AN EMPIRICAL ANALYSIS OF COMMERCIAL BANKS' PROFITABILITY DETERMINANTS IN MALAYSIA AFTER THE 2008 FINANCIAL CRISIS

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

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LIST OF ABBREVIATIONS

ROA	Return on Assets
CAR	Capital Adequacy Ratio
EXPS	Expenses Management
INC	Interest Coverage
LSIZE	Logarithm of the Total Assets of Each Commercial Banks
LDEPOSITS	Logarithm of the Total Deposits of Each Commercial Banks
LLOANS	Logarithm of the Total Loans of Each Commercial Banks
LTI	Logarithm of the Total Interest Income of Each Commercial Bank
BLR	Average Base Lending Rate
IR/INF	Inflation Rate
GDP	Annual Percentage Changes of Malaysian Gross Domestic Production
DEA	Data Envelopment Analysis (DEA)
EVA	Economic Value Added
PLS	Panel least square
GDPR	Gross Domestic Product Growth
MACGDP	Macroeconomic Conditions and Ratios Stock Market Capitalization to GDP
MACPASS	Stock Market Capitalization to Total Assets of Deposit Money Banks

ASSGDP	Total Assets of Deposit Money Banks to GDP
CONC	Banking Industry Concentration
LOSSPROV	Loan Loss Provisions to Net Interest Income
EQAS	Equity to Assets Ratio
HHI	Herfindahl-Hirschman Index
ROAA	Return on Average Assets
SCP	Structure-Conduct-Performance
RTOE	Ratio of Total Operating Expenditures to Total Assets
RCDD	Ratio of Demand (current account) Deposits to Total Deposits
TLTA	Ratio of Total Loans and Advances to Total Assets
MPI	Malmquist Productivity Index
NIM	Net Income Margin
RSIZE	Relative Size

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PREFACE

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

This paper is conducted under the title of "An Empirical Analysis of Commercial Bank's Profitability in Malaysia After the 2008 Financial Crisis". It is to be accomplished within 28 weeks.

Banking activity has rooted itself in Malaysia for so long but there is only few researches that talks about profitability determinants of commercial banks in Malaysia after financial crisis's, thus, this is the reason why we are conducting this paper, as it is essential to outline the profit determinants of commercial banks in Malaysia after financial crisis.

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

ABSTRACT

The main purpose of this research is to find out the profitability determinants of commercial banks in Malaysia after the 2008 financial crisis. 8 commercial banks have been chosen to represent the commercial banks in Malaysia during the time line from 2004 till 2010.

ROA was chosen as a dependent variable to estimate the commercial bank's profit, and 10 independent variables which are base lending rate, gross domestic production, inflation rate, capital adequacy ratio, total income, expenses management, interest coverage, total loans, total deposits, and bank size

After running these data on the data analysis software, it is found that only base lending rate, interest coverage, and capital adequacy ratio are significant variables while the other variables are insignificant in determining the profitability determinants of commercial banks in Malaysia after the financial crisis in 2008.

Chapter 1: Introduction

1.0 Background of Study

Banks is a critical point to financial system and plays an important role as control and contributes growth to the economic sector. The activities in a bank are lending funds to borrower which is that business firm by using issuing bonds and borrow money from lender which is households by using the ways of funds deposited in current account, saving accounts, or fixed deposit. In this process of lending and borrowing funds, the interest rate is discovering by paying lower interest to lender in a certain rate and receiving higher interest from borrower in order to establish a profitability level.

In 2002, the Malaysian government started the implementation of the banking sector reformation in respond to the 1997 financial crisis. Under the reform plan, Malaysian government guided the merger activities in the banking sector through the central bank. Prior to that date, the banking sector was made up of 54 domestic deposit taking institutions which became ten large-capitalized banks by the end of 2002 *(Ahmad, R.,Arrif, M & Skully, M. 2007)*.

Besides economic and regulatory factors, technology has revolutionised banking process and reshaped the industry. E-commerce and online banking were examples of technology-driven products that have fundamentally changed the way banks and other financial service providers competed. Widespread adoption of state-of-the-art technology in banking industry has undoubtedly made the Malaysian banking industry increasingly competitive.

Economic and regulatory forces as well as heightened competition may affect bank performance positively or negatively. It can be argued that due to bank-specific factors like quality of management, market coverage and size of capital. Different banks are affected with different degree of severity. The question then is does bank performance matter and for whom?

Various groups are interested in bank profitability for various reasons. The bank shareholders would want to know if the value of their investments are created or destroyed. Investors too use current and past performance to form expectation concerning future price of the banks' shares traded on the stock exchanged. The management of the bank as trustee of the shareholders is evaluated and compensated on the basis of how well their decisions and planning have contributed to growth in assets and profits of their banks. Bank employees too are concerned with profits, since their salaries and promotions are frequently tied to the profitability performance of their banks. Regulators concerned about the safety and soundness of the banking system and about preserving public confidence, monitor closely the banks performance and profits using on-site examinations and computer-oriented "early warning system" tracking. Depositors use bank performance and profitability as indicators of security for their deposits. Finally, business community and general public are concerned about their banks' performance to the extent that their economic prosperity is linked to the success or failure of their banks.

1.1   Problem Statement

In general, the Malaysian banking system entered the current global financial and economic crisis from a much stronger position compared to the Asian financial crisis. The consolidation and restructuring of the banking industry together with improvements in the governance structure, risk management framework, infrastructure and practices, as well as the capacity building undertaken as part of the banking sector reforms following the Asian financial crisis, have significantly strengthened the foundations for financial stability. Moreover, the Malaysian banking system operates within a diversified financial system, with a developed capital market. Total bonds outstanding accounted for 86% of GDP, providing an alternative funding source for the economy. The funding sources for businesses are evenly balanced between the equity and bond markets and the banking sector, thus diversifying credit risk concentration away from the banking system, which in turn provides the banking system with added capacity to withstand stress and shocks.

Another factor which prevented excessive risk-taking was the "originate and hold" business model adopted by banking institutions in Malaysia, where credit risks are retained within institutions' balance sheets. This served to align incentives with prudent risk-taking and ensured that lending institutions continued to vigilantly assess the repayment capacity of the risk weight of non-performing housing loans to 100% since March 2005 under the regulatory capital framework further strengthened incentives for banks to maintain high-quality loan portfolios. The legal requirement for all foreign institutions in Malaysia to be locally incorporated, with capital committed to support Malaysian operations and obligations, also limited any contagion effects of stresses faced by foreign-domiciled parent banks located in the countries severely affected by the crisis.

Notwithstanding the progressive deterioration of global conditions and the heightened uncertainty in the domestic economic outlook, the banking sector in Malaysia was well placed to maintain a "business-as-usual" posture with respect to risk management policies and standards. Risk mitigation responses were mainly pre-emptive in nature and largely took the form of more intensive surveillance and on-the-ground monitoring of small- and medium scale borrowers, and the retail segments comprising credit cards and hire purchase facilities for cars, which were experiencing a slight uptick in the level of delinquencies. Banking institutions were also forthcoming in facilitating the rescheduling or restructuring of debt repayment obligations of deserving borrowers facing temporary cash flow constraints. These pre-emptive measures prevented premature defaults among such otherwise creditworthy borrowers.

To ensure the undisrupted flow of funds to the real sector, the BNM intensified its engagements with various stakeholders, including financial institutions, trade associations and businesses, beginning as far back as the early part of 2008 when conditions in the global economy appeared to be worsening and increasingly fragile. These engagements proved to be particularly effective in bridging information gaps between financial institutions and businesses, and encouraging a better appreciation among financial institutions of the issues facing businesses. This in turn supported the rational credit decisions of financial institutions in relation to new and additional facilities as well as requests for the restructuring of outstanding facilities.

The foremost reason of this research is to set up a theoretical framework of commercial bank profitability to determine the variables which should be included in profitability models after a financial crisis. In this circumstance, variations in environmental factors and financial reporting measures are taken into account.

In this competitive environment, to identify bank's profitability determinants is the main reason because by knowing the variables that affect the bank's profit and bank's management contributes to the effort to optimize these variables and can be taken into consideration when decision are being made. Furthermore, by identifying

the profitability determinants is important to the bank's owner as well to the regulatory maker as they can assess and adjusts the performance of banks and the regulation to maximize profit *(Mamatzakis, & Remoundos, 2003; Pasiouras, & Kosmidou, 2007).*

Factors like consolidation, competition, crisis, and capital give different impact on bank profit in different economies. This has been the findings of many analytical studies on the profitability performance of the commercial banks. Unfortunately, there have not been many studies on the profitability performance of commercial banks. For that reason, this research intends to fill the gap by attempting to identify and measure factors that determine the profitability performance of commercial banks in Malaysia.

This study investigates that ways to improve profitability from its banking activities in Malaysia. It is examines the relationship between the profitability of banks in Malaysia and the ten variables chosen which is capital adequacy ratio, expenses management, interest coverage, bank size, total deposits, total loan, total income , gross domestic product and inflation rate. The determinants of banks' profitability are usually classified into 2 parts which is internal and external factors. From the research, internal factors focus on bank-specific features and its considered size, capital, efficiency and credit risk of banks. Whereas external factors are consider in macroeconomic and industry characteristics. In this study we included the eight of Malaysia's banks which is CIMB, Public Bank, Maybank, Affin Bank, Am Bank, RHB Bank, Hong Leong Bank and HSBC Bank during the period 2004 to 2010.

1.2 Research Objective

This exploratory study seeks to identify the determinants of commercial banks' profits. The study uses secondary data to measure the profitability and performance of Malaysia commercial banks for the seven year period from 2004-2010.

1.2.1 General Objective

The research is carried out to discover which variables that can determine the performance and profitability of Malaysian banks after the financial crisis happened in 2008. Resources of study are obtained from secondary data from year 1997 until year 2010. From those variables selected in the study, we analyze the significant profitability determinants. Moreover, our study is contributing to the existent literature as to make some improvement on it.

1.2.2 Specific Objective

In the circumstances, the main objective has been sub-divided as follows:-

- To identify factors that significantly affects the banks' profit during the study period.

- To generate data and enrich literature on profitability performance of domestic commercial banks.

1.3 Research Questions

The purpose of this research is to answer these following questions:

1. Is/Are there independent variables explain the changes in the bank's profitability level?

2. Is/Are there any significant relationship between the independent variables and the bank's profitability?

1.4 Significance of the Study

The importance of conducting the study is to provide empirical evidence on the profitability determinants of banks especially in Malaysia and it is leading to the idea that is given in the studies of existence relative literature. Hence, the study's outcome could help the country's regulator in formation of policy to deal with unexpected change in economic conditions, capital adequacy regulations and other factors that might affecting the banks' profitability. Furthermore, the study which is expected to provide empirical evidence might guide the bank's manager and owner in their strategic planning and consideration which allowing them to making more precise decision. This will generate greater impact on banks' profitability.

1.5   Scope of Study

Our study purpose is to determine the profitability determinants of bank after the 2008 financial crisis. In this study, we had included eight Malaysia banks which are CIMB, Public Bank, Maybank, Affin Bank, Am Bank, RHB Bank, Hong Leong Bank and HSBC Bank during year 2004 to year 2010 where we included capital adequacy ratio, expenses management, interest coverage, bank size, total deposits, total loan, total income, consumer price index, gross domestic product and inflation as the independent variables while return on assets as a dependent variable.

1.6   Chapter Layout

The remainder of this study is organised as follows:-

Chapter 1 will proceed with the description of the problem statement and research objective. It will then outline the significance of the research and will end with the research scope and research study chapter layouts.

Chapter 2 reviews the literature relating to profitability performance of the commercial banks. Some of these literatures have directly inspired the researcher to study what factors determine profitability performance of Malaysia commercial banks.

Chapter 3 describes the data and methodology, where it begins with the description of the data source and ends with the explanation on the analysis of the data.

Chapter 4 presents and discusses the findings. It includes the general discussion on the banks performance and the specific discussion on the internal and the external factors that have been identified as significant determinants of commercial banks profitability.

Lastly, chapter 5 concludes the research findings and offers some suggestions to further refine further research on the performance of Malaysian commercial banks.

1.7   Conclusion

All in all, this study aims to find the significance of each independent variable in regards to the dependent variable to determine the profitability determinants for commercial banks of Malaysia after the financial crisis based on existing literature on the subject and regression analysis of the data obtained from the related banks.

Chapter 2: Literature Review

2.0 Introduction

In the last decades, many studies have been undertaken to investigate the profitability determinants of commercial banks. Most of the studies have not been confined to national boundaries but have expanded using cross country data. In addition, some divided the profitability determinants into two categories i.e. internal and external determinants. Together these studies have been able to postulate some profitability theories related to banking. This chapter explores the previous literature related to the scope of this study and the determinants suggested by several studies done locally and globally regarding the profitability of commercial banks.

2.1 Review of Literature

A look at previous studies done on banking profitability reveals various factors which affects it. These factors could be microeconomic factors and bank specific factors.

Molyneux and Thornton (1992) found significant positive relationships between profitability (proxied through return on equity) and several macroeconomic

factors which were the level of interest rates, bank concentration and government owenership in the 18 European countries studied. Chaudry et al (1995) also found that US banks during the 1970s and 1980s depended on general interest rate trends. Gure et al (2002) however found a negative relationship between interest rates and bank profitability.

Other significant macroeconomic factors discovered in other studies are inflation rate and gross domestic product. Abreu and Mendes (2002) found that inflation rate positively affects the profitability of banks. This relationship was also found by Guru et al (2002) in their study on Malaysian banks, Naceur (2003) for Tunisian banks, Kosmidau et al (2005) for domestic UK commercial banks, Athanasoglou et al (2006) for banks in the South Eastern European region, Flamini et al (2009) for Sub-Saharan African commercial banks and by Sufian and Habibullah (2009) for commercial banks in China. These authors also found a positive relationship between GDP and profitability of the banks they studied. Bashir (2000) found the same relationship between GDP and profitability across eight Middle Eastern countries. However, Demerquc-Kunt and Huizingha (1999) found the ratio of bank asset to GDP led to lower profitability. They also found that lower market concentration led to lower profitability and this was also confirmed by Flamini et al (2009) who found a positive relationship between market concentration and bank profitability.

Aside from macroeconomic factors, bank specific factors have been shown to be just as important in determining the profitability of banks. These bank specific factors relate to the capital, liquidity, operational efficiency and asset quality of the banks. For instance, Abreu and Mendes (2002) found that well capitalized banks faced lower expected bankruptcy costs that enhance profit, thus showing a positive relationship between capital and profitability. Bashir (2000) measured capital efficiency through the equity to total asset ratio and found the same result, as did Nacuer (2003), Kosmidau et al (2005), Flamini et al (2009), Vong and Hoi (2009) and Sufian and Habibullah (2009). However, Asthanasoglou et al (2006) using the same

ratio found that capital was negatively related to bank profitability. Ghafar et al (2006) used the agency cost hypothesis to argue that low equity to total asset ratio reduces agency cost and increases firm value.

Camilleri (2005) found a positive relationship between profitability and size. But their findings are interesting in the sense that the banks' strength differed significantly, where when large banks hold more capital, there is a weaker relationship with its interest income and these banks then operate on a lower cost. This is in contrast to the smaller banks that have accumulated a relatively higher loan reserves and hold a higher ratio of liquid assets. Despite taking the log of total asset as the measure of size, results differed in the various studies. Bashir (2000) found size to negatively affect the profitability of Middle Eastern Islamic banks. This relationship was also found by Kosmidau et al (2005) and Sufian and Habibullah (2009) for conventional banks. However, Camilleri (2005), Athanasaglou et al (2006) and Flamini et al (2009) found size to positively affect the profitability of the banks they studied.

2.2   Bank Profitability

Profit generation is the most important target to all business and banks are not exception to this fact. However, banking sector has its own characteristics that make its position sensitive to the whole economy. That is, banks play a significant role as an intermediary institution in the economy growth and financial system stability. Banks basically gain the profit from lending activities through the difference between the interest paid to the depositors and interest received from the borrower. In addition, the non interest revenue which is received against the services offered has gained more

attention recently because of the limited opportunity to increase the interest revenue due to the competition difficulties. The study of banks profitability determinants is crucial for bank's managers, investors and government as they can assess the banks performance and adjust the government policy, investor choices and banks' manager's plans and decisions in order to achieve the target goals *(Mamatzakis, & Remoundos, 2003; Pasiouras, & Kosmidou, 2007.)*

2.3   Profitability Determinants

Bank profitability is the result of the interaction between internal and external factors that affects the bank. Athanasoglou, Brissimis and Delis *(2008)* divided these determinants into three categories, i.e., bank-specific determinant, industry-specific determinants and macroeconomic profitability determinants. Based on their explanation, the bank-specific determinants involve factors that arise from the bank structure as well as the daily activities that conducting in banks.

Although most of the previous studies have used return on assets (ROA) and return on equity (ROE) or one of them as a dependent variable to measures the bank profitability and efficiency, the independent variables that represent the bank-specific, industry-specific and macroeconomic profitability determinants were different from one study to another. The same thing can be noted in the empirical results in these studies which reflect the variation in the country's economic conditions, the degree of financial sector development and liberalization and the period of study, banks specific characteristics as well as the regulatory environment.

Pasiouras and Kosmidou *(2007)* conducted a research to study and to compare the performance of domestic and foreign banks operating in the 15 EU countries over

the period 1995–2001. They used return on average assets (ROAA) to evaluate bank's performance and bank's total assets, the cost to income ratio, the ratio of equity to assets and the ratio of bank's loans divided by customers and short term funding as the internal factors. For the external factors, they used gross domestic product growth (GDPGR) and inflation (INF) to evaluate the macroeconomic conditions and the ratios stock market capitalization to GDP MACGDP, stock market capitalization to total assets of deposit money banks (MACPASS), total assets of deposit money banks to GDP (ASSGDP) and banking industry concentration (CONC).

Kosmidou, Fotios Pasiouras, and Tsaklanganos *(2007)* studied the profitability determinants of 19 Greek banks operating in 11 different countries for the period of 1995 -2001. They tried to examine the assumption that foreign banks are more at a disadvantage compared to the domestic banks in developed countries although not so in less developed countries. They used ROA as the dependent variable and the ratio of loan loss provisions to net interest income LOSSPROV, the bank liquidity LIQUID, the equity to assets ratio EQAS, the ratio of non-interest expenses to average assets COST, the logarithm of a subsidiary's total assets SIZE, the ratio of stock market capitalization to total assets of the deposit money banks MACPASS, ratio of bank's deposits relative to the total deposits of the banking market SHARE and C5 to measure the concentration in the banking market as independent variables.

Instead, Park and Weber *(2006)* investigated the profitability determinants of the Korean banking sector for the period of 1992–2002 by using Data Envelopment Analysis (DEA) to test the market structure hypothesis against the efficient structure hypothesis. The empirical evidence supported the efficient structure hypothesis where they found that bank efficiency has a significant effect on bank profitability. Moreover, they found that market concentration has a negative relationship with banks profitability over the whole period of study. Their findings also indicated that the key determinants of bank profitability in Korea have changed after Asian financial crisis.

Lu, Y., Fung, H. F. and Jiang, X. *(2007)* investigated the changes in market structure and financial performance *(profitability)* of Chinese commercial banks for the period between 2002 and 2005 by using a sample of four state-owned commercial banks, ten joint-share commercial banks, and all foreign banks in China. The researches pointed out that the growth in the Chinese banking sector became faster after the implementation of the Chinese government reform plan. They summarized the results of the reform plan to three main benefits, i.e., the Chinese banks have become more competition and required sound financial performance. The researchers improved the nonperforming loans and China's entry into the World Trade Organization (WTO). They measured the bank's profitability by return on assets (ROA) and return on equity (ROE) and the market structure by using the concentration ratio and Herfindahl-Hirschman Index (HHI). They noted that both concentration ratio and Herfindahl-Hirschman Index (HHI) vary during the study period where the banking markets were highly concentrated in terms of loans, deposits, and assets before 2002. This picture, however, changed after that where the Chinese banking industry concentration became moderated. The empirical results indicated that market structure was not the major factor that affected the bank's profitability. Besides, the returns on assets of state-owned banks were lower than those of joint-share banks and of foreign banks whereas the returns on equity for state-owned banks were higher than those of foreign banks. Additionally, the banking market structure in China is moderately concentrated and the foreign banks have some effect on the market structure but they are not large enough yet to challenge Chinese banks.

For the Malaysian side, however, there are limited studies related to this issue. For example, Katib *(2004)* examined the structure-conduct-performance (SCP) hypothesis against the competing efficient structure hypothesis of 20 Malaysian commercial banks over the period from 1989 to 1996 by using a robust estimation method. He used a controlled variable ratio of total operating expenditures to total assets (RTOE) which reflects the ability of the banks to operate at lower costs, ratio of total loans and advances to total assets (TLTA) as a measurement of risk factor and

the ratio of demand (current account) deposits to total deposits (RCDD) to measure the cheap source of funds for the bank. The results indicated that banks efficiency is not the factor that determined the banks market shares and performance. In addition, the empirical results provided significant evidence supported the SCP hypothesis that market concentration determines profitability in the Malaysian.

The more recent study on this issue was conducted by Sufian *(2009)*. He discussed the 1997 financial crisis causes and consequences on the East Asian financial sector. In this context, he argued that the causes of the financial crisis are the poor banking practices and lack of revenue diversification, inadequate capital, shortcomings in the assessment of credit risk, lending to connected enterprises, excessive maturity or currency mismatches, and rapid rise of non-performing loans. As a result of this, East Asian banks became collapsed under the stress and became insolvent.

Goddard (*2004)* investigated the profitability determinants of the European banks. They applied cross-sectional and dynamic panel estimation methods on the data of six major European banking sectors namely Denmark, France, Germany, Italy, Spain and the UK for the period 1992–98. They used ROE to represent banks' profitability, the natural logarithm of total assets, OBS business as a proportion of assets plus OBS business, CAR, ownership and SIZE as the explanatory variables. They found a positive relationship between size and CAR and profit. In contrast, the found little evidence of a systematic relationship between ownership type and profitability, unconvincing relationship between size and profitability while the relationship between the relative size of a bank's OBS portfolio and its profitability was mixed.

Naceur (*2003)*, observed the effect of bank's characteristics, financial structure and macroeconomic indicators on bank's net interest margins and profitability in the Tunisian banking industry for the 1980-2000 period. He used ROA, ROE and NIM as dependent variables to estimate bank's profitability. The independent variables were the ratio of overhead to total assets, the ratio of equity

capital to total assets (CAP), the ratio of bank's loans to total assets (BLOAN), the ratio of noninterest bearing assets to total assets (NIBA) and the log of bank assets (LSIZE) as internal determinants. The macro economic measures were Inflation (INF) and GDP per capita growth. In addition, he used Relative size (RSIZE) as the ratio of the stock market capitalization to total assets of deposit money banks, stock market capitalization divided by GDP (MCAP). The size of the banking sector (SBS) was measured by the ratio of total assets of the deposit banks to GDP. MCAP and SBS were used in order to indicate the complementariness or substitutability between bank and equity market financing. His findings recorded that there is a positive and significant coefficient on the overhead to assets ratio variable in the net interest margin and return on assets equations while the LSIZE on the other hand has mostly negative and significant coefficients on the net interest margins equations. The macroeconomic indicators i.e. inflation and economic growth are insignificant in both spread and profit regressions. The stock market capitalization to GDP ratio had positive relationship with ROA. Besides, the concentration ratio has a negative and significant impact only on net interest margin. In addition, the stock market capitalization to banking assets ratio had a positive relationship with ROE.

Most studies concluded that bank's productivity had positive impact on operating efficiency which is contributing in scale efficiency thus improving the profitability of a bank. Fadzlan Sufian & M. Kabir Hassan(2011) has carried out the panel regression analysis. The empirical result implies that the more productive banks tend to have a higher proportion of income emanating from non-interest sources and follow the expense preference behavior. Their research also brings forth the importance of technological change in determining banks' total factor productivity which could influence Malaysian banks profitability as mention earlier. In the study, they employed two different estimating principles, the DEA based MPI method, is a non-parametric and oriented to frontier and also use the central tendency and parametric method that are involved in a panel regression analysis to investigate the Malaysian banking sector's production efficiency, while controlling for the potential

effects of the contextual variables. In this way, they protect against the 'methodological bias' that could occur when only one method is used.

2.4   Conclusion

In conclusion, previous literature studies provide a platform for this study as the independent and dependent variables are explained well by their research. These results can be used to compare and contrast with the outcome of the research study undertaken to determine the profitability determinants of commercial banks in Malaysia and analyse the effects of these determinants on the banks.

Chapter 3: Research Methodology

3.0 Introduction

Research methodology describes on how the research is carried out in terms of research framework, variable specification, data collection methods, techniques of data analysis, and econometric treatment.

This research tries to evaluate if the independent variables which are capital ratio, expenses management, interest coverage, banks size, total deposits, total loans, total income, based lending rates of the Malaysian commercial banks, inflation rate and gross domestic production is significant to its dependent variable which is the return on asset.

Eight commercial banks are selected for this study from the year frame of 2004 to 2010. The banks that have been chosen are CIMB, Maybank, RHB Bank, Public Bank, Affin Bank, Am Bank, HSBC, and Hong Leong Bank. This time span has been chosen as it was 4 years before and 3 years after the 2008 financial crisis.

3.1 Research Framework

In this research, the model been used was introduced by Desa, K. A., (2003). The objective as mentioned earlier for this study is to determine the relationship between the profitability of banks in Malaysia with the 10 variables.

The mathematical model:

$$y = \beta_0 + \beta_1 SIZE + \beta_2 LOANS + \beta_3 INC + \beta_4 CAR + \beta_5 EXP + \beta_6 BLR + \beta_7 INF + \beta_8 TI + \beta_9 GDP + \beta_{10} DEPOSITS + e$$

y = the profitability of the banks (ROA); (dependent variable)

β_0 = the intercept of the mathematical model

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}$ = the partial regression coefficients

SIZE = Logarithm of the total assets of each bank

LOANS = Logarithm of the total loans of each bank

INC = Interest coverage

CAR = Capital Adequacy Ratio

EXP = Expenses Management

BLR = Average annual Base Lending Rate of all commercial banks

INF = Annual percentage change of consumer price index; inflation rate

TI = Logarithm of the total interest income and non-interest income of each bank

GDP = Annual percentage change of Malaysian GDP by industrial origin

DEPOSITS = Logarithm of the total deposits of each bank

e = error term of the regression

3.2   Variable Specification

This is to classify and analyse factors that significantly affects the commercial bank's profitability performance. This is shown by assuming that the research framework mentioned above shows the relationship between the dependent variable and independent variables. Furthermore, by conduction this research, it is hoped to separate factors that are strongest from factors and also the weakest in term of their influence on the profitability performance of the banks.

3.2.1 Dependent Variable

The dependent variable represents the profitability performance of the commercial banks in Malaysia. The common indicator of profitability is return on asset (ROA) and return on equity (ROE). In this research, ROA is chosen over ROE because; assets size has been well accepted as a basis in establishing internal ranking of financial institutions worldwide. Second, assets figure also incorporates equity figure, since assets acquisition is financed by a combination of equity and debts. In other words, ROA is primarily an indicator of managerial efficiency as it shows how well a bank management uses the capital to acquire assets and utilise it to generate earnings. *(Desa, K. A., 2003)*

Formula to calculate ROA,

$$\text{ROA} = \frac{\text{NET INCOME AFTER TAXES}}{\text{TOTAL ASSETS}}$$

3.2.2 Independent Variables

Ten factors of independent variables were chosen to explain the profitability of the Malaysian commercial banks. These factors are divided into two groups which are internal variables and external variables. Internal variables consist of seven independent variables which are capital adequacy ratio, expenses management, interest coverage, bank size, total deposits, total loans, and base lending rate. On the other hand, the 3 remaining independent variables which fall under the external variables are base lending rate, inflation rate, and gross domestic production.

External variables were included because their performance was reflected in the ability of the bank to cope successfully with customers, competitors, regulator, and the public. All these 10 variables are chosen based on their relationship with the bank's profitability performance.

Table 3.1: Definition of independent variables

No.	Independent Variables	Definition	Symbol Used
1.	Capital Adequacy Ratio	Capital and reserves of every commercial bank as a percentage of weighted average of risky assets.	CAR

2.	Expenses Management	Expenditure as a percentage of total assets	EXPS
3.	Interest Coverage	Earnings before interest and tax of each bank as a percentage of interest expense	INC
4.	Bank Size	Logarithm of the total assets of each bank	SIZE
5.	Total Deposits	Logarithm of the total deposits of each bank	DEPOSITS
6.	Total Loan	Logarithm of the total loans of each bank	LOANS
7.	Total Income	Logarithm of the total interest income and non- interest income of each bank	TI
8.	Inflation Rate	Annual percentage change of consumer price index	IR
9.	Gross Domestic Product	Annual percentage change of Malaysian GDP by industrial origin	GDP
10.	Base Lending Rate	Average annual Base Lending Rate of all commercial banks	BLR

Source: Desa, K. A. (2003).

3.3 Data Collection Method

In this study, secondary data is used to extract the data. The data are grouped into two different types of category which are internal determinants and external determinants. Internal determinants are consists of capital adequacy ratios, loans, total income, expenses management, and interest coverage. On the other hand, the external determinants are gross domestic production, and inflation rate.

The information of internal determinants are extracted from the annual report of the 8 commercial banks mentioned above from year 2004 to 2010. The data are extracted mainly from their balance sheet and also from the income statement. On the other hand, the external determinants information are taken from the Asian Development Bank and Bank Negara Malaysia website.

3.4 Techniques of Data Analysis

To investigate the relationship between the dependent variable with the independent variables, two major statistical techniques were used. They are the correlation analysis and multiple linear regression analysis. The analysis was conducted by utilizing 2 user friendly software which are Microsoft Excel and E-view version 6.0.

3.5 Econometric Treatment

In order to determine the validity of the model, there should be presence of heteroscedasticity, misspecification error, autocorrelation problem and multicollinearity problems.

3.5.1 Heteroscedasticity

The assumption for heteroscedasticity is that the variance of the errors is not constant across observation, thus, standard estimations will be inefficient. In other words, heteroscedastic occurs in a series of random variables only when the random variables have different variance. Furthermore, error term in each period is not constant because the estimator and error term is influence by each other.

This problem can be detected by using White's test and the Breusch-Pagan test.

3.5.2 Misspecification Error

Specification error happens when an independent variable and error term is correlated because of many reasons. The causes could either be incorrect functional form, unrelated variable could possibly added in the model, the dependent variable could be a part of the mathematical model, an important variable has be omitted from the model, or measurement errors could affect the independent variables.

This problem can be detected by the Ramsey RESET test.

3.5.3 Autocorrelation Problem

Autocorrelation problem occurs when the error term in each period is influenced by each other so that the variance of error term is not in an optimal level. When autocorrelations of the errors at low lags are positive, standard errors are underestimated and the t-scores are overestimated. Furthermore, autocorrelation go against the ordinary least squares assumptions because the error terms are uncorrelated.

This problem can be detected by Durbin–Watson statistic or, if lagged dependent variable is included in explanatory variables, Durbin's h statistic could be used.

3.5.4 Multicollinearity

Multicollinearity occurs when there is correlation between two or more independent variables in the model.

Multicollinearity problem can be tested by using Variation of Inflation Factor, (VIF) method.

3.6   Conclusion

All in all, this chapter describes on how the research is carried out in terms of data collection methods, research framework, variable specification, techniques and data analysis, and econometric treatment. Therefore, to further explain on the econometric treatment, chapter 4 will explain in details regarding about the tests and measurements that carry out for the data that had been collected.

Chapter 4: Data Analysis

4.0   Introduction

Chapter 3 is about methodology, which describes on how the research is carried out in terms of data collection methods, research framework, variable specification, techniques of data analysis, and econometric treatment. In order to determine the validity of the model, there should be presence of heteroscedasticity, normality, linearity and multicollinearity problems. Therefore, chapter 4 is about the tests and measurements that carry out for the data that had been collected from eight commercial banks, in order to check the validity of our model and figure out which variables are profit determinants of commercial banks after financial crisis.

4.1   Scale of Measurement

4.1.1 Multicollinearity

Table 4.1: Correlation between variables

	ROA	BLR	INC	CAR	EXPS	GDP
ROA	1.000000	0.118576	0.658609	0.257402	-0.082269	-0.053672
BLR	0.118576	1.000000	-0.023459	-0.203514	-0.016500	0.036092

INC	0.658609	-0.023459	1.000000	-0.223287	0.067534	-0.129587
CAR	0.257402	-0.203514	-0.223287	1.000000	-0.359652	0.002239
EXP	-0.082269	-0.016500	0.067534	-0.359652	1.000000	0.012188
GDP	-0.053672	0.036092	-0.129587	0.002239	0.012188	1.000000

	ROA	IR	LDEPOSITS	LINCOME	LLOANS	LSIZE	CRISIS
ROA	1.000000	-0.258246	0.084425	0.297241	0.068264	0.099442	-0.031900
IR	-0.258246	1.000000	0.154885	0.096143	0.139594	0.105134	0.054874
LDEPOSITS	0.084425	0.154885	1.000000	0.832991	0.925267	0.825127	0.300675
LINCOME	0.297241	0.096143	0.832991	1.000000	0.872465	0.774239	0.180605
LLOANS	0.068264	0.139594	0.925267	0.872465	1.000000	0.887583	0.272440
LSIZE	0.099442	0.105134	0.825127	0.774239	0.887583	1.000000	0.241306
CRISIS	-0.031900	0.054874	0.300675	0.180605	0.272440	0.241306	1.000000

Table 4.2: Panel Least Square for loans and deposits

Dependent variable = LLOANS				
	Coefficient	Std. Error	t-Statistic	Prob.
LDEPOSITS	1.087238	0.060654	17.92514	0.0000
R-squared	0.856119			
Adjusted R-squared	0.853455			

VIF = $1/(1-R^2)$

  = $1/(1-0.856119)$

    = 6.9502

Since VIF for the model is lower then 10, this indicated that this model does not have serious multicollinearity problem in the model.

4.1.2 Normality test

Diagram 4.1: Results of the normality test

Series: Standardized Residuals	
Sample 2004 2010	
Observations 56	
Mean	5.85e-18
Median	6.43e-05
Maximum	0.010177
Minimum	-0.006389
Std. Dev.	0.002652
Skewness	0.606219
Kurtosis	5.698029
Jarque-Bera	20.41519
Probability	0.000037
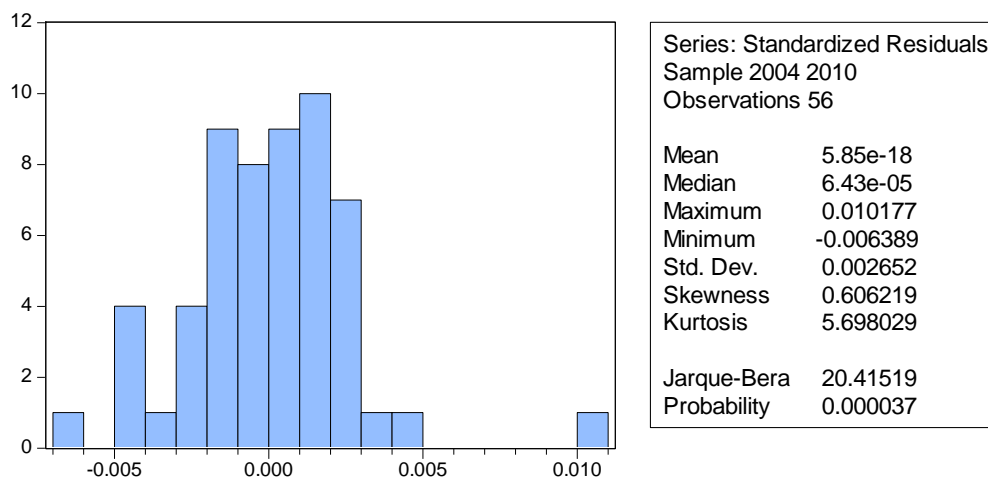
H_0: Error term is normally distributed.

H_1: Error term is not normally distributed.

Decision Rule: Reject H_0 if the p-value for Jarqua-Bera statistic < significant level (1%), otherwise do not reject H_0.

Decision: Since the p-value for Jarqua-Bera statistic (0.000037) < significant level (0.01), we reject H_0.

Conclusion: There is statistically significant to conclude that the error term of the model is not normally distributed.

4.2   Inferential Analysis

According to chapter 3, the mathematical model for this study is:

$$y = \beta^0 + \beta^1 SIZE + \beta^2 LOANS + \beta^3 INC + \beta^4 CAR + \beta^5 EXP + \beta^6 BLR + \beta^7 IR + \beta^8 TI \\ + \beta^9 GDP + \beta^{10} DEPOSITS + eit$$

Based on the regression results from this study, the mathematical model is:

$$ROA = 0.000556 LSIZE - 0.000710 LLOANS + 0.008364 INC + 0.070174 CAR \\ + 0.093714 EXPS + 0.242233 BLR - 0.012716 IR - 0.001391 LTI \\ + 0.018295 GDP + 0.001735 LEPOSITS + 0.000375 CRISIS - 0.027711 + eit$$

From the mathematical model in chapter 3, we had added in a dummy variable into the model so that the effect of Financial Crisis on commercial banks can be reveal in the panel least squares results. Moreover, the figures for some specific variables that we collected from the commercial banks are too large; therefore, we had applied the logarithm function onto it. Logarithm function will help to standardize the scale of measurement of the figures and omit the outliers. We had used 5% as the significant level. If the P-value of the variable is less than 0.5 or 5% significant level, this mean the variable is significant to the profit determinants of commercial banks.

Table 4.3: Panel Least Square results among variables

Dependent variable = ROA		
	Coefficient	Prob.
BLR	0.242233	0.0378
CAR	0.070174	0.0003
INC	0.008364	0.0000
IR	-0.012716	0.7206
EXPS	0.093714	0.4411
GDP	0.018295	0.3824
CRISIS	0.000375	0.7118
LDEPOSITS	0.001735	0.3212
LTI	-0.001391	0.3165
LLOANS	-0.000710	0.6895
LSIZE	0.000556	0.6343
R-squared	0.674442	
Adjusted R-squared	0.593052	

$R^{2}=$ 0.674442 which mean 67.44% of the variation in the dependent variable can be explained by the variation in the independent variables.

4.2.1 Total Loan

Based on our research, it is found that, total loan is insignificant. To support this statement, previous researches had also come out with the same findings. According to Fraser and Rose (1971), they found that loan rate; time deposit rate and loan-to-deposit ratio had no effect on profitability. Furthermore, Fraser and Rose

(1971) mentioned that loan composition and cost measures had no effect on profitability of a bank.

On the other hand, Galbraith (1963) indicated that if loans are funded with deposits and the bank experiences significant outflows of funds before these loans mature. The bank must seek additional funds to support the loans. The net return will be lower on those loans if the new funds are more costly and thus reducing profits of the commercial bank

4.2.2 Total deposit

According to our research, total deposit value is insignificant. To support this statement, Heggested (1977) believed that banks with a high percentage of time and savings deposits incurred high funding cost and thus had less profit. His findings indicated that the ratio of time and savings deposits had a significant negative impact on commercial bank profitability. This supported his claim that banks which were heavily committed to time and savings deposit earned considerably lower returns.

4.2.3 Bank size

Based on our research, Bank Size is insignificant. The research result by Daphne H. and Robert L. (2000) underline that the bank soundness, rather than bank asset size is most important to sustain the bank performance hence increase their profits. They proved that healthier banks report better profit than those less well equipped with tier-1 capital from the fact that profit growth increases with the size of tier-1 capital. Besides, they implied that the profit growth is inversely related to bank size, when the measurement is by the bank asset or pre-tax profit. Hence, the profit

growth of bank is independent of their size. It is important to mention that they had excluded those banks that have merged as to acquire a more accurate result.

4.2.4 Expenses Management

Based on our research, Expenses Management is insignificant as well. In order to support this statement, we found that Katib, M. N. (2004) stated that the bank good expenses management which could improve bank efficiency is not the factor that determined the bank market shares and performance. This was proven by the examined of the structure-conduct-performance (SCP) hypothesis against the competing efficient structure (ES) hypothesis. A total amount of 20 Malaysian commercial banks over the period from 1989 to 1996 was included in the exam by using a robust estimation method. Thus, the control variables ratio of total operating expenditures to total assets (RTOE) has been used in the exam to reflect the ability of the banks to operate at lower costs. Besides, the ratio of total loans and advances to total assets (TLTA) as a measurement of risk factor as well as the ratio of demand (current account) deposits to total deposits (RCDD) is to measure the cheap source of funds for the bank.

4.2.5 Gross Domestic Product

GDP (Gross Domestic Product) has no significant impact on profitability of the commercial banks. The per capita GDP is a general index of economic development, and thus it reflects differences in banking technology, the mix of banking opportunities, and any aspects of banking regulations omitted from the regression. Growth, defined as the growth rate of per capita real GDP, is insignificant in both spread and profit regressions. The percentage change in the GDP deflator, or inflation, is estimated to increase the net interest margin and bank profitability, although significance of the coefficients in the profitability regressions is low. This may reflect that banks obtain higher earnings from float, or the delays in crediting customer accounts, in an inflationary environment. With inflation, bank costs generally also rise. A larger number of transactions may lead to higher costs, and as shown by Hanson and Rocha (1986, p.40), results in lower bank profitability. On net, however, the regression results suggest that the impact of inflation on profitability, while not very significant, is positive throughout.

4.2.6 Inflation Rate

The impact of inflation rates on bank profitability will depend on its effect on bank costs and revenues. Perry (1992) working on the bank gains and losses from inflation asserted that the effect of inflation on bank performance depends on whether the inflation is anticipated or unanticipated. If the inflation is fully anticipated and interest rates are attuned accordingly resulting in revenues, which increase faster than costs, then it may have a positive impact on profitability. However, if the inflation is

not anticipated and the banks are sluggish in adjusting their interest rates then there is a possibility that bank costs may increase faster than bank revenues and hence adversely affect bank profits and thus bank profitability.

4.2.7 Total Income

The principal source of bank revenue is the interest income generated by the bank's earning assets, mainly loans, securities, interest-bearing deposits held with other banks, and miscellaneous revenue-generating assets. Based on our research, we found that total income is not significant in our analysis. This is supported by a Sudin Haron's research in 2004 that states total income is not significant to bank's profitability analysis as the importance of interest revenue relative to the non-interest revenue is changing rapidly with fee income today growing much faster than interest income as bankers work to develop fee-based services. Since this aspect of the bank is still developing, total income is not significant for our analysis

4.2.8 Crisis

In our research, we found that crisis has not much effect on Malaysia economy. According to Sundaram (2006), Malaysia economy was less vulnerable to crisis than other countries; this is because a severe banking crisis in the late 1980 and reforms undertaken in its aftermath had led to preemptive reform, which limited foreign borrowing and ensured greater banking prudence. Nevertheless, during the 1997 and 2008 financial crisis, Malaysia was vulnerable to contagion effect because the authorities had encouraged massive, easily reversible portfolio investments, especially in its stock market. The vulnerability was mitigated by the use of capital controls applied in September 1998 but was reduced drastically by the time the 2008 financial crisis hit the world which in turn cushioned up the recession effect on Malaysia's economy.

4.3   Conclusion

As a conclusion, we found that there are only three significant variables that appear on our model which have a positive effect on ROA, which are INC, BLR and CAR, whereas, DEPOSITS, TI, IR, LOANS, SIZE, GDP, EXP and CRISIS are insignificant variables. However, there is no serious multicollinearity problem in our model; thus, insignificant variables do not need to be omitted. For those insignificant variables, we had found some journals, in order to support our results and statements.

Next chapter will be discussing about the limitations that we faced during this research and study, as well as there are some recommendations for future research.

Chapter 5: Conclusion

5.0   Introduction

The main objective of the study has been achieved as we discovered the factors that were the key profitability performance of Malaysian commercial banks. The data is generated and literature is enriched on profitability performance of domestic commercial banks. The study used the accounting data for all the ten anchor banks over the seven year period from 2004-2010. This study has provided empirical evidences that are useful for bankers, regulators, academicians and general public.

5.1   Discussion of Major Findings

This study used linear regression analysis to measure the relationship between Return on Assets (ROA) and its possible determining factors namely capital ratio, bank size, base lending rate, gross domestic product, inflation, expenses management, interest coverage, total loan, total deposit and total income. Further refinement by using a more comprehensive data is required to produce a conclusive finding. The study concluded that three factors which are base lending rate, interest coverage and capital ratio were significant and positive determinants at 95% confidence level while bank size, total income, total deposit, total loan, gross domestic product and inflation

were unimportant predictors of profitability performance in Malaysian commercial banks.

Interest coverage ratio (INC) is a tool to measure the number of times a Bank can makes the interest payments on its debt with its earnings before interest and taxes. The higher of the interest coverage ratio, the lower the bank's debt burden, the lower the possibility of bankruptcy or default. Thus, the bank could make more profit with high interest coverage. While, Base Lending Rate (BLR) is a base interest rate calculated according to a formula which takes into account the institutions cost of funds and other administrative costs. So if the rate increases, the bank interest earning also increase. In this case the bank can generate more profit with higher BLR. Moreover, Capital Adequacy ratio (CAR) including tier one capital - equity capital, disclosed reserve, which can absorb losses without a bank being required to cease trading and tier two capital, which can absorb losses in the event of a winding-up such as cumulative preferred shares, subordinated term debt. This ratio is used to protect depositors and promote the stability and efficiency of financial systems. Thus, Malaysia commercial banks always can makes more profit with the contribution of sound performing financial system in the healthy market.

Last but not least, the regression analysis conducted with the dummy variable of financial crisis also shows that the financial crisis in 2008 does not have much effect on the commercial banks in Malaysia based on the sample of banks analyzed. Nevertheless, this study has provided useful insights into determinants of bank's profit for bankers, bank regulators, investors and the general public.

5.2   Limitations

Several limitations were encountered in this study. Firstly, limited number of studies by Malaysian scholars on the profitability determinants of Malaysia commercial banks has restricted a comprehensive review of the literature. Secondly, the ongoing merger and acquisition exercise among several banks under this study has made the extraction of data extremely difficult. Finally, the findings of this study were drawn from the data that covered a seven years period only. For instance, a model may be suffering from the econometric problem such as multicollinearity, autocorrelation and heteroscedasticity problems. A longer period of data, say thirty years were not available at Bank Negara Malaysia, Bursa Malaysia or Institute Bank-Bank Malaysia. Consequently, this study remains less comprehensive than it would have been had the data used covered longer than a seven year period. The limitations are acknowledged but they do not detract from the significance of findings but merely provide platforms for future research.

5.3   Policy Implications

For policy implications, we have several proposals for at the bank and national levels:

At the bank level, the improvement of the profitability of Tunisian commercial banks need to be conducted by a reinforcement of the capitalization of banks through national regulation programs, by reducing the proportion of non-interest bearing assets to the benefit of bank loans and by reducing the size of large banks to optimal levels while at the national level, we need to reduce concentration and spur

competition, and to boost the development of the equity market in order to improve bank's profitability as bank and stock market was found to be complementary in previous profitability analysis studies done by researchers.

5.4   Recommendations for future research.

This study has basically focused on the domestic commercial banks. Future research should extend to the analysis to include the subsidiaries of foreign banks operating in Malaysia. This will allow an interesting comparison of the profitability performance between domestic banks and foreign banks.

Besides that, this study analyses data using linear regression method. Panel least square measurement (PLS) in the linear regression method is only suitable to accurate point estimate and not interval estimate. PLS can perform well only if all assumption under Gauss Markov Theorem (BLUE) is held at the same time. If the normality assumption is not held, the estimator estimated by using PLS method will prevent us from making valid inferences as we don't know how precisely is the converge to its true. Other methods such as Data Envelopment Analysis (DEA) and Economic Value Added (EVA) were recommended to be using in future research as the purpose is to protect from methodological bias and improve the evaluation of the performance of commercial banks more precisely. These methods should be explored to see if they arrive at the same results or not.

Moreover, a comprehensive data set should be used as the period of seven years used for the research is a very small sample. A longer period should be used for the analysis as this will help to expand the degree of freedom and achieve a more symmetrical distribution of data upon which more conclusive findings can be drawn

to explain the actual behavior of the population i.e. profit performance of the commercial banks. This will also ensure that the results obtained are more accurate and precise.

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APPENDICES

Appendix 1: Value of ROA, INC, CAR, EXPS, GDP, and IR of 8 Commercial Banks from Year 2004 - 2010

ROA	INC	CAR	EXPS	GDP	IR
0.0091	0.4650	0.1458	0.0188	0.0520	0.0150
0.0066	0.4640	0.1336	0.0159	0.0710	0.0170
0.0062	0.3110	0.1341	0.0151	0.0520	0.0300
0.0069	0.2960	0.1363	0.0173	0.0590	0.0380
0.0108	0.5170	0.1033	0.0152	0.0630	0.0200
0.0097	0.6360	0.1351	0.0141	0.0460	0.0540
0.0098	0.6240	0.1240	0.0124	-0.0170	0.0060
0.0076	0.3780	0.1612	0.0071	0.0520	0.0150
0.0050	0.4090	0.1151	0.0157	0.0710	0.0170
0.0047	0.2564	0.1214	0.0148	0.0520	0.0300
0.0100	0.4174	0.0916	0.0110	0.0590	0.0380
0.0079	0.5169	0.1296	0.0104	0.0630	0.0200
0.0071	0.3750	0.1420	0.0136	0.0460	0.0540
0.0097	0.5364	0.1483	0.0159	-0.0170	0.0060
0.0196	0.0260	0.2505	0.0142	0.0520	0.0150
0.0066	0.0087	0.1357	0.0167	0.0710	0.0170
0.0076	0.0095	0.1287	0.0158	0.0520	0.0300
0.0084	0.0126	0.1245	0.0196	0.0590	0.0380
0.0114	0.0149	0.1390	0.0174	0.0630	0.0200
0.0092	0.0121	0.1506	0.0174	0.0460	0.0540
0.0112	0.0138	0.1536	0.0186	-0.0170	0.0060
0.0100	0.0140	0.2102	0.0115	0.0520	0.0150

0.0192	0.0265	0.1713	0.0099	0.0710	0.0170
0.0091	0.0126	0.1796	0.0096	0.0520	0.0300
0.0083	0.0115	0.1617	0.0104	0.0590	0.0380
0.0100	0.0136	0.1576	0.0112	0.0630	0.0200
0.0093	0.0125	0.1499	0.0114	0.0460	0.0540
0.0099	0.0124	0.1334	0.0107	-0.0170	0.0060
0.0139	1.0530	0.1050	0.0201	0.0520	0.0150
0.0146	1.1740	0.1100	0.0214	0.0710	0.0170
0.0168	1.2270	0.1010	0.0213	0.0520	0.0300
0.0153	1.1630	0.1000	0.0199	0.0590	0.0380
0.0170	1.2020	0.0980	0.0201	0.0630	0.0200
0.0113	1.0920	0.1180	0.0189	0.0460	0.0540
0.0122	1.2177	0.1100	0.0185	-0.0170	0.0060
0.0043	0.2110	0.1040	0.0188	0.0520	0.0150
0.0037	0.2250	0.1040	0.0122	0.0710	0.0170
0.0046	0.2680	0.0860	0.0129	0.0520	0.0300
0.0076	0.3750	0.0830	0.0137	0.0590	0.0380
0.0111	0.6020	0.0851	0.0142	0.0630	0.0200
0.0115	0.9250	0.1041	0.0132	0.0460	0.0540
0.0123	0.9611	0.0997	0.0124	-0.0170	0.0060
0.0252	2.0270	0.1792	0.0093	0.0520	0.0150
0.0119	0.8340	0.1730	0.0101	0.0710	0.0170
0.0133	0.8260	0.1580	0.0080	0.0520	0.0300
0.0133	0.7680	0.1390	0.0077	0.0590	0.0380
0.0136	0.6920	0.1340	0.0079	0.0630	0.0200
0.0124	0.9015	0.1390	0.0079	0.0460	0.0540
0.0157	1.1290	0.1330	0.0076	-0.0170	0.0060
0.0146	1.2008	0.1400	0.0138	0.0520	0.0150

0.0217	1.8542	0.1390	0.0138	0.0710	0.0170
0.0128	0.9294	0.1330	0.0141	0.0520	0.0300
0.0134	0.7357	0.1450	0.0125	0.0590	0.0380
0.0108	0.5447	0.1410	0.0147	0.0630	0.0200
-0.0014	0.0846	0.1410	0.0157	0.0460	0.0540
0.0143	1.5144	0.1490	0.0161	-0.0170	0.0060

Appendix 2: Value of BLR, INCOME, SIZE, LOANS, and DEPOSITS of 8 Commercial Banks from Year 2004 to 2010

BLR	INCOME	SIZE	LOANS	DEPOSITS
0.0600	1020791	18026582	10689274	13423958
0.0600	1324496	244993405	16423069	18748013
0.0600	1535717	26180984	15746648	20795652
0.0675	1707479	26233528	15100333	22308742
0.0675	1667854	27730474	17054062	23901610
0.0550	1578420	30333116	19108595	26336282
0.0630	1750472	35453667	22419251	31049296
0.0600	797354	15042765	5096297	11029470
0.0600	808915	3511806	4350433	28493195
0.0600	3145170	56359422	40736551	45910124
0.0675	3009442	53584812	37695578	46090403
0.0675	1667854	66473043	17054062	23901610
0.0550	4097876	70772211	46899886	59845170
0.0630	4519379	73379270	52010508	59732388
0.0600	594772	14734710	1297512	8674080
0.0600	3237162	86489410	54153477	65212617
0.0600	4079162	125914080	72965410	93431063
0.0675	5535628	139987541	73011777	113092527

0.0675	5315385	147069901	84922177	117674539
0.0550	5208741	160221618	84456367	132083308
0.0630	5617706	170823022	90816549	140021723
0.0600	1215807	36778941	15546040	27780688
0.0600	2265576	57675075	25578044	42056852
0.0600	1462432	55139095	24671107	41720207
0.0675	1605385	66161398	27965985	56911919
0.0675	1877559	69992756	30306207	62060236
0.0550	1868656	70659886	30938086	62093304
0.0630	1889773	77730208	33589093	67030179
0.0600	3792331	33600722	18963791	27989042
0.0600	4410076	36537716	21476706	10272171
0.0600	5535431	41002750	24343937	33756555
0.0675	6320991	48137962	26007124	40756761
0.0675	6887602	49591844	26792239	41240624
0.0550	5578690	52764494	25458819	44923990
0.0630	6169718	59192780	29439768	50818445
0.0600	3396605	71320123	37090808	50615012
0.0600	4541067	74154469	37607363	51552452
0.0600	4663412	85948893	46879331	57123934
0.0675	6279584	85063579	47470523	69593046
0.0675	6595165	84238533	52600047	67848155
0.0550	6248647	94045473	59116696	77056648
0.0630	7250121	105179231	71125558	86726030
0.0600	9316560	88932718	53856112	73031369
0.0600	10255498	107364902	64579905	88988782
0.0600	12104981	134267022	75891397	124948396
0.0675	14720510	158471100	89805707	135771662

0.0675	16316114	166698854	93174291	141183765
0.0550	14776966	176576601	107962807	156171419
0.0630	15860310	186409862	125062183	161859047
0.0600	14152591	143551149	86718412	111046214
0.0600	24538387	175434713	127848395	138149907
0.0600	22714885	197057006	115481632	153175298
0.0675	25082832	227447240	118557035	165026349
0.0675	26293066	219172485	138985721	182169861
0.0550	25788027	238277142	144431798	193574846
0.0630	25557541	248392266	151469585	198309563