	$\dfrac{RM157923010}{RM147920979}$ = 1.0676	$\dfrac{RM166050532}{RM155803591}$ = 1.0658	$\dfrac{RM175925633}{RM164735011}$ = 1.0679	$\dfrac{RM185792318}{RM172431460}$ = 1.0775
$X3$ ($Tax\ Rate$)	$\dfrac{RM650501}{RM134267022}$ = 0.0048	$\dfrac{RM744420}{RM158471100}$ = 0.0047	$\dfrac{RM624831}{RM166698854}$ = 0.0037	$\dfrac{RM607505}{RM176576601}$ = 0.0034	$\dfrac{RM746096}{RM186409862}$ = 0.0040

RHB Bank

YEAR / RATIOS	2001	2002	2003	2004	2005
Y (**ROA**)	$\dfrac{RM262910}{RM57071573}$ = 0.004607	$\dfrac{RM169516}{RM57158069}$ =0.002966	$\dfrac{RM338957}{RM69307480}$ =0.004891	$\dfrac{RM339174}{RM71356012}$ = 0.004753	$\dfrac{RM269802}{RM74154469}$ = 0.003638
X1 (**Credit Risk**)	$\dfrac{RM328622}{RM42962477}$ = 0.007649	$\dfrac{RM704686}{RM41593869}$ = 0.01694	$\dfrac{RM598872}{RM42377191}$ = 0.01413	$\dfrac{RM656401}{RM37607363}$ = 0.01745	$\dfrac{RM403043}{RM37090808}$ = 0.0109
X2 (**Liquidity Ratio**) (**Current Ratio**)	$\dfrac{RM280723}{RM6696691}$ = 0.04192	$\dfrac{RM264883}{RM8344555}$ = 0.03174	$\dfrac{RM1193195}{RM7340792}$ = 0.16254	$\dfrac{RM70828185}{RM66414072}$ = 1.0665	$\dfrac{RM73668036}{RM68991235}$ = 1.0678
X3 (**Tax Rate**)	$\dfrac{RM208576}{RM57071573}$ = 0.003655	$\dfrac{RM135385}{RM57158069}$ = 0.002369	$\dfrac{RM90274}{RM69307480}$ = 0.001303	$\dfrac{RM111183}{RM71356012}$ = 0.001558	$\dfrac{RM71686}{RM74154469}$ = 0.0009667

YEAR / RATIOS	2006	2007	2008	2009	2010
Y (**ROA**)	$\dfrac{RM392045}{RM85948893}$ = 0.004561	$\dfrac{RM645393}{RM85063579}$ =0.007587	$\dfrac{RM936456}{RM84238533}$ =0.01112	$\dfrac{RM1079716}{RM94045473}$ = 0.01148	$\dfrac{RM12944}{RM105179}$ = 0.01231
X1 (**Credit Risk**)	$\dfrac{RM643959}{RM46879331}$ = 0.01374	$\dfrac{RM515111}{RM47470523}$ = 0.01085	$\dfrac{RM484862}{RM52600047}$ = 0.009218	$\dfrac{RM491490}{RM59116696}$ = 0.008314	$\dfrac{RM34973}{RM711255}$ = 0.004917
X2 (**Liquidity Ratio**) (**Current Ratio**)	$\dfrac{RM85476999}{RM78797367}$ = 1.08477	$\dfrac{RM84643265}{RM79795959}$ = 1.0607	$\dfrac{RM83799368}{RM76998296}$ = 1.0883	$\dfrac{RM93568912}{RM85792022}$ = 1.0906	$\dfrac{RM104638}{RM959135}$ = 1.0909
X3 (**Tax Rate**)	$\dfrac{RM185719}{RM85948893}$ = 0.002161	$\dfrac{RM239874}{RM85063579}$ = 0.002819	$\dfrac{RM348548}{RM84238533}$ = 0.004138	$\dfrac{RM277628}{RM94045473}$ = 0.002952	$\dfrac{RM16313}{RM105179}$ = 0.001551

Hong Leong Bank

YEAR　　　RATIOS	2001	2002	2003	2004	2005
Y (**ROA**)	$\dfrac{RM511846}{RM24474305}$ $= 0.0209$	$\dfrac{RM262768}{RM26448680}$ $= 0.0099$	$\dfrac{RM668824}{RM28510895}$ $= 0.0235$	$\dfrac{RM369315}{RM36778941}$ $= 0.0100$	$\dfrac{RM1105795}{RM57675075}$ $= 0.0192$
X1 (**Credit Risk**)	$\dfrac{RM232321}{RM11673252}$ $= 0.0199$	$\dfrac{RM174347}{RM12544988}$ $= 0.0139$	$\dfrac{RM162834}{RM13406545}$ $= 0.0121$	$\dfrac{RM280050}{RM15546040}$ $= 0.0180$	$\dfrac{RM165434}{RM25578044}$ $= 0.0065$
X2 (**Liquidity Ratio**) (**Current Ratio**)	$\dfrac{RM24322057}{RM21598018}$ $= 1.1261$	$\dfrac{RM26291092}{RM23526606}$ $= 1.1175$	$\dfrac{RM28348255}{RM24974398}$ $= 1.1351$	$\dfrac{RM36606067}{RM32618260}$ $= 1.1223$	$\dfrac{RM57445240}{RM52561261}$ $= 1.0929$
X3 (**Tax Rate**)	$\dfrac{RM173119}{RM24474305}$ $= 0.0071$	$\dfrac{RM99752}{RM26448680}$ $= 0.0038$	$\dfrac{RM263952}{RM28510895}$ $= 0.0093$	$\dfrac{RM145014}{RM36778941}$ $= 0.0039$	$\dfrac{RM424217}{RM57675075}$ $= 0.0074$

YEAR / RATIOS	2006	2007	2008	2009	2010
Y (**ROA**)	$\dfrac{RM502556}{RM55139095}$ = 0.0091	$\dfrac{RM547031}{RM66161398}$ = 0.0083	$\dfrac{RM696530}{RM69992756}$ = 0.0100	$\dfrac{RM659678}{RM70732513}$ = 0.0093	$\dfrac{RM767817}{RM77730208}$ = 0.0099
X1 (**Credit Risk**)	$\dfrac{RM228214}{RM24671107}$ = 0.0093	$\dfrac{RM157355}{RM27965985}$ = 0.0056	$\dfrac{RM141335}{RM30306207}$ = 0.0047	$\dfrac{RM143297}{RM30938086}$ = 0.0046	$\dfrac{RM104568}{RM33589093}$ = 0.0031
X2 (**Liquidity Ratio**) (**Current Ratio**)	$\dfrac{RM54903582}{RM49868716}$ = 1.1010	$\dfrac{RM65926085}{RM59823851}$ = 1.1020	$\dfrac{RM69718534}{RM63059102}$ = 1.1056	$\dfrac{RM70435501}{RM63086070}$ = 1.1165	$\dfrac{RM77419045}{RM68024850}$ = 1.1381
X3 (**Tax Rate**)	$\dfrac{RM194563}{RM55139095}$ = 0.0035	$\dfrac{RM212413}{RM66161398}$ = 0.0032	$\dfrac{RM252491}{RM69992756}$ = 0.0036	$\dfrac{RM226717}{RM70732513}$ = 0.0032	$\dfrac{RM193188}{RM77730208}$ = 0.0025

DataStream Data for X4 and X5 of the Five Local Commercial Banks

Year	X4_CIMB	X4_MBB	X4_PBB	X4_RHB	X4_HLB
2001	0.01410	0.01410	0.01410	0.01410	0.01410
2002	0.01810	0.01810	0.01810	0.01810	0.01810
2003	0.01090	0.01090	0.01090	0.01090	0.01090
2004	0.01420	0.01420	0.01420	0.01420	0.01420
2005	0.02970	0.02970	0.02970	0.02970	0.02970
2006	0.03630	0.03630	0.03630	0.03630	0.03630
2007	0.02000	0.02000	0.02000	0.02000	0.02000
2008	0.05430	0.05430	0.05430	0.05430	0.05430
2009	0.00640	0.00640	0.00640	0.00640	0.00640
2010	0.01720	0.01720	0.01720	0.01720	0.01720

Year	X5_CIMB	X5_MBB	X5_PBB	X5_RHB	X5_HLB
2001	0.08850	0.08850	0.08850	0.08850	0.08850
2002	0.03300	0.03300	0.03300	0.03300	0.03300
2003	0.02910	0.02910	0.02910	0.02910	0.02910
2004	0.00300	0.00300	0.00300	0.00300	0.00300
2005	0.01260	0.01260	0.01260	0.01260	0.01260
2006	0.02510	0.02510	0.02510	0.02510	0.02510
2007	0.01370	0.01370	0.01370	0.01370	0.01370
2008	-0.03860	-0.03860	-0.03860	-0.03860	-0.03860
2009	0.12870	0.12870	0.12870	0.12870	0.12870
2010	-0.00070	-0.00070	-0.00070	-0.00070	-0.00070

Appendix 4.1.2: E-views Results for Pooled OLS

Method: Pooled Least Squares
Date: 02/19/13   Time: 18:02
Sample: 2001 2010
Included observations: 10
Cross-sections included: 5
Total pool (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001324	0.001626	0.814362	0.4198
X1_?	-0.018206	0.008697	-2.093291	0.0421
X2_?	0.002515	0.001203	2.089694	0.0425
X3_?	2.404101	0.178778	13.44741	0.0000
X4_?	-0.058948	0.032592	-1.808678	0.0773
X5_?	-0.023715	0.009914	-2.392060	0.0211

R-squared	0.825051	Mean dependent var	0.010914
Adjusted R-squared	0.805170	S.D. dependent var	0.005241
S.E. of regression	0.002313	Akaike info criterion	-9.187980
Sum squared resid	0.000235	Schwarz criterion	-8.958537
Log likelihood	235.6995	Hannan-Quinn criter.	-9.100607
F-statistic	41.50032	Durbin-Watson stat	1.391274
Prob(F-statistic)	0.000000		

Appendix 4.2: E-views Results and Calculations for Sensitivity Analysis

1. Results of dropping HLB

Dependent Variable: Y_?
Method: Pooled Least Squares
Date: 02/22/13   Time: 17:31
Sample: 2001 2010
Included observations: 10
Cross-sections included: 4
Total pool (balanced) observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001878	0.001863	1.007569	0.3208
X1_?	-0.017290	0.009406	-1.838249	0.0748
X2_?	0.002602	0.001311	1.984842	0.0553
X3_?	2.388384	0.234748	10.17423	0.0000
X4_?	-0.071887	0.039108	-1.838153	0.0748
X5_?	-0.031283	0.011955	-2.616629	0.0132

R-squared	0.790150	Mean dependent var		0.010391
Adjusted R-squared	0.759289	S.D. dependent var		0.005046
S.E. of regression	0.002476	Akaike info criterion		-9.026993
Sum squared resid	0.000208	Schwarz criterion		-8.773661
Log likelihood	186.5399	Hannan-Quinn criter.		-8.935396
F-statistic	25.60404	Durbin-Watson stat		1.395236
Prob(F-statistic)	0.000000			

2. Results of dropping RHB

Dependent Variable: Y_?
Method: Pooled Least Squares
Date: 02/22/13   Time: 17:33
Sample: 2001 2010
Included observations: 10
Cross-sections included: 4
Total pool (balanced) observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004482	0.002771	1.617188	0.1151
X1_?	-0.016650	0.008046	-2.069391	0.0462
X2_?	-0.001079	0.002193	-0.491919	0.6259
X3_?	2.423911	0.190367	12.73281	0.0000

X4_?	-0.034948	0.033659	-1.038310	0.3065
X5_?	-0.021038	0.010367	-2.029321	0.0503

R-squared	0.849963	Mean dependent var	0.011944
Adjusted R-squared	0.827899	S.D. dependent var	0.005114
S.E. of regression	0.002121	Akaike info criterion	-9.335977
Sum squared resid	0.000153	Schwarz criterion	-9.082645
Log likelihood	192.7195	Hannan-Quinn criter.	-9.244381
F-statistic	38.52212	Durbin-Watson stat	1.635069
Prob(F-statistic)	0.000000		

3. Results of dropping PBB

Dependent Variable: Y_?
Method: Pooled Least Squares
Date: 02/22/13   Time: 17:34
Sample: 2001 2010
Included observations: 10
Cross-sections included: 4
Total pool (balanced) observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000350	0.001719	0.203425	0.8400
X1_?	-0.015406	0.008474	-1.818094	0.0779
X2_?	0.003465	0.001327	2.611732	0.0133
X3_?	2.219718	0.187219	11.85629	0.0000
X4_?	-0.051109	0.034596	-1.477298	0.1488
X5_?	-0.021413	0.010639	-2.012722	0.0521

R-squared	0.834069	Mean dependent var	0.009969
Adjusted R-squared	0.809668	S.D. dependent var	0.005075
S.E. of regression	0.002214	Akaike info criterion	-9.250534
Sum squared resid	0.000167	Schwarz criterion	-8.997202
Log likelihood	191.0107	Hannan-Quinn criter.	-9.158937
F-statistic	34.18095	Durbin-Watson stat	1.721483
Prob(F-statistic)	0.000000		

4. Results of dropping MBB

Dependent Variable: Y_?
Method: Pooled Least Squares
Date: 02/22/13   Time: 17:35
Sample: 2001 2010

Included observations: 10
Cross-sections included: 4
Total pool (balanced) observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002720	0.001791	1.518514	0.1381
X1_?	-0.149344	0.062059	-2.406473	0.0217
X2_?	0.002927	0.001107	2.643966	0.0123
X3_?	2.361779	0.187334	12.60734	0.0000
X4_?	-0.069665	0.033587	-2.074178	0.0457
X5_?	-0.018838	0.009933	-1.896548	0.0664

R-squared	0.858170	Mean dependent var		0.010609
Adjusted R-squared	0.837313	S.D. dependent var		0.005211
S.E. of regression	0.002102	Akaike info criterion		-9.354497
Sum squared resid	0.000150	Schwarz criterion		-9.101165
Log likelihood	193.0899	Hannan-Quinn criter.		-9.262900
F-statistic	41.14468	Durbin-Watson stat		1.533127
Prob(F-statistic)	0.000000			

5. Results of dropping CIMB

Dependent Variable: Y_?
Method: Pooled Least Squares
Date: 02/22/13   Time: 17:37
Sample: 2001 2010
Included observations: 10
Cross-sections included: 4
Total pool (balanced) observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001486	0.001811	0.820608	0.4176
X1_?	-0.017608	0.009264	-1.900654	0.0659
X2_?	0.002490	0.001314	1.894822	0.0666
X3_?	2.462986	0.212710	11.57910	0.0000
X4_?	-0.074007	0.038821	-1.906364	0.0651
X5_?	-0.026739	0.011784	-2.269159	0.0297

R-squared	0.829524	Mean dependent var		0.011655
Adjusted R-squared	0.804454	S.D. dependent var		0.005531
S.E. of regression	0.002446	Akaike info criterion		-9.051470
Sum squared resid	0.000203	Schwarz criterion		-8.798139
Log likelihood	187.0294	Hannan-Quinn criter.		-8.959874
F-statistic	33.08831	Durbin-Watson stat		1.187240

Prob(F-statistic)   0.000000

Workings/Calculations for 95% of Confidence Interval

Formula =: $\bar{x} \pm t\alpha_{/2} \frac{\sigma}{\sqrt{n}}$
= (Low Confidence Interval, High Confidence Interval)
Where $\bar{x}$ = Mean, α=0.025 and $\frac{\sigma}{\sqrt{n}}$ = Standard Error

X5 (Interest Rate Risk)

ALL = -0.02372 $\pm$ 2.0105 (0.009914)
    = (-0.04365, -0.003783)

HLB = -0.03128 $\pm$ 2.0105 (0.01196)
    = (-0.05532, -0.007248)

RHB = -0.02104 $\pm$ 2.0105 (0.01037)
    = (-0.04188, -0.0001951)

PBB = -0.02141 $\pm$ 2.0105 (0.01064)
    = (-0.04280, -0.00002329)

MBB = -0.01884 $\pm$ 2.0105 (0.009933)
    = (-0.03881, -0.001132)

CIMB = -0.02674 $\pm$ 2.0105 (0.01178)
    = (-0.006047, -0.05343)