METICULOUS DISCOVERY OF RISK AND RETURN NEXUS ASEAN BANKING INDUSTRY

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

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

(4) The word count of this research report is 38993.

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<td>BG</td>
<td>Breusch-Godfrey</td>
</tr>
<tr>
<td>BLUE</td>
<td>Best Linear Unbiased Estimators</td>
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<td>BOARD</td>
<td>Size of the Board</td>
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<tr>
<td>BPLM</td>
<td>Breusch-Pagan Lagrange multiplier</td>
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<td>BUSFREE</td>
<td>Business Freedom</td>
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<td>CAR</td>
<td>Capital Ratio</td>
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<tr>
<td>CLRM</td>
<td>Classical Linear Regression Model</td>
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<td>CORRUPT</td>
<td>Corruption Freedom</td>
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<tr>
<td>CPI</td>
<td>Consumer Price Index</td>
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<tr>
<td>EA</td>
<td>Ratio of Equity to Assets</td>
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<td>ECM</td>
<td>Error Component Model</td>
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<td>Fixed Effect Model</td>
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<td>Fixed Effect Model Robust Standard Errors</td>
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<td></td>
<td>Clustered by Banks</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GLS</td>
<td>Generalized Least Squares</td>
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<td>GMM</td>
<td>Generalized Method of Moments</td>
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<td>INF</td>
<td>Inflation</td>
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<tr>
<td>IV</td>
<td>Instrumental variables</td>
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<tr>
<td>JB</td>
<td>Jarque-Bera</td>
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<tr>
<td>LEV</td>
<td>Leverage Ratio</td>
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<td>LIQ</td>
<td>Liquidity Ratio</td>
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<tr>
<td>LSDV</td>
<td>Least Square Dummy Variable</td>
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<tr>
<td>NED</td>
<td>Non-Executive Director</td>
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<tr>
<td>NONEXE</td>
<td>Non-executive director on board</td>
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<td>NPL</td>
<td>Non-performing Loan</td>
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<td>OBS</td>
<td>Off-balance Sheet Items</td>
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<td>OLS</td>
<td>Ordinary Least Squares</td>
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<td>POLS</td>
<td>Pooled Ordinary Least Squares</td>
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<td>REG</td>
<td>Regulatory Pressure</td>
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<td>REM</td>
<td>Random Effect Model</td>
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<td>ROA</td>
<td>Profitability</td>
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<td>ROE</td>
<td>Return on Equity</td>
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<td>TOL</td>
<td>Tolerance Factor</td>
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<td>VIF</td>
<td>Variance Inflating Factor</td>
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PREFACE

This paper represents “Meticulous Discovery of Risk and Return Nexus ASEAN Banking Industry”, which is being selected for our final year research project. Generally, this research project considers about the risk and profitability of 50 banks within the 6 ASEAN countries. The data were retrieved from year 2011 to 2016 and STATA and EVIEWS 9 are employed to examine how the factors affect the risk and profitability of the top 50 assets rated banks.

Several determinants such as capital ratio (CAR), regulatory pressure (REG), liquidity ratio (LIQ), leverage ratio (LEV), non-performing loan (NPL), off-balance sheet item (LNOBS), board size (BOARD), non-executive director on board (NONEXE), corruption freedom (CORRUPT), business freedom (BUSFREE), gross domestic product (GDP) as well as inflation (INF) had been detected to influence the banks’ risk and profitability. In order to confirm the truth of these fundamental factors would make incursions into the risk and profitability of banks, few tests have been run such as Poolability Test, BPLM Test, Hausman Test and Sargan-Hansen test. The main purpose of conducting this research is to identify and ensure the relevant factors that are significant in interpreting the bank’s risk and profitability within the 6 ASEAN countries.

With the effort and hard work paid, we believe that this research could contribute a crucial result to every related party for their studies in the future.
ABSTRACT

The main objective of this study is to inspect the impacts of bank specific and external factors in illustrating the risk and profitability of banks in ASEAN from year 2011 to 2016. With this, the exogenous variables deployed in this study comprised of factors like capital ratio (CAR), regulatory pressure (REG), liquidity ratio (LIQ), leverage ratio (LEV), non-performing loan (NPL), off-balance sheet item (LNOBS), board size (BOARD), non-executive director on board (NONEXE), corruption freedom (CORRUPT), business freedom (BUSFREE), gross domestic product (GDP) and inflation (INF). Besides, panel data is adopted in this study and data collection is on annual basis from year 2011 to 2016 (6 years). Our samples are made up of 50 conventional banks from 6 ASEAN countries. All information is sourced from Fitch Ratings, Bloomberg, Heritage Foundation and World Bank. The findings of this study disclosed that exogenous variables like CAR, REG, LNOBS, BUSFREE, GDP have a significant relationship with the banks’ risks meanwhile REG, NPL, LNOBS, BOARD, NONEXE, and CORRUPT possessed a significant relationship with the bank’s profitability.
CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

This chapter illustrates the research background which prompts the intention to conduct research and scrutiny about the risk and profitability of banks. This research’s project focuses on how internal variables categories like Basel, asset liabilities management, off-balance sheet, and governance; and external variables categories like institutional quality and economics significantly affect the dependent variables, namely risk and the profitability of banks between a period of 2011 to 2016. This study aims to figure out determinants that will influence profitability and risk of 50 ASEAN banks which selected based on their high rating of total assets possessed.

Besides, independent variables like capital ratio, regulatory pressure, liquidity ratio, leverage ratio, non-performing loan, off-balance sheet item, board size, non-executive director on board, corruption freedom, business freedom, gross domestic product (GDP) and inflation were adopted to figure out the relationship between every single variable with profitability and risk. In this research, data were collected from 50 banks from different ASEAN countries namely Thailand, Singapore, Malaysia, Indonesia, Vietnam and Philippines from 2011 to 2016. Moreover, this chapter also included research background, problem statement, objectives of study, research questions, hypotheses of study, the significance of this paper together with layouts of chapter.
1.1 Research Background

The banking sector is a fundamental field all around the world. It indicates critical driver of the whole economy, and it played a significant role in supporting it. It was questioned that why banks’ profitability is important. Besides, ingredients of banks’ risk were also interrogated. The profitability of bank was critical to maintain and keep the financial system stable and secure. Banks’ risk was also a significant concern for a bank and country as well due to the outrageous risk-taking of banks had strong linkage with banks failing and will subsequently lead to cost shaking off the government. In other words, the economy would be efficient if the profitability of banks improved and banking risks being lessened. Poor profitability can lead to a deceleration economy as it would be in a poor performance condition, and the similar thing would happen for banks with sky-high risks.

Figure 1.1: Global Capitalization in Banks from Year 2005-2016

Source: International Monetary Fund: Global Financial Stability Report
According to Hasman and Samartin (2017), the regulators of banking industry had established the capital requirement for the banks since mid of the 1980s. There were arguments about the capital requirements which claimed that if bank's shareholders had more stakes, there would be lesser possibility that shareholders will be bailed out. When there was a requirement for banks to increase the capital reserve, the chance for banks to meet failure would be lower, as the banks will have to consider the criteria set and draw the most appropriate decision when they wanted to run a project, and smaller risk project may be in consideration. In contrast, as capital reserve increased, the portion of capital that banks can use is decreased, and this will reduce the capability of banks to generate profit. Thus, it will affect the franchise value of banks (Hasman & Samartin, 2017).

Figure 1.2: Liquidity Percentage in Banks from Year 2005-2016

Source: International Monetary Fund: Global Financial Stability Report

Figure 1.1 shows the global capitalization in banks from year 2005-2016 and a dramatic increase of total asset of the banks can be seen from 2005 until 2011, where it reached the peak. A continuous upward trend of the adjusted capital can also be seen in the figure and it tended to maintain constantly and slowed down the pace in year 2015 and 2016. Liquidity is viewed as a key indicator to explain the performance and growth of the bank. Global bank liquidity components are shown,
and percentage of each component has been presented in the diagram. Global banks were better capitalized and will hold more liquidity.

**Figure 1.3: Growth of the ASEAN Banking Market from Year 2010 to 2016**

![Growth of the ASEAN Banking Market from Year 2010 to 2016](image)

Source: Oliver Wyman Report: Asia Banking Agenda 2017

In figure 1.3, it presented the growth of the ASEAN banking market from year 2010 until 2016. A steady growth trend can be observed in the diagram and it showed that the growth rate from 2010 to 2013 and 2013 to 2016 have increased by 10.5% and 6.9% respectively. The increment from US$37 trillion to US$55 trillion sum up the total growth in value. Among the countries in ASEAN, China market has the most rapid growth and Vietnam as well. Conversely, Japan market showed a negative sign in the report. It is now broadly acknowledged that stable macroeconomic factors are essential for economic growth although it is not sufficient to sustain the growth if other factors are not in a good situation.

Hol (2006) studied about the macroeconomic condition and forecast the probability of bankruptcy. In his study, GDP is the primary variable used to examine and observe regressions, and the study estimated the result with microeconomic and macroeconomic variables. When macroeconomic variables are included in the
equation, some of the financial ratios tend to become insignificant to explain the probability of bankruptcy. This shows that macroeconomic factors will have impacts on bank conditions. Besides, Chen, Jeon, Wang and Wu (2015) stated that stability of bank was placed priority in the banking industry. The stability of bank will be affected by many factors, and it is closely related to the economic condition. Thus, Chen et al. (2015) investigated the effect of corruption towards bank risk which they employed about 1200 banks from the year 2000 till 2012. The relative outcome supported that high rate of fraud will increase bank risk-taking.

Besides, some researchers studied about bank risk in a different period. Risk will occur in all types of corporations and businesses, and they will involve themselves in minimising the risk that they will be taking. This paper concerned about the risk in the banking sector. Konishi and Yasuda (2004) questioned about factors that will affect the bank’s risk. They examined determinants of the bank risk-taking from the year 1990 till 1999 in Japan, and they used metric for insolvency risk to test and study as they found out that government focused on the failure of bank and uncertainty of bank’s returns. In their study, the capital requirement will bring impact to bank risk whereby it will lessen risk. Besides, they also concluded that connection between proprietorship by shareholders and bank risk were nonlinear as it will affect risk in both ways (Konishi & Yasuda, 2004).
Line trend in figure 1.4 shows that various types of debt have increased steadily in ASEAN countries and % of GDP represented the measurement of public debt. The percentage of GDP of Japan showed a tremendous rise where it almost hits 250% of GDP. Evolution of the debts in ASEAN had been presented above and different forms of debts of banks may bring uncertain effect to the banks. Thus, debt of the bank is one of the prime concerns to the bank.

Also, Soedarmono, Sitorus, and Tarazi (2017) conducted a study to examine the linkage between abnormal loan growth, bank's reporting system and risk of the bank. They set study period from 1998 to 2012 in ASEAN banks, and their investigation presented that high abnormal loan growth was the determinant of bank risk and it showed an unfavourable effect on risk. Brandao-Marques, Correa, and Sapriza (2018) questioned about the impact of government action and regulations on bank risk-taking, and they conducted their study for the period of 2003-2004 and 2009-2010. In their study, they employed sample banks from 54 countries which were huge in sample sizes, and they found out that the linkage of the government support was much stronger from 2009 to 2010 compared to 2003-2004.

In addition, banks governance is deemed as a basic and vital element for well-
functioning banks. There are three areas of governance which are ownership structure, board structure and risk management of the company, and Himaj (2014) studied about these areas in his research in order to identify the impact and weight of the elements on the performance of the bank. The ownership and board structure are being focalized as these factors are closely related to the execution of bank, specifically, they are central to corporate governance of bank. Tomar and Bino (2012) also intended to study about these elements in their research and they investigated the similar study with Himaj (2014). Both researchers suggested that the efficiency of the corporate governance is associated with Agency Theory or Shareholder Theory that revealed about the problem that may have faced in company. The interests between shareholders and bank are closely related, as well as directors on board. Pathan (2009) emphasized that bank with strong board is associated with board size, independent directors and less constrained rights for shareholders. Therefore, board structure variables will be discussed in this study to indicate the impact of the variables on the bank performance.

Some researchers studied about the association between board size and bank risk, they argued about whether the size of the board will bring significant influence towards bank condition. For instance, Nakano and Nguyen (2012) involved board size in their study as the main variable to investigate the relation and connection between risk-taking. They questioned about the effect of board size on corporate risk-taking, whether the relative impact would spread to firms in Japan, so they conducted a study to observe it. In their research, they also included important specification of a firm, for example, size and leverage in the regressions so that they could generate a substantial outcome. Pathan (2009) collected data of 212 banks between 1997 and 2004 and studied the linkage between bank risk and board structure. The strong board structure is the proxy used and mentioned in the study which the definition of durable board included board size, independent directors and less restrictive shareholders right in a bank.

There was a transformation of the banking system from older time until now. According to Albertazzi and Gambacorta (2009), the banking industry had shifted from the traditional role of financial intermediation as net interest income had
shifted to non-interest income. The interest margin had decreased, and this gave pressure to banks to look for alternatives to increase their revenues. Trading, services or introducing other financial products will be the new sources for banks to generate their revenues. Net interest margin and non-traditional activities were negatively related (Aktan, Chan, Žiković & Evrim-Mandaci, 2013). The term, profitability is one of the indicators to express the performance of banks. Performance of banks can be analysed through internal and external factors which will bring impacts toward it. Analysis of the performance can be executed in the event of efficiency, productivity, competitiveness and profitability. The profitability of banks will give signal whether they can take risks or expansion of banks can be carried out (Apatachioae, 2015).

Off-balance sheet activities had been increased when traditional financial intermediation activities decreased as off-balance sheet item is the alternative source of banks to generate revenues (Aktan et al., 2013). The off-balance sheet items included guarantees, business volume, commitments and derivatives. The driver of banks to engage in off-balance sheet was when traditional activities reduced; the banks will be forced to involve in off-balance sheet activities as banking industry become more competitive (Aktan et al., 2013). By taking part in off-balance sheet activities, besides providing high earnings, banks can maintain a strategic distance from regulatory charges and premium of insurance will not be applied to off-balance sheet events. However, banks that engaged in those activities were exposed to uncertainties such as credit risks and other financial risks.

Based on Apatachioae (2015), the profitability had a relationship with risks in which it is a concern for banks. In the banking industry, there were risks involved in the economic cycle which will affect the performance of banks. This showed that the chances that had been drawn into the economic cycle were interrelated with the bank's performance. Operations and directions of the banks might be affected by uncertainty. Thus, it may lead to the failure of the banks or towards the negative side. In the event of numerous financial risks involved, it will affect the development of deregulation, reregulation and open competition (Apatachioae, 2015). Different movement of regulations and game will influence the earnings of banks. The risk takings of banks and deregulation will bring essential impacts.
toward financial statements of banks (Albertazzi & Gambacorta, 2009). The regulation of banking was a slideway for banks to monitor and control the behaviour of banks. The supervision of government towards the banking industry was essential as it can assign some solutions or implement specific policies to secure the risk taking of the sector. The soundness and stability of banks can be maintained by the government. Apatachioae (2015) revealed that the regulations and supervision of the government or authorities were related to each other.

1.2 Problem Statement

Bank stability, measured in term of risks, has become a topic for researchers to explore more about the determinants of risks and different researchers would apply different variables to determine the factors that will affect it. Some researchers such as Zaabi (2011) and Konishi and Yasuda (2004) used bank insolvency risk, in other words, bankruptcy risk to study the stability of the bank. Microeconomic and macroeconomic variables will somehow bring specific effects on bank risk while internal or external factors will also have a connection with bank risk. Hol (2006) mainly studied the linkage between GDP and bank risk, but he also involved microeconomic factors in the study. He found that liquidity and bank risk have a significant connection and the firm is closed to bankruptcy when GDP is below the trend.

Banking sector played an important role in assisting the economy of a country. According to Jiang, Tang, Law and Sze (2003), high profitability of banking sector had a capability in resisting the economic crisis and supporting the stability of the financial system. Staikouras and Wood (2011) also mentioned that output and productivity of banks could be used as the indicator in evaluating bank's earnings performance. However, it is more difficult for researchers in assessing data as different banks had different products and services. Besides, various banks also had different conceptual issues, joint products and a definitional problem (Staikouras &
Wood, 2011). Hence, to overcome the problem, the profitability of banks is the most favourable concern of the researchers in evaluating banking performance as bank profitability can be affected by internal and external factors. Moreover, it is challenging for the researcher in collecting market data as these data were only available in stock exchange for large company. Therefore, it is evident that accounting data which can be used to estimate bank’s profitability is more straightforward to be collected compared to market data as accounting data is available for all company. With this, bank’s profitability is applicable and suitable to evaluate banks profitability performance.

In this study, off-balance sheet (OBS) item is one of the significant interests of investors in assessing the bank's earnings performance and banks risks taking. Kangarluei, Motavasel and Rahim (2012) remarked that off-balance sheet financing was one of the problematic and most common ways of funding. However, off-balance sheet item was hard to be discovered in the financial report as the data always displayed in the complementary notes in the financial statement. With this, many researchers will not choose off-balance sheet items as one of the variables in their study as they will have difficulties in evaluating the financial report. Furthermore, off-balance sheet items might become a hidden liability for a bank which may lead the banks to incur a high liquidity and interest rate risk. The unknown debt may be the cause of bank insolvency risks, and those liabilities will be a trouble for banks. According to Aktan et al. (2013), off-balance sheet items may increase the profitability of banks as it did not entail the regulatory cost and taxes since the reserve requirements and deposit insurance premiums were not required in OBS activities. However, these may cause the banks to face credit, market and operational risk, which may influence the liquidity of banks. Consequently, OBS item will affect banks' profitability and risks, and this study will discuss further the connection between off-balance sheet items with profitability and risks of banks.

“Do governance factors affect performance of the bank?” It is a question placed in the researcher's mind and some researchers analysed its effect on the risk and
earnings performance of the banks (Himaj, 2014; Tomar & Bino, 2012). Shareholder theory and stakeholder theory showed the issues that will occur in the execution of the company and these issues may affect the bank performance. Board size and non-executive director on board will be investigated in this research to determine whether they have association with risk and profitability of bank.

Furthermore, financial market regulations had been examined by researchers to study the linkage of the government factors and banking sector. Different studies had been carried out to discover the effect of government action and regulations on the performance of the bank. Brandao-Marques et al. (2018) showed that impact of government support towards bank risk and the significant result was also presented in their study. The regulatory pressure was widely used by different countries with different banks. According to Tanda (2015), legal force acted as the core of the prudential regulation as it ensured banks to achieve minimum capital while managing risk. Besides, it also provided strong capital base by making the bank capital requirement to be more responsive to assets portfolio risk (Badar, Sidra & Hu, 2016). However, society might question about the necessity of the regulatory pressure imposed on all banks.

According to previous research, some studies found out that increase of capital ratio may subject to more regulatory pressure (Shrives & Dahl, 1992). However, some studies indicated that there was an adverse effect of regulation where the lower the capital ratio, the more regulatory pressure will be required (Ahmad, Ariff & Skully, 2008). With this, the banks will be more stressful during the financial crisis as they need to strengthen their capital base and minimise their risk exposure (Tanda, 2015). Moreover, bank decisions will be influenced by the pressure of regulation as they need to decide how much to hold in minimum to increase their capital base based on statute. Therefore, the effect of regulatory burden on the profitability generated the desires to study the relationship between regulatory pressure and profitability.
According to Bourke (1989), he found that there was a definite connection between capital ratio and profitability since well-capitalised banks may enjoy a cheaper source of funds and hence, increased bank’s profitability. In other perspectives, capital ratio is related to bank risk, and this statement is supported by Köhler (2015), Konishi and Yasuda (2004) and Nwosu, Amadi and Mba (2012). These researchers have similar outcome whereby capital ratio and bank risk have a positive association. Besides, credit risk may increase the probability of bank failure when their borrowers cannot return their loan. With this, banks may also suffer liquidity risk as the asset holding by banks will be reduced and lead to insufficiency of cash provided to their customers. Therefore, this research will further examine the effect of capital ratio, credit ratio and liquidity ratio toward banks’ profitability.

1.3 Research Objectives

1.3.1 General Objectives

The purpose of conducting this research project is to inspect how internal and external variables of various banks in 6 different ASEAN countries would alter its’ profitability and risk. This investigation was enforced according to 50 banks appointed within 6 ASEAN countries, which consisted of Malaysia, Indonesia, Singapore, Philippines, Thailand and Vietnam. The period covered was from the year 2011 to 2016.
1.3.2 Specific Objectives

Four specific objectives are classified as below:

i. To analyse the components leading to the risk of 50 banks within ASEAN countries.
ii. To discover the essential promoting factors of profitability of 50 banks within ASEAN countries
iii. To justify the vast outcome of external factors on banking risk and return.
iv. To recognise the outstanding variables towards 6 different ASEAN countries

1.4 Research Questions

There are four specific questions to be addressed in this study. It provides better understanding and comprehension on the association between capital ratio, regulatory pressure, liquidity ratio, leverage ratio, non-performing loan, off-balance sheet item, board size, non-executive director on board, corruption freedom, business freedom, GDP and inflation with risk and profitability of banks. This study’s further exploration, discussion and justifications will regard to answering the questions below:

i. What are the essential contributing factors of banking risk?
ii. What are the vital factors granting the profitability of banks?
iii. Do external factors possess immense outcome on banking risk and return?
iv. Which variables possess significant impact among 6 ASEAN countries?
1.5 Hypotheses of the Study

1.5.1 Capital Ratio (CAR)

$H_{0a}$: Capital ratio has no significant relationship with risk of ASEAN banks.

$H_{1a}$: Capital ratio has significant relationship with risk of ASEAN banks.

$H_{0b}$: Capital ratio has no significant relationship with ASEAN banks’ profitability.

$H_{1b}$: Capital ratio has a significant relationship with ASEAN banks’ profitability.

1.5.2 Regulatory Pressure (REG)

$H_{0a}$: There is no significant relationship between regulatory pressure and ASEAN banks’ risks.

$H_{1a}$: There is a significant relationship between regulatory pressure and ASEAN banks’ risks.

$H_{0b}$: There is no significant relationship between regulatory pressure and ASEAN banks’ profitability.

$H_{1b}$: There is a significant relationship between regulatory pressure and ASEAN banks’ profitability.
1.5.3 Liquidity Ratio (LIQ)

H$_{0a}$: Liquidity ratio has no significant relationship with risk of ASEAN banks.

H$_{1a}$: Liquidity ratio has a significant relationship with risk of ASEAN banks.

H$_{0b}$: Liquidity ratio has no significant relationship with profitability of ASEAN banks.

H$_{1b}$: Liquidity ratio has a significant relationship with profitability of ASEAN banks.

1.5.4 Leverage Ratio (LEV)

H$_{0a}$: Leverage ratio has no significant relationship with ASEAN banks risks.

H$_{1a}$: Leverage ratio has a significant relationship with ASEAN banks risks.

H$_{0b}$: Leverage ratio has no significant relationship with ASEAN banks’ profitability.

H$_{1b}$: Leverage ratio has a significant relationship with ASEAN banks’ profitability.

1.5.5 Non-performing loan (NPL)

H$_0$: There is no significant relationship between non-performing loan and risks of ASEAN banks.

H$_1$: There is a significant relationship between non-performing loan and risks of ASEAN banks.

H$_0$: There is no significant relationship between non-performing loan and profitability of ASEAN banks.
H₁: There is a significant relationship between non-performing loan and profitability of ASEAN banks.

1.5.6 Off-Balance Sheet Items (LNOBS)

H₀ₐ: Off Balance sheet item has no significant relationship with ASEAN banks’ risks.

H₁ₐ: Off Balance sheet item has a significant relationship with ASEAN banks’ risks.

H₀ₖ: Off Balance sheet item has no significant relationship with ASEAN banks’ profitability.

H₁ₖ: Off Balance sheet item has a significant relationship with ASEAN banks’ profitability.

1.5.7 Size of the Board (BOARD)

H₀ₐ: Size of the board has no significant relationship with risk of ASEAN banks.

H₁ₐ: Size of the board has a significant relationship with risk of ASEAN banks.

H₀ₖ: Size of the board has no significant relationship with ASEAN banks’ profitability.

H₁ₖ: Size of the board has a significant relationship with ASEAN banks’ profitability.
1.5.8 Non-Executive Director on Board (NONEXE)

H₀a: Non-executive director on board has no significant relationship with ASEAN banks’ risks.

H₁a: Non-executive director on board has a significant relationship with ASEAN banks’ risks.

H₀b: Non-executive director on board has no significant relationship with profitability of ASEAN banks.

H₁b: Non-executive director on board has a significant relationship with profitability of ASEAN banks.

1.5.9 Corruption Freedom (CORRUPT)

H₀a: There is no significant relationship between corruption freedom and ASEAN banks’ risks.

H₁a: There is a significant relationship between corruption freedom and ASEAN banks’ risks.

H₀b: There is no significant relationship between corruption freedom and ASEAN banks’ profitability.

H₁b: There is a significant relationship between corruption freedom and ASEAN banks’ profitability.
1.5.10 Business Freedom (BUSFREE)

H₀a: Business freedom has no significant relationship with the risk of ASEAN banks.
H₁a: Business Freedom has a significant relationship with the risk of ASEAN banks.
H₀b: Business freedom has no significant relationship with the profitability of ASEAN banks.
H₁b: Business Freedom has a significant relationship with the profitability of ASEAN banks.

1.5.11 GDP

H₀a: GDP has no significant association with ASEAN banks’ risks.
H₁a: GDP has a significant relationship with ASEAN banks' risks.
H₀b: GDP has no significant relationship with ASEAN banks’ profitability.
H₁b: GDP has a significant relationship with ASEAN banks' profitability.

1.5.12 Inflation (INF)

H₀a: There is no significant relationship between inflation and ASEAN banks’ risks.
H₁a: There is a significant relationship between inflation and ASEAN banks’ risks.
H₀b: There is no significant relationship between inflation and ASEAN banks’ profitability.

H₁b: There is a significant relationship between inflation and ASEAN banks’ profitability.
H₁₁: There is a significant relationship between inflation and ASEAN banks’ profitability.

1.6 Significance of Study

This study will provide results on correlation between explanatory variables like capital ratio, regulatory pressure (Basel category); liquidity ratio, leverage ratio, non-performing loan (asset liability category); off-balance sheet item (off balance sheet category), board size, non-executive director on board (governance category); corruption freedom, business freedom (institutional quality category); and lastly GDP and inflation (Economic category) with dependant variable, risks. Also, this paper will cover the effects of all these variables from different groups like Basel, asset liabilities management, off-balance sheet, governance; institutional quality and economics on profitability of banks. Besides, it also scrutinised how internal and external factors bring impacts to the risk and profitability of banks in ASEAN countries respectively. In this context, the analysis of the main elements of bank risks and profitability is a matter of interest for the banking industry, policymakers, shareholders as well as investors.

1.6.1 Banking Industry

The essence of this paper towards banking industry is that it would help banks based in few selected ASEAN countries namely Malaysia, Singapore, Vietnam, Thailand, Indonesia and Philippines in disclosing main aspects that supplied to their risk-taking and profitable operation. Hence, the bankers are suggested to refer to this paper in taking actions to maximise their profit and minimise risk at the same time. Besides, they may also discover new techniques in maximising their earnings and
discern their oversight in the surplus making. Also, this study was believed to be beneficial and helpful at the same time seeing that it could engender consciousness of the banking industry in their effort of controlling the risk of capital, liquidity and credit which then direct them to have a better yielding operation. With this, banks could assure the factors that bring significant influence on its profitability and risk and thus take corrective action in controlling them for the sake of higher earnings of the bank as well as the industry. Besides, banks tend to have better understanding and insights on determinants of the successful performance, and now they can generate a higher return and lesser risk after having sufficient knowledge regarding factors that could bring out positive and negative effects toward banks’ profitability and risks.

1.6.2 Policymakers

Besides, this paper also contributed to policymakers as they can use this study as a guideline in the process of deciding for policy implementation. This research may provide some useful data and messages to them. Thus, policymakers may able to generate different ideas and increase their knowledge toward circumstances that will bring impacts to profitability before the process of policy implementation. The same thing applied when they had to design policy to reduce banks' risks. As noted previously, poor profitability can be indicated as a bank in a poor performance condition, and this may lead to a deceleration economy. Similarly, high risks banks tend to perform delicately and bring downside risks to the whole economy. Since the performance of banking sectors acted as the backbone of the economic stability, the policymakers can acknowledge more through this study to regulate and control banking sector by improving the profitability of banks. In this case, an economy can be monitored indirectly as the performance of banks will affect the economic stability. In sum, this study can contribute to policy makers in getting a different point of views to improve banks’ profit earning, minimise banks risks and decide a suitable policy regulation.
1.6.3 Investors

From the view of investors, it is essential to understand and ensure profitability of a bank to make a further investment decision. The poor performance of a bank in various decisive factors will alter bank's profit as well as might cause investors to suffer the risk of loss in the coming days. Not only that, risks of banks might be elevated as well when banks performed awfully, and this will end up causing investors to face the risk of non-recovery. Through this study, investors managed to gain some extra knowledge and information on how these bank's specific variables can give impact to bank's profit, and at the same time influencing banking risks. By referring to this paper and points contributed, it is believed that investors would be able to deal with problems that are facing currently and make a wise choice in investing decision.

1.6.4 Shareholders

Furthermore, shareholders are the person, company and other related parties that owned one and more company’s shares. Shareholders were also known as an owner of a company who required the company to gain benefits to enhance value of company's stock. Besides, lesser risk possessed by banks favour the shareholders, especially for risk-averse shareholders. They thus perceive that banks are stable whenever they have a lower risk. With higher profit ratio increased in a bank, shareholders will be able to receive more dividends at the end of the year. Also, the profits gained in every year end can be used for increasing capital or further expansion of the company. By interpreting this study, shareholders able to control, monitor and understand the exact situation of their company.
1.7 Chapter Layout

The structure and content of this research are arranged as follow:

Chapter 1 provides an overview regarding this study. It began with research introduction, followed by research background, problem statement, research questions, research objectives, hypotheses as well as the significance of the study.

Chapter 2 will then comprise literature review on endogenous variables. Also, it embraced past studies outcomes as to project the result of this study, appropriate theoretical framework review will be discussed as well so that proper theoretical framework will be adopted.

Chapter 3 will describe methodologies deployed to evaluate capital ratio, regulatory pressure, liquidity ratio, leverage ratio, non-performing loan, off-balance sheet item, board size, non-executive director on board, corruption freedom, business freedom, GDP and inflation with banks’ risks and profitability. With this, research design, data collection methods, sampling design, data processing and data analysis will be further explored. As for inferential analysis, potential panel data models such as Pooled Ordinary Least Squares (POLS) model, Fixed effect model (FEM) and Random effect model (REM) are reported. These are primarily critical as it aids to assure result soundness.

Chapter 4 depicted the outcomes together with an interpretation of regression model of this study. It encompassed descriptive analysis of data along with results and description of panel data analysis, diagnostic checking and inferential analyses.
Chapter 5 lastly covered a brief presentation of significant findings as well as conclusion. It also revealed implications and limitations of this study. Apart from that, recommendations are also attached to benefit future researchers.

1.8 Conclusion

This chapter mainly covered background of study, problem statement, objectives, research questions, hypotheses as well as significance of study. The principal goal of this study is to evaluate effects of various internal and external variables on banks’ risk and profitability. With this, further exploration on literature review regarding exogenous variables namely capital ratio, regulatory pressure, liquidity ratio, leverage ratio, non-performing loan, off-balance sheet item, board size, non-executive director on board, corruption freedom, business freedom, GDP and inflation will be discussed in Chapter 2, along with relevant theoretical framework.
CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter will highlight previous literature associated with this topic together with constituents recommended by past studies regarding banks’ risks and profitability. With the literature review, perhaps it can provide researchers better insight in comparing outcomes with those previous papers. The literature review of previous paper will cover for risks (ZSCORE), profitability (ROA), capital ratio (CAR), regulatory pressure (REG), liquidity ratio (LIQ), leverage ratio (LEV), non-performing loan (NPL), off-balance sheet item (LNOBS), board size (BOARD), non-executive director on board (NONEXE), corruption freedom (CORRUPT), business freedom (BUSFREE), GDP and inflation (INF). Instead of focusing solely on Malaysia’s bank, this study extended to other ASEAN countries like Indonesia, Singapore, Philippines, Thailand and Vietnam. Following that, review of relevant empirical models and proposed theoretical framework will be discussed in detail as well.
2.1 Review of the Literature

2.1.1 1st Dependent Variable: Risk (ZSCORE)

Z-score is the indicator to define probability of bankruptcy and it is inverse indicator of bank's insolvency (Konishi & Yasuda, 2004; Zaabi, 2011; Beck, Demirgüç-Kunt & Levine, 2009). Z-score is a model established by Professor Edward Altman and it is used to estimate the likelihood of company to declare bankrupt. High score obtained by bank indicated that bank is stable and less likely approaching to bankruptcy. Conversely, bank will be placed at risk if the bank has low z-score and the insolvency risk that they faced will be high. Zaabi (2011) employed Z-score in his study to find out whether it can be a measurement for bank performance. In the study, Z-score proved to be a solid and useful measurement to indicate performance of the bank. Zaabi (2011) and Beck et al. (2009) showed that Z-score is highly suggested to be indicator of bank's failure risk and high score means lower insolvency risk to the bank.

Konishi and Yasuda (2004) revealed that capital adequacy requirement would diminish involvement of risk by banks. The data that researchers used to investigate is panel data technique which is similar with our study, and they used Z-score in their research to identify the association with bank risk because policymakers are focusing on the failure of bank instead of volatility of stock's return. Implementation of capital adequacy will affect bank risk which indicating that the higher the capital ratio obtained by a bank, the lower the bankruptcy risk faced by the bank. In other words, a bank with lower capital ratio tends to be riskier which is supported by Köhler (2015). The relative outcome also endorsed by Nwosu et al. (2012) where they also proved that capital ratio brings positive impact towards the bank stability and thus decrease the risk of the bank.
Brandao-Marques et al. (2018) revealed that regulations would diminish the risk taking of the bank. This result converses with Barth, Caprio and Levine (2006) where they showed that regulations would increase bank risk taking and thus it may increase fragility of the bank. Besides, Laeven and Levine (2009) found that impact of regulation on bank risk consists both sided effect which indicates that it can be either positive or negative impact on the bank. It depends on the ownership structure of the bank, and different structures will lead to a different result.

Köhler (2015) noticed that liquidity ratio has an insignificant relationship with bank risk as he used Z-score to define risk. In other words, bank's liquidity does not produce any effect on stability of the bank and the probability of bankruptcy is rarely influenced by liquidity. Baselga-Pascual, Trujillo-Ponce and Cardone-Riportella (2015) investigated the relationship between bank risk and liquidity and concluded that both variables have an inverse relationship. Lin and Yang (2016) proposed that bank with lower liquidity is closer to failure probability. For leverage, the firms that have higher financing leverage tend to increase the interest obligation and thus costs of the firm will increase as well (Chen, 2013). High-interest obligation will cause the sensitivity of firm to become greater when the condition of the economy goes down, and this will then expose firm to bankruptcy risk (Chen, 2013).

Campbell (2007) explained that Bank of England's study found that bank will face bankruptcy or failure when their lending situation is weak and bad debts are the common factor that will cause failure of the bank. Most of the banks will have NPL, and it seems familiar in the banking industry. It is not a severe problem at the beginning if the bank does not have a critical liquidity problem, but the issue may become the main problem if the bank does not solve it from time to time. Eventually, efficiency and flows of the bank may be affected by this problem. Duran and Lozano-Vivas (2013) study about the nature of off-balance sheet activities and the effect towards bank risk and they discovered the negative impact of OBS on bank insolvency risk.
It is suggested that organisation size and failure of the bank are closely related. In addition, Nakano and Nguyen (2012) study about the association between board size and firm's risk taking and, in their study, they used Z-score to measure the bankruptcy risk and found that the firm with larger board size will have lower bankruptcy risk. Thus, it brings the meaning that board size and bank risk appear to have a negative relationship. The result also supported by Pathan (2009) where his study also found an inverse relationship between these two variables. Conversely, Fich and Slezak (2008) have a different result where they revealed that board size would affect the probability of bank failure positively. In their study, the bankruptcy risk increased when the number of board size is growing.

Chen et al. (2015) studied the association of corruption and bank risk. Z-score is the universal indicator of what we used in this study. Although they found that corruption will affect the bank soundness significantly and directly, indirect relationship is found between the corruption and bank insolvency risk. Corruption freedom is the index that accesses the consciousness of corruption in the business world and environment which it included legislation and administrative levels. Besides, based on Ghosh (2016), business freedom measures about the freedom of businessman to set up their business, the ease for them to get permit or license and also end up the business. In the study, a positive association is found between the business freedom and bank risk.

Moreover, Demirgüç-Kunt and Huizinga (1999) revealed that GDP and Z-score do not have significant association in their study. Some researchers proved that positive relationship existed between GDP and Z-score because they found that when GDP increases, it will lead to the increment of Z-score and thus indicates that the bank is more stable and lower the chance to fail (Chen et al., 2015). A booming economy will enhance the stability of the bank which it can diminish the failure of a bank. Baselga-Pascual et al. (2015) employed GDP in their study to investigate the relationship between economic growth and bank risk. They also supported the result from Chen et al. (2015), where GDP is found to have adverse association with risk significantly in the study.
Also, Baselga-Pascual et al. (2015) revealed that inflation has a negative relationship with Z-score and in another meaning, inflation will affect bank risk positively as bank will become unstable if inflation increases. The relevant result also supported by Lin and Yang (2016) where they also explored the association between inflation and bank risk is positive. This outcome explained that higher inflation would give rise to the failure of the bank.

2.1.2 2nd Dependent Variable: Profitability (ROA)

Profitability indicated how well the performance and operation of a bank under a given environment. High profitability allowed a bank to withhold their firm and robust position under substantial market power and ability to limit efficient intermediation of savings; conversely, low profitability will cut down confidence level of the private agencies, which might impede them from conducting banking activities in that bank. To maintain the stability of banking system, it was necessary to ensure that banks able to achieve and maintain healthy, sustainable profitability (García-Herrero, Gavilá & Santabárbara, 2009). In previous literature regarding a study of bank profitability, the researchers presented that determinants of profitability can be categorised into internal and external elements.

Return on assets (ROA) is a general measurement tool to detect profitability. It is the ratio of net income over average total assets, employed to determine the performance of non-traditional as well as traditional activities of the banking industry (Tran, Lin & Nguyen, 2016). Joo, Nixon and Stoebel (2011) stated ROA is a ratio commonly used by bank manager to define profit of bank gain as it is not limited by a particular value.

Based on the research of Bitar, Pukthuathanhong and Walker (2018) capital is a vital contingency tool employed to absorb risk and loses from future financial crises. By
holding a high value of the capital ratio, bank can absorb losses and reduce probability of suffering from default as well as insolvency risk. An inverse relationship is shown as the result of this study indicated higher capital ratio required a bank to keep more reserves if it gained an enormous profit. The bank is expected to retain reserve with the central bank of country. Therefore, this caused amount of loans can be lent out to reduce. This result is supported by others academic for example Demirguc-Kunt and Huizinga (1999) as well as Saona (2016).

Also, Saona (2016) discovered an inverse relationship between implementation of new regulations and profitability of bank. This study adopted 156 banks from Latin America banks to study the performance of effects between bank's profitability and controlled variables. Result reported that impose of new rules and regulation is the barriers for banks to maximise their profits. When new rules are implemented, barriers existed which avoid bank to get involved in riskier activities or products. Therefore, the profitability of bank will decrease respectively due to the implementation of rules and regulations.

A negative relationship is proved between liquidity risk and bank's profitability. Tran et al. (2016) researched by adopting all banks in the United States, from the year 1996 to 2013. Result portraited that when more liquid assets to hedge against liquidity risk, a low return will be generated. Holding of liquid assets can reduce risk of bank encountering problem of default, indirectly, returns of a bank received will be typically lowered apparently.

Besides, positive relation between leverage ratio and profitability of bank is expected (Berger & Patti, 2006). High leverage ratio will indirectly decrease the agency cost outside equity which will enhance value of firm at the same time by prompting bank's manager to act more in the interests of shareholders. Therefore, increase in the level of leverage ratio will maintain or raise the level of profitability ratio of a bank.
In Chi and Li (2017) study, data of commercial banks from China since year 2000 to 2014 had been collected to conduct a study regarding effect between credit risk and return of bank. Academicians adopted non-performing loan as indicator to detect credit risk faced by bank. A country with high level of legal protection will simplify the process of approving loans, while dominate non-performing loan, enhance commercial bank’s operating performance. However, this would cause return of bank to reduce due to strict supervision from government as less credit can be lent out to customers.

A positive and significant result is presented between both off-balance sheet items (OBS) and performance of banks. Based on Lozano-Vivas and Pasiouras (2014) study, they mentioned that quality of products and services of bank would increase markedly when there is involvement of OBS items. By providing excellent services to customers, performance, as well as reputation of bank, will be better, which will increase profit of banks indirectly.

Next, Ozili and Uadiale (2017) investigated the relationship between board of directors and bank’s profitability. A large group of board of directors had a significant and positive effect towards a bank's performance. A strong team of board of directors not only managed to contribute knowledge and wealth but determined the policies and objectives, while supervising the management of a bank. With active supervision from board of directors, probability of poor management in a bank would be minimised, meanwhile to achieve a high profitability ratio. This statement is supported by Petchsakulwong and Jansakul (2017).

Apart from that, study of Liang, Xu and Jiraporn (2013) demonstrated that non-executive director on board had a positive impact towards bank's profitability. A study proved that presence of independent executive on board could minimize bank's interest conflict and handle agency problem occurred efficiently. The appearance of non-executive directors can conduct information on firm-specific information, while increase equity level of firm as well, to avoid a bank from
suffering bankruptcy risk. Evidence can be found from financial crises happened in year 2008-2009.

Chen et al. (2015) demonstrated that high level of corruption would increase risk faced by bank, meanwhile reduce profitability of bank. Both intellectuals revealed that allocation of funds into a certain project instead of a better project is a suspicious action that a bank involved in corruption matter. Non-performing loans ratio will be increased, meanwhile, a bank will suffer from a severe insolvency risk, as more debts than capitals. In this case, profitability of a bank will be reduced undeniable.

Moreover, Sufian and Habibullah (2010) paper presented that higher degree of business freedom in a particular country enhances profitability of a bank. Business freedom is a key that allowed sustainability of firms and economic growth of a nation. When less restriction is imposed, availability of opportunities for business to start up, run and close out their businesses foster bank performance especially in a developing country like Malaysia.

Alper and Anbar (2011) discovered increase in a country’s real GDP growth rate had a significant positive effect on return of banks. The intellectuals mentioned that, when there was a high level of demand in economy, bank’s profitability increase since greater revenues were generated that could expand business of a bank. This will lead to a boost in a country's economy which directly affects GDP of a nation.

Furthermore, inflation has a direct relationship with return of a bank. According to Khan, Ahmad and Gee (2018), they stated that if a bank’s manager can determine future trend of inflation, he or she will be able to produce more wealth for banks. Their study showed, by adjusting interest rate of lending rate, bank can earn more return from customer, while frequency of deposit offered remained the same. In this case, more income can be adopted by banks and hence profitability will be inflated.
2.1.3 1st Explanatory Variable: Capital Ratio (CAR)

Capital was considered as one of the essential components that can affect bank’s profitability. Capital was amount of banks’ fund available to support bank’s business and acted as a cushion to protect bank itself (Athanasoglou, Brissimis & Delis, 2008). With this, capital requirements toward banks had been established by regulators of banking industry since mid of the 1980s (Hasman & Samartin, 2017). All banks had to follow eight percent minimum requirement of capital ratio set by Basel Committee. It was the benchmark for all banks to gauge grade of capital adequacy. By using this, banks can prevent the chances to meet bank insolvency and hence, reduce risk of bankruptcy.

Capital ratio can also be known as Capital Adequacy Ratio (CAR) used to compute and calculate capability of bank to overcome its risk. There was a statement stated that the higher the amount of bank’s capital, lower the chances of bank to meet failure. This was because capital can provide liquidity to banks which enabled them to withstand credit, market and operational risk. Besides, it also offered banks to protect debtor and absorb potential losses. According to Ongore and Kusa (2013), capital ratio demonstrated internal capability of bank to resist its losses during financial crisis. Thus, capital ratio had a direct relationship on profitability of banks by identifying risk which signified profitable areas (Sangmi & Nazir, 2010).

On the other hand, there was some previous research that concluded relationship between capital ratio and risk of bank. According to Konishi and Yasuda (2004), their study showed that risk-taking of banks in Japan could be reduced by executing capital ratio requirement. A well-capitalised bank can lower down probability of bank to meet insolvency and failure. Moreover, high capital ratio considered as less risky to banks as banks could attract confidence of depositors and enjoy free supply of funds from depositors (Bourke, 1989). With this, this statement can conclude that there was a negative relationship between capital and risk.
Besides, some previous researchers used Z-score as a proxy to estimate bank soundness. Mokni, Mohamed and Rachdi (2016) mentioned that Z-score could be used to measure insolvency risk of a bank. The primary function of Z-score was to estimate probability of a corporate or banks to meet failure (Obaid, 2011). According to Korbi and Bougatet (2017), the higher the value of Z-score, it meant that bank stability was higher and lesser risk to meet failure. The researchers claimed that Z-score is more efficient than using CAMELS variables in estimating bank soundness as it purely used accounting information from banks. Based on result from this research, it concluded that capital ratio is positively related to bank risk. Customers would be more confident with well-capitalized banks. Thus, this relationship assisted bank to withstand financial crisis. According to Mokni et al. (2016), capital represented an important role in corporate risk-taking regard to when bank or corporate had more capital; they might have the ability to hold more assets. However, their research showed that there was a negative relationship between bank capital and insolvency risk. This statement promoted that higher capital ratio of a bank will restrict their decision on taking high-risk business.

Blum (1999) stated that increase in capital adequacy ratio would not reduce insolvency risk of banks; conversely, it will enhance the insolvency risks faced by banks. When there are more regulations imposed by federal government, future profits of banks will be lower, hence low incentives gained to prevent banks from default. This was agreed by Altunbas, Manganelli and Marques-Ibanez (2017). They declared that a positive connection might exist between capital and risks. The agency problem between stakeholders and manager will lead to outrageous risks takings through managerial rent seeking.

According to Bourke (1989), he reviewed performance of banks in 12 countries in Europe, North America and Australia and examined internal and external determinants of profitability. In his research, he indicated that there was a definite relationship between capital ratios and profitability. The researcher also stated that capital represents a ‘free’ sources of fund to bank. Therefore, well-capitalised bank had lesser chances to meet failure and can enjoy a cheaper source of funds as high
capital ratio could protect bank from loan portfolio by using profit gained from bank. The research also suggested that differences of capital adequacy ratio could be used as a proxy for regulation as researcher found that capital ratio could be equalised according to bank size. However, cost of bank capital should be computed first before proceeding to proxy of regulation.

Other than that, ratio of equity to assets (EA) can be used to represent capital variable to estimate relationship with profitability (Athanasoglou et al., 2008). According to the researchers, there was a positive impact of capital ratio toward profitability. The sufficient amount of capital can be applied to support its own banking business and hence, acted as protection from loss and risk. Moreover, Demirgüç-Kunt and Huizinga (1999) used book value of equity over total asset as measurement for capital ratio. In their research, they investigated the relationship between bank capitalisation and profitability of bank. They found out banks with high franchise value had incentive to maintain their business activities. Also, it is stated that well-capitalized bank will meet lower bankruptcy cost for themselves and their clients. With this, they managed to reduce their cost of funding and could withstand cost of insolvency.
2.1.4 2\textsuperscript{nd} Explanatory Variable: Regulatory Pressure (REG)

Regulatory pressure can be known as force imposed on banks to hold a specific amount of capital according to their risk exposure to prevent bankruptcy (Tanda, 2015). Besides, this regulation was encouraged principally by the concern of bank may default by holding insufficient amount of capital to support bank’s operation (Rime, 2001). However, if capital regulation was not planned correctly, regulatory pressure may create adverse effect on banks due to false information and moral hazard which will lead to excessive risk (Tanda, 2015). According to Calem and Rob (1999), moral hazard was a critical problem for all banks. The moral hazard problem increased due to government deposit guarantee which allowed banks to take more risky loans without paying high-interest rates for the deposit.

According to Tanda (2015), regulatory pressure will affect banks in making decision. The bank had to follow eight percent minimum requirement of capital ratio. However, amount of capital hold above minimum requirement can be decided by bank itself. In this research, bank with high capital ratio will expose to a lower regulatory pressure as they had sufficient amount of capital to resist bank insolvency and absorb risk and shocks. In contrast, more regulatory pressure will be imposed on banks with low capital ratio as the capital may not able to absorb potential losses. With this, bank might strengthen capital base and level to achieve minimum capital requirement. Regarding this statement, it could be said that a positive relationship existed between regulatory pressure and risk.

According to research done by Korbi and Bougatef (2017) they had similar result in which a positive relationship occurred between regulatory pressure and risks (bank stability). The capital was precious for every bank as they could use equity to cover losses if there were any financial crisis. To require more capital, bank would increase their incentives in taking more risky business. With this, banks may expose to more risk, hence reduced bank stability.
However, some argument said that more regulatory pressure imposed would not lower probability of banks to meet failure (Ahmad et al., 2008). Cost of capital of bank will increase when more capital regulations were imposed. Thus, bank might choose business operation that earned more income and profit to maintain minimum capital requirement and to gain more return. With this, bank may expose to more risk and lead to a fall in bank profitability.

According to Bashir (2003), his research showed that one of the most essential components that can affect bank's profitability was the regulation pressure. In his research, if regulation imposed to banks reduced, banks will put more effort on riskier activities or businesses as this could help banks to earn more profit. With this, banks will choose more portfolio and leverage risk to maximise its shareholder value (Rime, 2001). If risky operation and business gained profit, depositors and shareholders might earn more. On the other hand, if bank failed to make profit on those risky businesses, depositor may suffer loss, and bank will face impact of bankruptcy especially when they did not have sufficient capital to cover losses. With this, restricting bank with regulatory pressure was one of the methods to reduce problem of moral hazard as it can prevent banks to invest in a higher risk operation (Rime, 2001).

2.1.5 3rd Explanatory Variable: Liquidity ratio (LIQ)

Researcher adopted measure of liquid assets to total assets ratio to test for liquidity (Tan, 2017; Roman & Tomuleasa, 2012; Erdogan & Aksoy, 2016).

Baselga-Pascual et al. (2015) studied the determinants of bank risk using several financial ratios included liquidity ratio. The findings suggested that liquidity ratio is negatively significant to risk of bank measured by using Z-scores. In other words, it can be indicated that a high ratio of liquidity will reduce the risk-taking by banks.
Next, the researchers found that the liquidity ratio is significant to the probability of banks to fail. They pointed out that banks with low liquidity ratio will tend to be defaulted (Lin & Yang, 2016). This result is in line with the previous researchers.

According to Richards and Laughlin (1980), the researchers stated that liquidity ratio is one of the prime factors to determine risk-taking of banks. A misevaluation of liquidity implication may turn into undetected default risk.

In the study on banks profitability determinants which conducted by previous researchers, the findings suggested that there is a weak negative significant relationship between liquidity ratio and the bank’s profitability. In other words, it can be indicated that profitability goes up when liquidity decreased as the researchers treat liquidity as liquidity holding which represented expenses of banks (Molynuex & Thornton, 1992).

According to a study conducted by Tan (2017), he did a research which analysed bank profitability by researching effects brought by competitors and shadow banking on profitability of bank. He found out that liquidity negatively significant to bank profitability as large figure of liquid asset may limit probability of bank to gain extra interest return by using funds.

Besides, Roman and Tomuleasa (2012) also studied determinants of bank profitability which included liquidity. In this paper, result suggested that liquidity was negatively significant to profitability of banks as return may decline regard to increase in liquidity. The researchers stated that banks might usually hold diminished liquid assets and resisted with risk which unable to finance day-to-day operation.

According to Cornett, McNutt, Strahan and Tehranina (2011), they stated that banks that owned more liquid assets would reduce lending numbers indirectly. In their
investigation, they studied how banks controlled appearance of liquidity shock during financial trouble happened within year 2007 until 2009. Banks may more rely on equity capital financing and deposit. This would regulate and control liquidity crisis and lead to a decrease in credit supply.

### 2.1.6 4th Explanatory Variable: Leverage ratio (LEV)

In the study of Akhter and Roy (2017) they included loan-deposit ratio to represent the leverage factor.

Generally, banks faced smaller costs of going insolvent when it possessed lower leverage ratio, whereby it is considered well capitalised and had sufficient capability to withhold from the financial crisis, and it is somehow secured for the depositors (Sufian & Hassan, 2011). Besides, regarding risks of banks, high leverage reflected higher risks due to the small equity base available to shield the banks against losses of risky assets (Clark, Mare & Radic, 2018). This was parallel with the findings of Chen (2013), firms that owned high financing leverage would increase their interest obligation and hence costs of the firm will also increase. High-interest obligation will cause firm to become more sensitive when economy downturn and will lead firm to have high insolvency risks.

Kiema and Jokivuolle (2013) investigated the relationship between leverage ratio and stability of the banks. Based on the findings, both high-risk loans’ in the banks’ portfolio and capital amount which is in the mixed-portfolio will go up when leverage ratio increased. Besides, when the leverage ratio goes up, loan volume that held by the mixed-portfolio banks will also go up. The probability of bank default may increase due to the contamination effect.
The study of Tariq, Usman, Mir and Ali (2014) declared that banks’ leverage directed adverse impact on profitability. This is because when more customers become defaulters and fail to repay loan, banks will need to finance their operation with debt and hence higher chance to meet bankruptcy. This was in line with the findings of Işık (2017) where leverage is significantly and adversely affecting ROA, parallel with results obtained by Sufian and Habibullah (2010) where low leverage (well-capitalized bank) faced lower chance of bankruptcy, lessen their funding costs, lesser demand for external funding and resulting in high profits earning.

2.1.7 5th Explanatory Variable: Non-performing loan (NPL)

Loan impaired charges referred to money put aside by bank assuming customers unable to repay, similar to loan loss provision. Asset quality often expressed in studied model by non-performing loan (NPL) (Roman & Tomuleasa, 2012; Buchory, 2015; Akter & Roy, 2017; Kadioglu, Telceken & Ocal, 2017; Ozurumba, 2016).

Adeolu (2014) declared that asset quality was a strand of banking management which demands appraisal of firm asset to assist the assumption of size and level of risks associated with banking activities. The collapse of bank asset quality altered it's financial performance and the soundness of the financial system. This was supported by Ozurumba (2016) as asset quality was a critical element causing bank failures and acted as a significant insolvency predictor. Hence banks with high NPL exposed much to failure.

This variable was found to direct positive impacts on both banks risks and return. Since NPL can be perceived as risk, hence reaffirmed high profit linked with high risks (Lee, Yang & Chang, 2014). This was in line with the finding of Roman and Tomuleasa (2012). They claimed that NPL exerted positive influence on bank
returns in the context of Latvia. This was definable because during years before crisis, aggressive bank lending led to revenue growth, and offset the losses of NPL, hence the effect was positive but insignificant statistically. This was similar to the finding of Buchory (2015) as he justified that a positive relationship found between bank returns and NPL despite insignificant effects.

A significant relationship between NPL and bank profitability was proved by Adeolu (2014), Kadioglu et al. (2017), Akter and Roy (2017), Ozurumba (2016) and Roman and Tomuleasa (2012). Adeolu (2014) illustrated that bank performance concerning profits, was significant to asset quality measured by loan loss provision and NPL. Its profit would be volatile when asset quality fell.

NPL was found to exert adverse effect on banks profitability (Kadioglu et al., 2017; Ozurumba, 2016; Roman & Tomuleasa, 2012; Akter & Roy, 2017). Ozurumba (2016) explained that adverse influence of NPL on commercial bank performance could not be neglected as it constituted fundamental danger to the banks. In the study of Roman and Tomuleasa (2012) result obtained consistent with their expectations, whereby NPL directed negative impact on banking profitability in all countries analysed but Latvia. This implied that banks with strong credit risks stimulated lesser profits.

2.1.8 6th Explanatory Variable: Off-balance Sheet Items (LNOBS)

Off-balance sheet items are items not included on the balance sheet of a company. The items can be liabilities or assets of the company such as operating lease. In recent years, banking industry had changed their operation structure as the off-balance sheet items were introduced to the financial industry. In the developed and developing countries, the banking system they adopted had increased the involvement towards the off-balance sheet items (Khasawneh & Al-Khadash, 2014).
They showed that OBS had become a tool for the banks to hedge and manage the risks. There are different studies emphasised on effect of OBS towards the profitability and performance of the banks. Different results are shown through those studies, and then argument existed.

Duran and Lozano-Vivas (2013) studied OBS activities and the performance of banks, they highlighted that OBS showed significant association with bank insolvency risk. The researchers used cross-sectional estimates to measure the relation between OBS and insolvency risk. Although they forecast that the linkage between both variables should be negative, but the result showed positive connection. They examined this study for the pre-crisis period which is from 1996-2006 of EU15 banks, and the outcome indicated that in that period, if the bank involved OBS in large extent, the relative bank will face less insolvency risk. Caldentey, Titelman and Pineda (2009) suggested that OBS can diversify risk that will be faced by bank and the diversification can diminish the probability of bankruptcy of bank.

Karim and Chan (2007) analysed that involvement of OBS activities in the banking industry will cause the increment of volatility of banks. They also found out that the effect of OBS activities not only focused on the risks but also toward the profit of the banks (Karim & Chan, 2007; Lozano-Vivas & Pasiouras, 2014). In the long run, this volatility effect will influence the bank's benefits and profitability as the bank performance is related to the bank risks exposure. Karim and Chan (2007) showed evidence that OBS activities had widespread and growth in Malaysia's banking industry from the year 1995 until 2003. The banks had allocated some amount of money in OBS activities, and the amount that had been utilised for this purpose seems to be increased year by year (Karim & Chan, 2007).

Also, there are also researchers who supported that OBS activities can reduce the risk exposure and increase the revenues. Khasawneh and Al-Khadash (2014) investigated the role of the OBS activities in the Middle East and North Africa
banking industry in term of profitability and risks. They found out that OBS activities had significant association with the bank risks and profitability (Khasawneh & Al-Khadash, 2014). Bank risk was found to be more sensitive to Islamic banks compared to commercial banks. Kashian and Tao (2014) also suggested that after OBS items involved in the banking system, the income of the bank had increased in term of noninterest income. Their studies focused on one of the elements of OBS items which is loan commitment. The loan services that they provided to the customer can help the bank to generate revenue as the customer had to pay for an amount of money so that the account will be kept available.

According to Aktan et al. (2013), they studied the impact towards the performance and profitability of the listed banks in Istanbul. They found that OBS had improved the bank's stock return because OBS will reduce the bank exposure towards risks. Thus, as the risk exposure decreases, the bank's stock return will increase, and the profitability of the bank will also be affected. However, they found that OBS and profitability had negative relationship and are significantly related. Through the studies they had done, they came out with the conclusion whereby OBS activities or items are the vital elements that will affect the performance of the bank in term of the earning and profitability.

Lozano-Vivas and Pasiouras (2014) examined the effect of the presence of OBS items toward the bank's profitability and productivity. Their studies showed that OBS items had positive and significant effect towards the profitability of the banks. This is due to the circle of effect when the OBS is engaged in the activities of the banks. The involvement of the OBS items causes the banks to increase their costs to provide various services to the customer. This will enhance the quality of the facilities that had been offered by the banks and eventually bring the highest revenues.
2.1.9 7th Explanatory Variable: Board Size (BOARD)

Mathew, Ibrahim and Archbold (2016) indicated that the central role of board of director is to monitor firms' managers who are responsible for day to day running of business. The performance of a company quite dependable on monitoring quality of directors, number of board members showcased the depth of experience and expertise of the board, and a large number of board members indicated stakeholders monitoring management. Owing to these facts, board size became a critical element in deciding how a firm performed. In their study, they proved that board size exerted adverse effects on all measures of risk whereby large board size led to low risks of firms. This can be explained by a large board size able to make less extreme decision, and more agreement could be arrived at compared to small board. This result was consistent as decision made by a large group would be an average of individual prior judgement. This was in line with the finding of Huang and Wang (2014). They pointed out that size of board negatively significant to risk-taking of banks. The researchers paid attention to board size and policies implemented in firm in different areas which included overall risk-taking by firm. After research was completed, results suggested that companies with more great board size firm will receive lesser risk in the future. Nakano and Nguyen (2012) and Pathan (2009) also agreed with the statement as they disclosed that board size led an inverse impact on banks risks.

However, according to Konishi and Yasuda (2004), they stated that there was no relationship between board size and risk-taking of banks as they were nonlinear and risk-taking may be reduced although board size was stable. Also, there was an expansion due to asset substitution impact monopolised impact on bank risk which affected by managerial reinforcement.

It negatively affected profitability of banks and this statement was supported by research done by some previous researchers (Guest, 2009; Vafeas, 2000; Eisenberg, Sundgren & Wells, 1998). Vafeas (2000) studied the relationship between size of
board and profitability. The result suggested that small board size may earn higher profitability as they were able to get precise and accurate information to make investment decision. This may increase return of firm indirectly (Vafeas, 2000). Besides, in the study of Guest (2009), his result indicated board size might lead negative impact to performance of firms. The result stated that size of board was simultaneously tested by firm performance. The researcher also used various measures to detect profitability and control other factors. The result was in line with statement made by previous researchers.

However, the study conducted by Eisenberg et al. (1998) pointed out that board size owned a negative correlation with profitability in small firms. The researcher suggested that the effects that usually occurred in small or medium-size firms, which possessed small board size will also arise when ownership was less controlled and separated compared to large firm. The perfect board size effect different among varied of firm size. Vafeas (2000) also investigated the connection between board size and profitability, and he suggested that small board size might earn higher profits as they were able to obtain precise and exact information to do investment decision. This helped them to raise up firms' return indirectly.

Conversely, some researchers indicated that there was a definite relationship between board size and banks profitability. Banks with large and robust supervision from board of directors, probability of poor management in a bank would be minimised, and able to achieve high profitability (Ozili & Uadiale, 2017; Petchsakulwong & Jansakul, 2017).
2.1.10 8th Explanatory Variable: Non-executive Director on Board (NONEXE)

According to Treadwell (2003), role of non-executive director (NED) was increasingly became attention for every corporate. The non-executive director also considered as one of the directors in corporate board. However, they were not included in management business team like executive director. The role of NED was to keep an eye on information of day-to-day business management which considered as a primary custodian in managing information and responsibilities of business activities.

Talking about banking risks, Adusei, Akomea and Nyada-Addo (2014) found that there was a positive relationship between non-executive director and bank's risk. However, they used credit risk as an indicator to estimate bank stability. Their result was different with their expected result which they supposed that independent director was positively related to bank's risk. With this, agency theory and resource dependence method were claimed to be refuted in their research.

Mayur and Saravanan (2017) claimed that relationship between non-executive director and performance firm was mixed and supported in banking industry. El-Chaarani (2014) used ROA as an indicator to estimate performance of Lebanese banks, and she found that there was a positive and significant relationship between independent directors and performance of Lebanese banks. According to the researchers, non-executive directors were independent of bank owner, with this, they could carry out their responsibility more effectively. Moreover, independent director played an important role in protecting bank's owner and reducing bank risk by using his expertise and experience in managing business (El-Chaarani, 2014). With this, commitment of NED, the financial profitability of a bank could be guaranteed.
This result was in line with research from Al Manaseer, Al-Hindawi, Al-Dahiyat and Sartawi (2012). Their result also showed that non-executive directors were positively related to bank performance. The recruitment of NED diminished conflict between stakeholders and also improved management control. According to the researchers, business decision could be improved by hiring high capabilities and knowledgeable director. This was because independent director could assist bank management in managing risk and problems and also giving strategic advice to strengthen bank’s performance.

2.1.11 9th Explanatory Variable: Corruption Freedom (CORRUPT)

In a study conducted by Louati, Louhichi and Boujelbene (2016) to analyse risk-capital-efficiency interconnection between banks, they incorporated Corruption freedom variable, which was the freedom from corruption index obtained from Heritage Foundation. Likewise, corruption freedom was adopted by Sufian and Habibullah (2014), Chortareas, Girardone and Ventouri (2013) and Sufian and Hassan (2011) to study banks efficiency. Similarly, a few other researchers also adopted Transparent International’s Corruption Perception Index in their paper to discover the impacts of corruption on banking risks and returns (Chen et al., 2015; Lourenço, Rathke, Santana & Branco, 2018; Aburime, 2009).

Besides, in a study conducted by Chen et al. (2015), they justified that high levels of corruption increased banks' risk-taking behaviour, regard to "sand the wheel" perspective in corruption development network. The stability of banks fell when corruption rose. Banks involved in more risky activities in a corrupt economy, hence they became more volatile. Indirect impacts of corruption on banking risks were also analysed, and evidence was that severe levels of corruption associated with greater risk-taking of banks. The "sand the wheel" hypotheses were supported by Chen et al. (2015), Habibov, Afandi and Cheung (2017) and Sharma and Mitra (2015).
Another finding of Louati et al. (2016) conveyed that in conventional banks context, corruption freedom had significant and positive effect on banking risks, which means low corruption (corrupt-free) stimulated high banking risks. Such positive impacts could be explained alternatively by the fact that increase in corruption might well direct managers to contribute more efforts to control and management, thus lower risks. Meanwhile, for Islamic context, corruption urged credit-related risks. Habibov et al. (2017) also found that high corruption destroyed confidence and trust at all levels including financial institutions.

Corruption was found to have relative positive connection with banks earnings (Naceur & Omran, 2011; Lourenço et al., 2018; Aburime, 2009). With this, Naceur and Omran (2011) declared that regulatory and institutional variables tend to influence bank performance. Their findings suggested that corruption increased cost efficiency and net interest margins. In their study, they indicated that corruption was being measured with a range of 0 to 6 whereby low scores signified high corruption. In this case, a bank required lower risk contribution on their investment in a country with little corruption. Besides, another finding of Sufian and Habibullah (2010), Chortareas et al. (2013) and Sufian and Hassan (2011) disclosed that freedom from corruption exerted positive influence on banks’ profitability.

Aburime (2009) found that coefficients of corruption in their models are negative, which implied that when Corruption Perception Index increased, CI, (regard to high score implied low corruption), Nigeria banks profitability decreased. They discovered that banks in Nigeria were growing from and highly complicit in the high level of corruption in their country. Lourenço et al. (2018) highlighted that higher corruption level stimulated higher incentives for a company to adjust their earning especially in a growing nation instead of a developed one. This was contrast with the findings of Chen et al. (2015), they revealed that corruption maintained a negative connection with ROA as it disrupted financial soundness by suggesting imprudent loans which encouraged lower and high volatility profit. Even large banks were found to have no resistance to destructive impact of corruption.
2.1.12 10th Explanatory Variable: Business Freedom (BUSFREE)

Business freedom came into prominence of late, to what extent it would affect bank risks taking and returns remained to be a valid concern. It was derived from an array of complication of starting, operating and closing a business (Ghosh, 2016; Sufian & Habibullah, 2010; Sufian & Habibullah, 2014). Business freedom measured the extent to which a firm able to establish and run a business freely and data were obtained from Heritage Foundation (Sufian & Habibullah, 2010; Al-Amarneh and Yaseen, 2017; Sufian and Hassan, 2011; Chortareas et al., 2013)

Ghosh (2016) agreed that business freedom increased profit variability and thereby rose risk appetite of banks. High freedom allowed banks to be more susceptible to presuming excessive risks. Economic freedom was found to direct a significant but non-negligible effect on banks risks taking. It was proved that government interference affected banks risks taking behaviour.

Another study of Amir (2013) sought to reveal the impact of economic freedom on banking stability measured by Z-score. Overall result obtained was that business freedom possessed positive effects on bank stability. With this, Z-score at this moment rendered universal measure for banking stability. Thus, higher Z score depicted stable banks. They illustrated that countries with higher levels of business freedom owned high levels of bank stability.

In addition, business freedom was justified to exert positive influence on banks profitability in Malaysian banking sector. This implied that higher freedom allowed for activities that banks can handle helped boost banks returns, which was agreed by the fact that banks can involve in different activities to exploit economies of scale and generate earnings from non-traditional source when lesser regulatory control imposed. Similarly, higher freedom for entrepreneurs to start doing business was beneficial to job formation and subsequently caused banks profit to grow
(Sufian & Habibullah, 2010). Their finding was supported by Shahabadi and Samari (2013) as they also illustrated that business freedom maintained positive connection with banks profitability.

Besides, Al-Amarneh and Yaseen (2017) declared a robust positive relationship existed between business freedom and Jordanian banks efficiency. They also clarified that increased government intervention led to the decline of Jordanian banking sector efficiency. This was supported by the study of Chortareas et al. (2013). Nonetheless, their findings were contrasted with Sufian and Habibullah (2014) and Sufian and Hassan (2011) as the latter claimed that business freedom exerted negative influence on banks efficiency and profits respectively. Sufian and Habibullah (2014) and Sufian and Hassan (2011) justified that when banks were free to start new business, banks’ efficiency would be hindered. To be specified, when banks had greater freedom to start a business, there would be lower entry barriers for banks, which then intensified competition level and resulted in adverse effects on bank efficiency. To add to that, Sufian and Hassan (2011) disclosed that high freedom regarding more significant potential to obtain licences to start, operate, and close business could obstruct the banks to gain profit. This could be explained by the easiness of getting licence caused intensified competition and slowed down returns.
2.1.13 11st Explanatory Variable: Gross Domestic Product (GDP)

Gross domestic product (GDP) is a monetary value employed to determine all finished goods and services generated in a specific period within a particular country. Generally, GDP is known as a country’s health indicator or appraised the standard living of a country. It is also one of the macroeconomic factors that influence risks and returns of a bank within ASEAN countries.

On the other hand, GDP not only give impact on profitability of banks but also affecting risk faced by a bank. When a country's economy is turning bad, risk of a bank encountered will be uprising, a negative relationship is found between both bank’s risk and a country’s GDP (Nicolò, Dell’Ariccia, Laeven & Valencia, 2010; Jimenez, Lopez & Saurina, 2013; Altunbas, Gambacorta & Marques-Ibanez, 2010). Based on Nicolò et al. (2010) research, they mentioned that when a country was undergoing an economic downturn, the bank given loan will become riskier and real fund rate will be lower. A bank will be facing a great risk not because of holding or choosing a riskier portfolio of loans, but due to availability of set loan is becoming riskier for a bank to hold. This statement is supported by Atlunbas et al. (2010).

Annual real GDP growth rate is one of the macroeconomic factors that gave impact on a bank’s profitability within ASEAN countries. GDP is found to have a positive relationship with profitability of one bank (Alper & Anbar, 2011; Bikker & Hu, 2002; Demirguc-Kunt & Huizinga, 1999; Garcia & Guerreiro, 2016). Alper and Anbar, 2011 expected the reason of having positive relationship between both GDP and bank's profitability is due to high demand for lending in market. A part of that, a country that consists of a tremendous competitive banking sector which banking asset had contributed a big portion of GDP, will have a smaller and lower profitability. However, a larger stock market capitalisation to GDP will enhance margin ratio of bank, which provides consideration for a bank to make a balance between exposed debt and equity (Demirguc-Kunt & Huizinga, 1999).
According to situation in China’s banking industry, initiation of new bank required intricated procedures as well as approval from China government. Difficulties of entering into the market enabled existing banks to magnify their profitability as demand of banking services by Chinese was increasing markedly (Tan & Floros, 2012). Garcia and Guerreiro (2016) also indicated that due to high demand of lending, banks were able to expand and enlarge their businesses that would lead to higher profitability.

### 2.1.14 12nd Explanatory Variable: Inflation (INF)

Consumer price index (CPI) is a tool of measurement to detect changes in price level of consumer goods and services over time. CPI is the goal, indicator of macroeconomic regulations and controls, as it reflects efficiency and effectiveness of a country’s government in implementing fiscal and monetary policies (Xiao, Wang, Tian & Zhen, 2018).

If part of inflation is unexpected, a negative coefficient result will be presented. There will be limited or no effect on the values of bank and stability if inflation is predicted perfectly. The researcher declared that if price level of real goods and services increase surprisingly, it might downsize exchange value of assets as well as liabilities. Generally, a bank has more assets than liabilities; therefore, bank owners would experience high risk of losing his wealth due to the unexpected inflation (Clark et al., 2018).

One of the macroeconomic determinants employed by scholars is inflation rate to define alteration on profitability of banks. Some scholars think that high accuracy of prediction on a country's inflation rate is important as it will influence the relationship with a bank's profitability. Khan et al. (2018) discovered that, if a bank manager managed to predict country's inflation entirely, he or she would have a chance to take precautionary steps. High profit will be gained if higher lending rate
is imposed. Meanwhile, deposit rate is being reduced. This action will enhance level of inflation-indexed real profits. In this case, the relationship between bank’s profit and inflation will be positive.

However, Bouzgarrou, Jouida and Louhichi (2017) stated that, a negative coefficient is expected when cost is rising quicker than income. A reverse relationship is assumed between inflation and profitability of bank as it is not easy for a bank to notice inflation of a nation is speeding up. If a manager failed to anticipate the latest trend of inflation, he might suffer from losses instead of gaining profits at that particular period. Unforeseeable increased inflation will lead to difficulties of cash flows for borrower, which would cause premature termination of loan hence results in suffering losses (Tan & Floros, 2012).

2.2 Review of Relevant Theoretical Models

2.2.1 Agency theory

Tomar and Bino (2012) and Himaj (2014) declared that efficiency of corporate governance is highly associated with Agency theory. According to Eisenhardt (1989) agency theory is a crucial yet debatable theory. Hereby this theory is made useful to resolve problems, which include the problem of risk sharing that aroused when both principal and agents own different perspective and behaviour toward the matter of risks. The unalike risk preferences led them to perform dissimilarly. In his research, he discussed principal and agent were found to have conflicting interest and governance mechanisms might be fruitful to restrict agent’s self-serving attitude. In addition, Fama and Jensen (1983) declared the effectiveness of board of director to exert monitoring and compensation to top-level decisive managers and hence able to supervise vital conclusion by managers. This was also
agreed by Liang et al. (2013) who depicted that the independent director on board would be effective at reducing interest conflict in banks and manage agency problem wisely.

Jesus and Gabriel (2006) added that principal-agency problem might drive imprudent volatility into growth rate of loans. This is because when managers achieve sufficient profits for shareholders, they would involve with activities irrespective of firms’ value maximization and focused on own interest instead. Such activity included excessive credit growth which could increase banks’ social existence. In this case, should managers be compensated in form of growth objectives, it might result in motivation to prompt growth.

Moreover, Hussain et al. (2015) disclosed that shareholders would desire to reduce agency conflict which will contribute to problem of under-investment. They will include equity as a form of compensation to the management. It was found that managers who obtain certain forms of ownership tend to involve themselves with high risk activities which benefits the shareholders as the increasing risks would give rise to great return. Berger and Patti (2006) however justified that high leverage ratio will indirectly reduce agency cost outside equity. This would help enhance firms’ value and urge bank’s manager to act more in the interests of shareholders.

In addition, agency cost would direct negative influence on banks’ profit earning (Roman & Tomuleasa, 2012). Plus, Jesus and Gabriel (2006) conveyed that agency problem combined with intense banking competition and risk-related capital necessity might give rise to low credit evaluation and led too expansionary credit policy and lastly, sky-high loan loss. Jensen and Meckling (1976) later introduced “agency theory” concept where they highlighted the interest conflict happened between different contracting parties namely the shareholders, managers and capital holders. The cost of incapability to achieve goal are solely bore by managers at the expense of enjoying small portion of benefit. With this, agency cost is highly linked with the debt claim on a company.
2.2.2 Asymmetric information

Ariccia (1998) declared that in lending process, binding banks collect required information of borrowers, since they faced uncertainty concerning customers’ creditworthiness, and this information gathering helped banks in obtaining advantage over possible entrants. Besides, these information asymmetries are crucial to decide the industry structure and signified a barrier for new banks to enter. Thus, potential entrants face adverse selection problem more intense than those confronted by incumbent banks. The role of asymmetric information in testing equilibrium structure of loan market in multi-period model of intense competition is studied by the researcher. Basically, it developed banks’ decision of entry and exit internally. Toward this end, she proved that asymmetric information exerted adverse selection effect which acted as barrier to entry, obstructing new lenders to enter market. No to forget that incumbent benefit is enlarged in market which asymmetric information is made essential.

In addition, banks would assess small firms for loan crediting for uncertain decision, by studying asymmetric information of customers. Banks are expected to establish a good network with institutions outside to obtain information regarding analysis of technology and technical capability of entrepreneur, which help to minimize acute problem brought up by asymmetric information. With this, the inadequacy of knowledge regarding industry sectors and technology applications give rise to asymmetric information problem and hinder banks to study risk for small operations (Deakins & Hussain, 1994).

According to Meza and Webb (1987) asymmetric information led to adverse selection problem which caused projects or operations which are substandard in banks’ perspective to drive out good projects. It was somehow declared that with the existence of asymmetric information, firms’ financial structure and investment level relied on allocation of projects returns. If all projects denote similar expected
returns but differ in risks, equity is thus favour means of finance and social efficiency gains.

With the absence of moral hazard, to make collateral useful for contractual purpose, there must be presence of either imperfectly competitive credit market, risks averse lenders or asymmetric evaluation of lenders and borrower either. Asymmetric evaluations aroused from different in information by both parties, lender and borrower. The evaluations results in lender proffered greater deduction in loan rate that what required by borrower in exchange for security collateral. With asymmetric valuations attached, borrowers’ quality is positively associated to collateral amount (Chan & Kanatas, 1985).
2.3 Proposed Theoretical/Conceptual Framework

A model is constructed to study banking risks and profitability, attached with theories to evolve theoretical framework. It is illustrated as below:

Figure 2.1: The effects of Basel, Asset Liability Management, Off-balance Sheet Items, Bank Governance, Institutional Quality and Economics Variables on ASEAN Banks from Year 2011 to 2016

In this study, profitability of the banks and banking risks were adopted as our dependent variables and the remaining variables acted as independent variables which include capital ratio, regulatory pressure, liquidity ratio, leverage ratio, non-performing loan, off-balance sheet item, board size, non-executive director on
board, corruption freedom, business freedom, GDP and inflation. The banks selected were from ASEAN countries and the period of this study ranged from the year 2011 to 2016. The predicted models are as below:

**Model 1:**

\[
ZSCORE_{it} = \beta_1 i + \beta_2 CAR_{it} + \beta_3 REG_{it} + \beta_4 LIQ_{it} + \beta_5 LEV_{it} + \beta_6 NPL_{it} + \\
\beta_7 LNOBS_{it} + \beta_8 BOARD_{it} + \beta_9 NONEXE_{it} + \beta_{10} CORRUPT_{it} + \\
\beta_{11} BUSFREE_{it} + \beta_{12} GDP_{it} + \beta_{13} INF_{it} + \epsilon_i + \mu_{it}
\]

**Model 2:**

\[
ROA_{it} = \beta_1 i + \beta_2 CAR_{it} + \beta_3 REG_{it} + \beta_4 LIQ_{it} + \beta_5 LEV_{it} + \beta_6 NPL_{it} + \\
\beta_7 LNOBS_{it} + \beta_8 BOARD_{it} + \beta_9 NONEXE_{it} + \beta_{10} CORRUPT_{it} + \\
\beta_{11} BUSFREE_{it} + \beta_{12} GDP_{it} + \beta_{13} INF_{it} + \epsilon_i + \mu_{it}
\]

Note: ZSCORE=Risk, ROA=profitability ratio, CAR=capital ratio, REG=regulatory pressure, LIQ=liquidity ratio, LEV=leverage ratio, NPL=non-performing loan, LNOBS=off-balance sheet item, BOARD=size of the board, NONEXE=non-executive director on board, CORRUPT=corruption freedom, BUSFREE=business freedom, GDP=gross domestic product, INF=inflation, \(\mu\)=company fixed effect, \(\epsilon\)=error term, \(\beta\)=intercept
2.4 Conclusion

In the nutshell, this chapter provided a better understanding and strong point between decisive variables such as capital ratio, regulatory pressure, liquidity ratio, leverage ratio, non-performing loan, off-balance sheet item, board size, non-executive director on board, corruption freedom, business freedom, GDP and inflation with risks and profitability of fifty banks within ASEAN countries. Each factor mentioned was being discussed and examined according to previous scholar's study specifically as well as precisely. In addition, theoretical models detected throughout the process of this research project had been mentioned and interpreted accordingly and theoretical framework was proposed for this research.
CHAPTER 3: METHODOLOGY

3.0 Introduction

The research methodology was defined as process used to gather data and information. By using a research methodology, a relationship between independent variables and dependent variables can be determined and identified. Moreover, panel data regression will be applied in this research to study profitability of 50 top assets rating conventional banks in ASEAN countries. This chapter comprised ways of collecting data and program for examining data. Last but not least, with results of different types of diagnostic test, interpretation and evaluation of data and result can be obtained.

3.1 Research Design

In this research, quantitative data was used to analyze correlation between exogenous variables like capital ratio, regulatory pressure, liquidity ratio, leverage ratio, non-performing loan, off-balance sheet item, board size, non-executive director on board, corruption freedom, business freedom, GDP and inflation with endogenous variable, risk and profitability of conventional banks in ASEAN countries. Throughout this research, this paper adopted secondary data acquired from Fitch Ratings, Bloomberg, Heritage Foundation and World Bank. 50 top asset rating sample banks were selected from ASEAN countries which consisted of
Vietnam, Singapore, Malaysia, Thailand, Philippines, and Indonesia. These banks constituted about 80% ASEAN banking assets which bring significant impact toward the banking industry. Moreover, the period of this study was conducted from the year 2011 to 2016, and data was collected based on annual basis. Panel data was chosen as it was more accurate and specific compared to cross-sectional data or time series data.

### 3.2 Data Collection Methods

This part discussed methodologies applied to achieve objectives of this study. With this, it covered approaches to investigate risk and profitability of conventional banks based in ASEAN, type of data involved, techniques used in data collection and method used for managing data and empirical model establishment.

#### 3.2.1. Secondary Data

This research was conducted based on secondary data collection and then directed into a set of panel data. The data was obtained from Fitch Ratings, Bloomberg, Heritage Foundation and World Bank. This study deployed secondary source data as it was more reliable and less time consuming compared to primary data. Besides, Hsiao (2007) indicated that panel data was preferred to cross-sectional and time series data as it provided more precise reasoning for model parameters and clarified computation and statistical presumption. Besides, he also claimed that panel data had become more readily available in developing countries and it had a higher magnitude than cross-section or time series data for conquering complex human behaviour.
Table 3.1: Variables, Proxies, Explanations, Unit Measurement and Sources

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Proxy</th>
<th>Explanations</th>
<th>Unit Measurement</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>ZSCORE</td>
<td>(ROA + EA)/standard deviation of ROA</td>
<td>Percentage (%)</td>
<td>Own calculation</td>
</tr>
<tr>
<td>Profitability</td>
<td>ROA</td>
<td>Net income divided by total assets</td>
<td>Percentage (%)</td>
<td>Fitch Ratings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Proxy</th>
<th>Explanations</th>
<th>Unit Measurement</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital ratio</td>
<td>CAR</td>
<td>Equity divided by total assets</td>
<td>Percentage (%)</td>
<td>Fitch Ratings</td>
</tr>
<tr>
<td>Regulatory pressure</td>
<td>REG</td>
<td>It is modelled as dummy variable, that takes value equal to 1 given that bank capital ratio exceeded 8% (regulatory minimum) and 0 otherwise</td>
<td>Not applicable</td>
<td>Own calculation</td>
</tr>
<tr>
<td>Liquidity ratio</td>
<td>LIQ</td>
<td>Liquid Assets divided by total assets</td>
<td>Percentage (%)</td>
<td>Fitch Ratings</td>
</tr>
<tr>
<td>Leverage ratio</td>
<td>LEV</td>
<td>Loan/Deps and ST funding</td>
<td>Percentage (%)</td>
<td>Fitch Ratings</td>
</tr>
<tr>
<td>Non-performing loan</td>
<td>NPL</td>
<td>Loan imp charges/Avg gross loans</td>
<td>Percentage (%)</td>
<td>Fitch Ratings</td>
</tr>
<tr>
<td>Off-balance sheet items</td>
<td>OBS</td>
<td>Ln (total business volume)</td>
<td>USD (million)</td>
<td>Fitch Ratings</td>
</tr>
<tr>
<td>Size of the board</td>
<td>BOARD</td>
<td>Number of directors on board</td>
<td>-</td>
<td>Bloomberg</td>
</tr>
<tr>
<td>Non-executive director on board</td>
<td>NONEXE</td>
<td>Independent directors who do not manage the day-to-day business like an executive director. Their role is mainly supervising and guiding directors and CEO.</td>
<td>Percentage (%)</td>
<td>Bloomberg</td>
</tr>
<tr>
<td>Corruption Freedom</td>
<td>CORRUPT</td>
<td>Government integrity, derived from Corruption Perceptions Index (CPI), by converting the raw CPI data to a scale of 0-100 by multiplying it by 10, say raw CPI score is 5.3, its freedom from corruption score will be 53.</td>
<td>Index</td>
<td>Heritage Foundation</td>
</tr>
<tr>
<td><strong>Business Freedom</strong></td>
<td><strong>BUSFREE</strong></td>
<td>Measures the efficiency of government regulation of business, score is ranged between 0 and 100, with 100 representing the freest business condition</td>
<td><strong>Index</strong></td>
<td><strong>Heritage Foundation</strong></td>
</tr>
<tr>
<td>----------------------</td>
<td>------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>---------</td>
<td>------------------------</td>
</tr>
<tr>
<td><strong>Gross Domestic Product</strong></td>
<td><strong>GDP</strong></td>
<td>Annual GDP of the country</td>
<td><strong>Percentage (%)</strong></td>
<td><strong>World Bank</strong></td>
</tr>
<tr>
<td><strong>Inflation</strong></td>
<td><strong>INF</strong></td>
<td>Annual change rate in INF</td>
<td><strong>Percentage (%)</strong></td>
<td><strong>World Bank</strong></td>
</tr>
</tbody>
</table>

### 3.3 Sampling Design

#### 3.3.1 Target Sample

1. Vietnam
   - Asia Commercial Joint Stock Bank
   - Joint Stock Commercial Bank for Foreign Trade of Vietnam
   - Sai Gon Joint Stock
   - Saigon Thuong Tin
   - Vietnam Bank for Agriculture and Rural
   - Vietnam Joint Stock Commercial Bank for Industry and Trade
   - Vietnam Prosperity Joint Stock Commercial Bank
   - Vietnam Technological and Commercial Joint Stock Bank

2. Singapore
   - Bank of Singapore Limited
   - Citibank Singapore Limited
   - DBS Bank Ltd.
   - Oversea-Chinese Banking Cooperation
   - United Overseas Bank Limited
3. Malaysia

- Affin Bank Berhad
- Alliance Bank Berhad
- Ambank (M) Berhad
- CIMB Group Holdings Berhad
- Hong Leong Bank Berhad
- Hongkong and Shanghai Banking Corporation (HSBC) Berhad
- Malayan Banking Berhad
- Oversea-Chinese Banking Corporation Limited
- Public Bank Berhad
- United Overseas Bank Berhad

4. Thailand

- Krung Thai Bank Public Company Limited
- Thanachart Bank Public Company Limited
- The Siam Commercial Bank Public Company Limited
- United Overseas Bank (Thai) Public Company Limited
- Bangkok Bank Public Company Limited
- Bank of Ayudhya Public Company Limited
- TMB Bank Public Company
- Kasikornbank Public Company Limited

5. Philippines

- Bank of the Philippine Islands
- BDO Unibank, Inc
- China Banking Corporation
- Development Bank of the Philippines
- Land Bank of the Philippines
- Metropolitan Bank & Trust Company
- Security Bank Corporation
- Development Bank of the Philippines
6. Indonesia

- PT Bank Central Asia Tbk
- PT Bank CIMB Niaga Tbk
- PT Bank Danamon Indonesia Tbk
- PT Bank Mandiri (Persero) Tbk
- PT Bank Maybank Indonesia Tbk
- PT Bank Negara Indonesia (Persero) Tbk
- PT Bank OCBC NISP Tbk
- PT Bank Pan Indonesia Tbk
- PT Bank Permata Tbk
- PT Bank Rakyat Indonesia (Persero) Tbk
- PT Bank Tabungan Negara (Persero) Tbk

These banks were selected as they had greater and sufficient total assets among rest of the banks in their representative country. They were ranked the top 50 total assets banks in ASEAN countries. Each bank consisted of a strong capital base which managed to contribute a positive impact towards their nation's economy. The endogenous variables, risks and profitability of conventional banks in ASEAN countries can be obtained from Fitch Ratings and Bloomberg. It is a reliable database to be used because it was being monitored and renewed regularly and data provided was precise and specific.

3.3.2 Sampling Technique

STATA and EVIEWS 9 were adopted to evaluate result as well as to construct output of our study. This is because they provided helpful tools for analysing, managing, estimating and producing research models automatically. Besides, they mingled superior modern software technology and is now widely used for everyone due to its easy-to-use interface and its advanced data management. Besides, both software allowed researchers to carry out hundreds type of statistical tools such as standard method and advanced technique. Other than that, econometric and statistical analysis could be executed with a distinct quality of graphs and tables in
this study of the panel data. Even so, they can be used in research of time series and cross-sectional data as well. Moreover, tests like LR Test, Hausman test, binomial test, Jarque-Bera tests can be executed to study Fixed effect model and Random effect model. With this, it is possible to discover the best-fitted model for this study and at the same time attaining research objectives. This research covers commercial banks ranked top 50 in ASEAN countries and they are significant in representing 80% ASEAN banking assets, constitute big portion and marked impact on ASEAN banking industry.

3.4 Data processing

Figure 3.1: Data Processing Cycle

Throughout the process of study, there are a total of 5 steps to process data. First and foremost, reviewing a lot of journals and articles to seek for an appropriate topic
for further investigation. Then, variables were determined after the declaration of this research topic. These variables were selected due to past supporting theories, researchers’ recommendation as well as accessibility of data.

Following that, data were retrieved from Bloomberg, Fitch Ratings (financial data), Heritage Foundation and World Bank. Relevant data will be well arranged in Microsoft Excel for the ease of carrying out analysis through statistical tools (STATA and EVIEWS 9).

Last but not least, results generated will be explained and clarified. A conclusion will be drawn accordingly based on interpretation results of STATA and EVIEWS 9.

3.5 Data analysis

3.5.1 Models Testing

3.5.1.1 Pooled Ordinary Least Squares (POLS)

Pooled OLS Model is a model used to help researcher to obtain reliable and better results for their studies. Masood, Niazi, and Ahmad (2011) applied Pooled OLS in their study to investigate the factors for Islamic banks to expand and bank's risks. In their study, they used Z-score as the measurement of bank risk, and they employed POLS to examine the regression. Masood et al. (2011) used this technique to explore the reaction of large bank and small bank toward the variables in their study. Besides, Nwosu et al. (2012) also employed Pooled OLS to determine the factors of bank risk where they used Z-score as their proxy for the bank risks.
Pooled OLS has been used to examine the behaviour of risk-taking towards the bank-specific variables in Nigeria. Baselga-Pascual et al. (2015) used Pooled OLS to identify determinants of bank risk in their alternative models so that the outcome of the model will be more solid.

Javaid, Anwar and Ghafoor (2011) studied about the determinants of bank profitability and they employed Pooled OLS Model to examine effect of the assets, loans, equity and deposits on the profitability of the bank where they used ROA as the profit measurement. Javaid et al. (2011) explained that by using this pooling method, results obtained by the study would be more reliable. It tends to be a valid procedure when variables showed stable connection across the banks. They used Pooled OLS Model because they believed that the data sets they obtained had similar reaction with the cyclical pattern and thus they were stable enough to run the model.

Besides, Ani, Ugwunta, Ezeudu and Ugwuanyi (2012) also researched with Pooled OLS Model, and they used the model to investigate the impact of assets, loans, economic growth, inflation, deposits, market capitalisation and equity towards profitability of banks. The concept that they used Pooled OLS Model is similar to Javaid et al. (2011). Ani et al. (2012) also stated that the data sets they used in their research were identical with the cyclical movement.

Moreover, Saif-Alyousfi, Saha and Md-Rus (2017) used Pooled Ordinary Least Square Model in their study to examine whether capital adequacy, asset quality, operational efficiency, bank size and liquidity had causal effect toward profitability of the bank. The indicators that they used as the measurement of the performance of the bank return on asset(ROA), return on equity(ROE) and net interest margin(NIM). The model pattern they used was similar to the model constructed in this study. They used Pooled OLS Model because they stated that Pooled OLS Model is the traditional model to use when the data employed in their study is panel data (Saif-Alyousfi et al., 2017).
Pooled OLS is a regression used to analyse panel data which included cross-sectional and time series data. This regression allowed multiple observations and periods to be grouped and behave similarly to run the analysis. Pooled OLS will have greater efficiency when individual effect did not exist which meant all independent variables would behave the same. Croissant and Millo (2008) stated that on the off chance that individual segment was missing, this estimator would be most appropriate and efficient estimator for the coefficient, $\beta$. There were two subscripts involved in regression which were $i$ and $t$ (Baltagi, 2008). The subscript $i$ stands for individuals observation while subscript $t$ stands for time or number of period for the observations. In this study, $i$ is representing banks that had been selected while $t$ is representing years. The equation that we employed can be represented as follow:

$$Y_{it} = \alpha + \beta X_{it} + \epsilon_{it}, \; i=1, 2, 3, \ldots, n; \; t=1, 2, 3, \ldots, t$$

Where:
- $Y =$ Dependent variables of banks $i$ at time $t$
- $\alpha =$ Intercept
- $\beta =$ Coefficient of $X$
- $X =$ Independent variables of banks $i$ at time $t$
- $\epsilon =$ Error term

This equation represents a relationship between exogenous and endogenous variables which were represented by $X$ and $Y$. The equation's intercept, $\alpha$ indicates value of endogenous variable, $Y$ when exogenous variable, $X$ is zero in value. The $\beta$ which is coefficient of $X$ is representing changes of endogenous variable towards changes of exogenous variable, $X$. The $i$ and $t$ are indices representing individuals and time. The error term in pooled OLS regression consists of two components which are individual effect and time effect (Croissant & Millo, 2008). In this research, it will be addressed as below:
Model 1:

\[ ZSCORE_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 REG_{it} + \beta_3 LIQ_{it} + \beta_4 LEV_{it} + \beta_5 NPL_{it} + \beta_6 LEV_{it} + \beta_7 LNOBS_{it} + \beta_8 BOARD_{it} + \beta_9 NONEXE_{it} + \beta_{10} CORRUPT_{it} + \beta_{11} BUSFREE_{it} + \beta_{12} GDP_{it} + \beta_{13} INF_{it} + \varepsilon_{it} \]

Model 2:

\[ ROA_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 REG_{it} + \beta_3 LIQ_{it} + \beta_4 LEV_{it} + \beta_5 NPL_{it} + \beta_6 LEV_{it} + \beta_7 LNOBS_{it} + \beta_8 BOARD_{it} + \beta_9 NONEXE_{it} + \beta_{10} CORRUPT_{it} + \beta_{11} BUSFREE_{it} + \beta_{12} GDP_{it} + \beta_{13} INF_{it} + \varepsilon_{it} \]

Note: \( ZSCORE \) = Risk, \( ROA \) = profitability ratio, \( CAR \) = capital ratio, \( REG \) = regulatory pressure, \( LIQ \) = liquidity ratio, \( LEV \) = leverage ratio, \( NPL \) = non-performing loan, \( LNOBS \) = off-balance sheet item, \( BOARD \) = size of the board, \( NONEXE \) = non-executive director on board, \( CORRUPT \) = corruption freedom, \( BUSFREE \) = business freedom, \( GDP \) = gross domestic product, \( INF \) = inflation, \( \mu \) = company fixed effect, \( \varepsilon \) = error term, \( \beta \) = intercept

3.5.1.2 Fixed Effect Model (FEM)

Fixed Effect Models (FEM) can be classified into two different general classes. One model will be defined precisely if the regressors are categorical. The model is equivalent to analysis result of the variance, but only applicable to the special characteristics of effect size estimates. A part of that, the second class of models will be considered accurate if there are either discrete or continuous controlled variable. In this case, the first-class models will usually be known as particular case. Hausman test will be applied to determine the selection of Fixed Effect or Random Effect Model (Cooper & Hedges, 1993).
Pasiouras and Kosmidou (2007) had developed a model which can be predicted through a fixed effect regression by adapting each bank's profitability (ROA). In this research, fixed effect model (FEM) is an appropriate choice to be chosen compared to the Random Effect Model (REM), as the Hausman test's value is higher than the chi-square. The researcher also mentioned that the FEM could be supported by the absence of significant heteroscedasticity in the residuals from the researcher's estimated model.

Fixed Effect Model and Random Effect model are being considered in this research. The researcher believed that FEM is easier to be conducted and defined throughout the process of this research (Naceur, 2003). He thought that FEM is a better alternative hypothesis if there is a need to differentiate the situation in each bank chosen and ensure the presence if significant heterogeneity across banks.

Based on Petria, Capraru and Ihnatov (2015) research’s result, they proposed FEM is the better option after the Hausman test is being carried out. They stated that the dummies of the years elicit the time effect. The bank's profitability is being influenced due to the consequences on performance of different events. Standard errors are being appraised to make sure the covariance estimator handles heteroscedasticity of unknown form.

Apart from that, in Athanasoglou et al. (2008) research, Fixed effect model is being adopted. The estimation result presented the existence of individual effect since the F-static is significant. However, the least square estimator of FE model together with the presence of lagged regressand among the independent variables is biased as well as inconsistent. Research shows that the bias will be significant for T which consist a small value, but as the T value increased, it will go near to zero.

Fixed Effect Model was used to eliminate omitted variable bias by estimating a number of omitted variables from a sample size of a large population over time.
However, FEM was unable to include many dummy variables as the observation was not enough to run analysis and hence, affect the degree of freedom. Moreover, common intercept had to be dropped in the model when introducing more dummy variables to prevent dummy variable trap (Gujarati & Porter, 2009). The equation can be presented as below:

\[ Y_{it} = \alpha + \beta X_{it} + \mu_i + \epsilon_{it}, \ i=1, 2, 3, \ldots, \ n; \ t=1, 2, 3, \ldots, t \]

Where:
- \( Y \) = Dependent variables of banks i at time t (Risk, Profitability)
- \( \alpha \) = Intercept
- \( \beta \) = Coefficient of X
- \( X \) = Independent variables
- \( \mu \) = Company fixed effect
- \( \epsilon \) = Error term

In this research, it will be addressed as below:

**Model 1:**

\[ ZSCORE_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 REG_{it} + \beta_3 LIQ_{it} + \beta_4 LEV_{it} + \beta_5 NPL_{it} + \beta_6 LEV_{it} + \beta_7 LNOBS_{it} + \beta_8 BOARD_{it} + \beta_9 NONEXE_{it} + \beta_{10} CORRUPT_{it} + \beta_{11} BUSFREE_{it} + \beta_{12} GDP_{it} + \beta_{13} INF_{it} + \mu_{it} + \epsilon_{it} \]

**Model 2:**

\[ ROA_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 REG_{it} + \beta_3 LIQ_{it} + \beta_4 LEV_{it} + \beta_5 NPL_{it} + \beta_6 LEV_{it} + \beta_7 LNOBS_{it} + \beta_8 BOARD_{it} + \beta_9 NONEXE_{it} + \beta_{10} CORRUPT_{it} + \beta_{11} BUSFREE_{it} + \beta_{12} GDP_{it} + \beta_{13} INF_{it} + \mu_{it} + \epsilon_{it} \]

Note: ZSCORE=Risk, ROA=profitability ratio, CAR=capital ratio, REG=regulatory pressure, LIQ=liquidity ratio, LEV=leverage ratio, NPL=non-performing loan, LNOBS=off-balance sheet item, BOARD=size of the board, NONEXE=non-executive director on board,
CORRUPT=corruption freedom, BUSFREE=busin
ess freedom, GDP=gross domestic product, INF=inflation, µ=company fixed effect, ε=error term, β=intercept

According to Gujarati and Porter (2009), models with too many dummy variables would suffer the problem of multicollinearity. With multicollinearity problem, it will influence the accuracy of result. Time-invariant variables were discouraged to be included in Least Square Dummy Variable (LSDV) as these variables such as sex and ethnicity could not be controlled over time and only applicable by including dummy variables. However, including too many dummy variables will cause the model or research to consist even more useless information.

3.5.1.3 Fixed Effect Model Robust Standard Errors Clustered by Banks (FER)

Petersen (2009) declared that white standard error which is not robust to within cluster dependence are identified as standard error not rectified for within cluster dependence. He claimed that standard errors which are robust to heteroscedasticity tended to underestimate true standard error. Hence, he concluded that estimates which are made robust to dependence form in data would generate unbiased standard error together with accurate confidence intervals, meanwhile the one which is not robust to dependence structure in data sets would result in too-small confidence intervals and biased standard error.

Dkhil (2014) justified that fixed effects should be considered, and heteroscedasticity and autocorrelation of error term have to be controlled. To rectify this, they employed robust fixed effects models with cluster on countries, or named as robust FE with clusters. Hence, he deployed Instrumental variables (IV) and the Generalized Method of Moments (GMM) with fixed effects being robust to heteroscedastic and autocorrelated errors and managed to find relationship between regulation and broadband investment in an inverted U shape in developed nation.
The robust technique to model diagnostics relaxed the hypotheses of homoscedastic and independent errors. Furthermore, robustness usually happened at the expense of precision, since model hypotheses are being relaxed, to the extent where standard errors have unnecessary sky-high rise and inaccurate estimates. There are rules of thumb exerted where robustness is added only when it is required, especially along short clustering dimension and those both where errors and regressors are possibly correlated (Millo, 2017).

In a study conducted by Altunbas, Binici and Gambacorta (2017) they performed various test to verify the robustness of their result measuring bank risk denoted by Z-score. They intended to inspect possible heterogeneity present in the effectiveness macroprudential tools brought up by different phases of economic and financial evolution across countries, global macroeconomic and financial impacts and attainable limits in data coverage. Besides, robustness of result is verified with inclusion of a complete set of country and time fixed effects and relinquish macroeconomic control. In their study, they obtained robust standard errors clustered at the bank-year level.

Besides, Brandao-Marques et al. (2018) revealed that panel data is usually used for robustness test and they employed this test to study panel regression with fixed effect which this is commonly tested by other researchers.

\[ Y_{it} = \alpha + \beta X_{it} + \mu_i + r_b \epsilon_{it}, \quad i=1, 2, 3, \ldots, \ n ; \ t=1, 2, 3, \ldots, \ t \]

Where:
- Y = Dependent variables of banks i at time t (Risks, Profitability)
- α = Intercept
- β = Coefficient of X
- X = Independent variables
- μ = Company fixed effect
- \( r_b \epsilon \) = Robust standard error term cluster by bank
In this research, it will be constructed as below:

**Model 1:**

\[
ZSCORE_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 REG_{it} + \beta_3 LIQ_{it} + \beta_4 LEV_{it} + \beta_5 NPL_{it} + \beta_6 LEV_{it} + \beta_7 LNOBS_{it} + \beta_8 BOARD_{it} + \beta_9 NONEXE_{it} + \beta_{10} CORRUPT_{it} + \beta_{11} BUSFREE_{it} + \beta_{12} GDP_{it} + \beta_{13} INF_{it} + \mu_{it} + \delta r \varepsilon_{it}
\]

**Model 2:**

\[
ROA_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 REG_{it} + \beta_3 LIQ_{it} + \beta_4 LEV_{it} + \beta_5 NPL_{it} + \beta_6 LEV_{it} + \beta_7 LNOBS_{it} + \beta_8 BOARD_{it} + \beta_9 NONEXE_{it} + \beta_{10} CORRUPT_{it} + \beta_{11} BUSFREE_{it} + \beta_{12} GDP_{it} + \beta_{13} INF_{it} + \mu_{it} + \delta r \varepsilon_{it}
\]

Note: ZSCORE=Risks, ROA=profitability ratio, CAR=capital ratio, REG=regulatory pressure, LIQ=liquidity ratio, LEV=leverage ratio, NPL=non-performing loan, LNOBS=off-balance sheet item, BOARD=size of the board, NONEXE=non-executive director on board, CORRUPT=corruption freedom, BUSFREE=business freedom, GDP=gross domestic product, INF=inflation, µ=company fixed effect, ε=error term, β=intercept
3.5.1.4 Random Effect Model (REM)

In highly variable data set, random effects estimator was expected to generate more significant results (Francis, 2013). Random effect model (REM) was proposed as an effective measurement for unbalanced panel models, which will be justified by Hausman specification test to determine the efficiency between Random effect model and Fixed effect models for panel regression estimations (Francis, 2013; Muda, Shaharuddin & Embaya, 2013).

In a study done by Safiullah and Shamsuddin (2018) regarding difference in risk between Islamic and commercial banks from 28 countries, they claimed that REM was favoured to FEM in their context as FEM involved time variation and cross-firm variation of variables. Nonetheless, bank-level corporate governance variable in their study did not differ over time, and country-level macroeconomic variables did not vary across banks. Plus, REM was more proper respect to the existence of dummy variables in their model, as FEM removed dummy variables effects. Similarly, Mokni et al. (2016) included REM in their investigation of risk-taking determinants of Islamic and conventional banks across a sample of 15 conventional and 15 Islamic banks from 2002 to 2009.

Also, Francis (2013) applied REM to study profitability of commercial banks’ in Sub-Saharan Africa. The samples were drawn from 42 countries involving an unbalanced panel of 216 banks from 1999 to 2006. His findings were found to be uniform with theory which stated that REM could generate more efficient results in highly variable data set. Hence, REM was justified to be more logical in estimating unbalanced panel model.

Furthermore, Muda et al. (2013) also employed REM to study determinants of Islamic banks’ profitability based in Malaysia. It was a panel data estimation with unbalanced data drawn from 17 Islamic banks using quarterly data from 2007 to
2010. REM was used to assist them in achieving their research objectives. Hausman test carried out by them revealed that REM was the proper panel data estimator.

According to Gujarati and Porter (2009) Random effect model (REM) also known as error component model (ECM) demonstrated its knowledge insufficiency about the actual model through error term meanwhile fixed effect model (FEM) was concerning inclusion of dummy variables along with subsequent loss of number of degree of freedom in LSDV model. In this case, dummy variables constituted a knowledge deficiency for exact model explained in FEM.

\[
\text{Yit} = \beta_1 + \beta_2 X_{it} + \varepsilon_{it} + \mu_{it}, \quad i = 1, 2, 3, \ldots, n \quad t=1, 2, 3, \ldots, t 
\]

Where:
\( Y \) = Dependent variables of banks i at time t (Risks, Profitability)
\( \beta_1 \) = Coefficient of \( X \)
\( X \) = Independent variables
\( \mu \) = Company time series and cross-section error component
\( \varepsilon \) = cross section, or individual-specific error component
\( w_{it} \) = composite error term

Moreover, in REM, \( \beta_{1i} \) is presumed to be a random variable with mean value of \( \beta_1 \), instead of regarding it as fixed. Thus, intercept value for a single firm can be displayed as follow:

\[
\beta_{1i} = \beta_1 + \varepsilon_i
\]

where \( \varepsilon_i \) is random error term and has mean value equal to zero and variance of \( \sigma^2_{\varepsilon} \).

The composite disturbance term, \( w_{it} \) contained two elements, namely \( \varepsilon_i \), which is known as cross-section error component and \( \mu_{it} \) which is the combined time series error element. With this, ECM is named as such because of these two components.
that it contained. Following that, assumptions for the model were individual error components not associated with one and another and not autocorrelated in both cross-section as well as time series unit. Besides, there should be no correlation between exogenous variables and $w_{it}$. Nonetheless, since $\varepsilon_i$ is an element of $w_{it}$, the latter hence tend to interact with independent variables. As a result, REM will have an inconsistent prediction of regression coefficients. Moreover, Hausman test can reveal whether REM is a suitable model to be used given that $w_{it}$ is related to explanatory variables (Gujarati & Porter, 2009).

Also, the difference between FEM and REM is that in REM, the common intercept acted as mean value of all cross-sectional intercepts and error term represented a random variation of discrete intercept from an average value. There were two features to be taken into account. Firstly, the relation value between disturbance term at two different times remained the same regardless how apart two-time periods were for any given cross-sectional unit and second, the correlation for all cross-sectional units remained identical. With this, Generalized Least Squares (GLS) will be the best method to be adopted as OLS will result in inefficient estimators (Gujarati & Porter, 2009). In this research, it will be demonstrated as below:

**Model 1:**

$$ZSCORE_{it} = \beta_1i + \beta_2CAR_{it} + \beta_3REG_{it} + \beta_4LIQ_{it} + \beta_5LEV_{it} + \beta_6NPL_{it} + \beta_7LEV_{it} + \beta_8LNOSB_{it} + \beta_9BOARD_{it} + \beta_{10}NONEXE_{it} + \beta_{11}CORRUPT_{it} + \beta_{12}BUSFREE_{it} + \beta_{13}GDP_{it} + \beta_{14}INF_{it} + w_{it}$$
Model 2:

\[ ROA_{it} = \beta_1 + \beta_2 CAR_{it} + \beta_3 REG_{it} + \beta_4 LIQ_{it} + \beta_5 LEV_{it} + \beta_6 NPL_{it} + \beta_7 LEV_{it} + \beta_8 LNOBS_{it} + \beta_9 BOARD_{it} + \beta_{10} NONEXE_{it} + \beta_{11} CORRUPT_{it} + \beta_{12} BUSFREE_{it} + \beta_{13} GDP_{it} + \beta_{14} INF_{it} + \epsilon_{it} \]

Note: ZSCORE=risks, ROA=profitability ratio, CAR=capital ratio, REG=regulatory pressure, LIQ=liquidity ratio, LEV=leverage ratio, NPL=non-performing loan, LNOBS=off-balance sheet item, BOARD=size of the board, NONEXE=non-executive director on board, CORRUPT=corruption freedom, BUSFREE=business freedom, GDP=gross domestic product, INF=inflation, \( \mu \)=company fixed effect, \( \epsilon \)=error term, \( \beta \)=intercept

3.5.2 Scale Measurement

3.5.2.1 Normality Test

According to Gel and Gastwirth (2008), Jarque-Bera test was goodness of fitness used to test the null of normality. This test was important especially when it consisted of a smaller sample size which observation (n) is lesser than 100. The OLS residuals can be measured by quantifying skewness and kurtosis (Gujarati, 2004). Skewness and kurtosis in JB test were very sensitive towards the utmost observations (Gel & Gastwirth, 2008). The expected value of Jarque-Bera will be zero if customarily distributed variable, \( S \) equals to 0, \( K \) equals to 3.

\[ JB = \frac{n}{6} \left( S^2 + \frac{(K-3)^2}{4} \right) \]

\( n \)= Sample Size
\( S \)= Skewness Coefficient
\( K \)= Kurtosis Coefficient

H0: The error term is normally distributed
H1: The error term is not normally distributed.
Gujarati (2004) stated that if p-value of JB statistic was relatively low, which was very different from 0, the hypothesis can be rejected as there was sufficient evidence to prove that hypothesis was not normally distributed. In contrast, if p-value was sufficiently high, say closer to zero, the hypothesis remained; do not reject H0.

### 3.5.2.2 Multicollinearity

Multicollinearity is the problem where two or more explanatory variables highly correlated with each other. However, according to Gujarati and Porter (2009), one of the assumptions in Classical Linear Regression Model (CLRM) was no exact relationship between explanatory variables. The regression model can be stated as below:

\[
Y = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + \beta_9 X_{9it} + \beta_{10} X_{10it} + \beta_{11} X_{11it} + \beta_{12} X_{12it} + \mu_{it}
\]

Where Y = dependent variables; X1it, X2it, X3it, X4it, X5it, X6it, X7it, X8it, X9it, X10it, X11it and X12it are independent variables, and \(\mu_{it}\) is the error term. Gujarati and Porter (2009) also mentioned that CLRM assumed regression model is linear in parameters in which relationship between regressand and regressor is linear. Therefore, multicollinearity will occur when there was more than one exact linear relationship between the variables and hence, causing a standard error to become unmeasurable.

However, there were several factors in causing multicollinearity problem. Firstly, is the method used in collecting data. The limited or insufficient data in independent variable will easily cause problem as collecting data may highly correlated with each other. Second, an overdetermined model will also cause
multicollinearity. When regressor is more than the number of observation in a regression model, it will increase complexity of model and the relationship between independent variables. Third, a model with time series data will also lead to the problem. This was due to explanatory variables changed their values over time and hence, improved the relationship between variables.

With these, multicollinearity will lead to several consequences to the regression model. According to BLUE (Best Linear Unbiased Estimators), the OLS estimators are still unbiased even there is a multicollinearity problem whereby the expected value is equal to true value. Other than that, OLS estimators will still have a large value of variance and covariance, causing accuracy of estimation to be more difficult. To detect multicollinearity problem, variance-inflating factor (VIF) can be used in determining the problems. The formula is stated as below:

\[
VIF = \frac{1}{1 - R_{aux}^2}
\]

VIF shows estimator is inflated by the presence of multicollinearity (Gujarati & Porter, 2009). When the value of VIF is greater than 10, it indicated that the model suffered from multicollinearity problem. Another method of detecting multicollinearity is tolerance (TOL), an inverse of VIF. The formula of TOL is stated as below:

\[
TOL = \frac{1}{VIF} / (1 - R^2)
\]

If \( R^2 \) is equal to 1, it shows the model is in perfect collinearity which it had a serious multicollinearity problem. When value of TOL is equal to 1, it indicated that model is free from multicollinearity problem. Moreover, slope coefficient will be individually insignificant in t-test and increase value of \( R^2 \) as standard errors of model is high in value. Besides, due to high standard errors, confidence interval tends to be wider and causing serious multicollinearity.
Last but not least, Gujarati and Porter (2009) mentioned that researcher might ignore multicollinearity problem as data available for analysis was limited. Otherwise, the researcher may collect more data by increasing sample size. Other than that, researcher will choose to remove one of the independent variables that were insignificant or redesign model.

3.5.3 Inferential Analysis

3.5.3.1 Reluctant F-Test

Reluctant F test allowed the selection of the best model between Pooled OLS and FEM. A panel data study conducted by Hamdan (2016) regarding FDI impacts on 17 Arab countries’ economic growth from 1995 to 2013 considered three different models namely Pooled regression model, FEM and REM. With this, the probability of Cross-section F was 0.00, smaller than the 5% significance level. As a result, FEM is preferred to Pooled model, and this is how Reluctant F test is used to choose between these two models. The remaining model selection, FEM or REM was determined using Hausman tests.

According to Croissant and Millo (2008), application of this test was to examine the hypothesis of data of different individuals or time period which were in constant coefficient. To apply this test, OLS regression had to be run in the form of group or time by time. In other words, it can be considered as a classic F test according to an investigation of analogue and contrast between models retrieved from full sampling and equation detected for every individual. It can be indicated as the testing of the existence of individual effects by using hypotheses below:
Besides, the formula below can be applied since it is defined as restricted F test.

\[
F_0 = \frac{R^2_{\text{FEM}} - R^2_{\text{POLS}}/K_{\text{FEM}} - K_{\text{POLS}}}{(1 - R^2_{\text{FEM}})/K_{\text{FEM}}}
\]

\(R^2_{\text{FEM}}\): R-squared of FEM
\(R^2_{\text{POLS}}\): R-squared of POLS
\(K_{\text{FEM}}\): Number of independent variables in FEM
\(K_{\text{POLS}}\): Number of independent variables in POLS

If F-value is found larger than the critical value, the null hypothesis should be rejected. This can be defined as collected panel data unable and should not be pooled together. Thus, no conclusion can be made related to the legality of fixed effects or random effects (De Jager, 2008).

### 3.5.3.2 Breusch-Pagan Lagrange Multiplier (BPLM) Test

Breusch-Pagan test is a common diagnostic tool being applied in a linear panel data model. Pesaran (2015) stated that the LM test which is based on the progressive critical values from related \(\chi^2\) distribution might suffer from a severe distortion of size when \(N/T\) is big. Waldman (1983) proposed that an independent testing model for heteroscedasticity according to squared least squares residuals had been created by Godfrey and Breusch and Pagan in the year 1978 and 1979. The squared residual is divided by the mean-squared residuals are regressed on a set of independent variables selected, the test statistic is the explained sum of squared from this model.
Breusch and Pagan's test was developed by Trevor Breusch and Adrian Pagan in 1979. This test aimed to test for the presence of heteroscedasticity and autocorrelation in regression model. The efficiency of linear regression model will be questioned when assumptions of model were not met (Breusch & Pagan, 1979). They stated that inefficiency of ordinary least square (OLS) would give effect to error term in the regression to be biased. Homogenous disturbance and fixed coefficient were basic requirements of a linear model to be fulfilled. Homogenous disturbance indicated that error term in the model did not consist of heteroscedasticity and autocorrelation problem which arouse from individual effect and time effect. Croissant and Millo (2008) inferred that LM test could examine the presence of individual and time effects based on pooling model's outcome. The hypotheses of test are as follow:

\[
H_0: \ alpha_n = 0, \ n=1,2,3... \text{ (Homoscedastic disturbance)}
\]

\[
H_1: \text{At least one of } \alpha \text{ is not equal to zero (Heteroscedastic disturbance)}
\]

LM statistic was computed using residual in model estimated by OLS. Breusch-Pagan test can be employed to test the presence of random effects in model (Breusch & Pagan, 1980). This LM test was employed to indicate whether Pooled OLS or Random Effect Model (REM) is more suitable to be used (Gujarati & Porter, 2009). If the null hypothesis, \( H_0 \) is being rejected, it indicated that REM would be preferable compared to Pooled OLS, or vice versa.

The steps to perform LM test can be represented as follow:

<table>
<thead>
<tr>
<th>Step 1: Use OLS to perform the model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2: Estimate auxiliary regression</td>
</tr>
<tr>
<td>Step 3: Retain ( R^2 ) which had been computed from auxiliary regression</td>
</tr>
<tr>
<td>Step 4: Obtain F-statistic or Chi-square statistic</td>
</tr>
</tbody>
</table>


3.5.3.3 Hausman Test

According to Baltagi and Liu (2007), they had researched Hausman test. They tried to show the specification test which is in panel data. The research is based on the divergence between fixed effect and random effect, and they came out with the conclusion that Hausman test was chosen to detect which model to choose by applying 2SLS regressions.

Next, the researchers stated that Hausman test is usually used in selecting between the fixed effect and random effect estimators for the panel data. For the random effect estimator, it assumed that the interaction between regressors and the unobservable, and the individual-specific effects are nil. Thus, it should consider the expectation instead of rule. They stated that if the test statistic is conflicting with the fixed effect estimators and random effect estimator, the null will be rejected, and the researcher will typically discard the random impact estimator and make their conclusion based on fixed effect estimator. They suggested by using the variant which is based on the divergence between group and fixed effects and enabled the researchers to estimate the equality of the sets of coefficient and individual variables that cannot be forwarded by the basis of Hausman Test (Frondel & Vance, 2010).

Besides, a study was done by the researcher, and they stated that they would first implement Hausman test when they were going to decide the inference according to the fixed effects or random effects in the model of panel data. They also noticed that if the Hausman test rejected the null hypothesis which stated the random effect is right, the second stage will continue by using fixed effect estimators. Otherwise, random effect estimator will be used instead of fixed effect if there is not enough evidence to reject the null hypothesis. This showed that Hausman test is used to decide which estimators to be used between fixed and random effect model (Guggenberger, 2009).
Similar to the research done by Kabaila, Mainzer and Farchione (2015), they also studied that the time-varying covariate could be included in the panel data and Hausman test will typically be used whether the influence may be conducted using fixed effect or random effect model. In this research, the researchers considered the effect of the test in minimum coverage of the probability of the confidence interval. In this study, they found out three new sample theorems that able to make the test easier to be accessed.

Hausman test was being deployed to determine whether FEM or REM is suitable to be adopted. This test can reveal that whether a composite error term had relation with independent variables, or in other words, whether REM is a proper model. Also, null hypothesis underlying Hausman test was that estimators of FEM and REM do not have marked contradiction. Furthermore, test statistic involved in this test is asymptotic $X^2$ distribution. If null hypothesis was rejected, conclusion drawn was that REM is hence improper to be adopted since random effects correlated with at least one independent variable. In other words, FEM is preferred to REM if the null hypothesis is rejected, and vice versa. With this, it showcased that FEM is senior to REM if the null hypothesis is rejected. Moreover, due to high-efficiency reason, REM would be the null hypotheses with FEM as alternative hypothesis (Gujarati & Porter, 2009).

### 3.5.3.4 Sargan-Hansen Test

Generally, Sargan-Hansen is a test of Fixed Effect (FE) versus Random Effect (RE) which is applied to examine overidentifying restrictions (Corbae, Durlauf & Hansen, 2006). Tested hypothesis is that the instruments as a group are exogenous, therefore they are acceptable and declared healthy instruments. The number of instruments used by GMM should not exceed the sample numbers (number of banks adopted in this research).
A large sample of chi-squared test statistic is investigated with no degrees-of-freedom corrections. Under homoscedasticity circumstances, the test statistic is gradually equivalent to the Hausman fixed versus random effect test. In contrast, with a balanced panel, the artificial regression and Hausman test statistics will be numerically equal. Unlike the Hausman version, result of test will be prolonged straightforwardly to heteroscedastic and cluster-robust versions. It ensures the result generated will be a positive test statistic as well (Cameron & Trivedi, 2010).

Sargan-Hansen test which is also known as Sargan’s J test is adopted to examine Fixed effect (FE) versus Random Effect (RE) to identify restrictions in a statistical model (Sargan, 1958). Tested hypothesis refer to the instruments as a group are exogenous, therefore they are acceptable and known as a healthy instrument. The number of instruments used by GMM should not exceed the sample numbers (number of banks adopted in this research). As opposed to Hausman version, result of test will be sustained straightforwardly to heteroscedastic and cluster-robust versions. It ensures the result generated will be a positive test statistic as well. This Sargan-Hansen test is exploited and supported by Chen et al. (2015), Sufian and Habibullah (2010), Lee et al. (2014) Mokni et al. (2016 )and Safiullah and Shamsuddin (2018).

3.5.3.5 T-test

According to Gujarati and Porter (2009), T test was a replacement yet compatible method to confidence-interval method of statistical testing hypothesis. Besides, it was also known as a test-of-significance approach. It is a test of significance whereby sample outcomes were deployed to validate certainty or falsehood of a null hypothesis. It was used to certify whether each explanatory variable had a significant effect on the explained variable. With this, the conclusion as to whether accept or reject H₀ is based on test statistic value obtained from data. Furthermore, under normality assumption, test statistic computation will be as follow:
This paper examined 12 different independent variables relation with dependent variable, profitability and risks of banks. With this, independent variables of this study included capital ratio (CAR), regulatory pressure (REG), liquidity ratio (LIQ), leverage ratio (LEV), non-performing loan (NPL), off-balance sheet item (OBS), board size (SIZE), non-executive director on board (NONEXE), corruption freedom (CORRUPT), business freedom (BUSFREE), GDP and inflation (INF). The null and alternative hypotheses are as follow:

\[ H_0: \text{There is no significant relationship between independent variables and dependent variable (} \beta_i = 0, i=1, 2, 3, 4, 5) \]

\[ H_1: \text{There is a significant relationship between independent variables and dependent variable (} \beta_i \neq 0, i=1, 2, 3, 4, 5) \]

Hence, based on decision rule, \( H_0 \) will be rejected if significance level, \( \alpha \) is found higher than p-value of T-test. This also conveyed that exogenous variable had a significant impact towards endogenous variable, as it will not be rejected if otherwise.

### 3.5.3.6 F-test

\[
F = \frac{R^2/(k-1)}{(1-R^2)/(n-k)}
\]

\( F \)= Total number of parameter to be estimated

\( R^2 = \) ESS/TSS
F test was used to define the significance of model used in this paper (Gujarati, 2004). F test was applied by previous researchers to investigate joint effect among explanatory variables toward explained variables. The example of hypothesis testing is shown as below:

Ho: The model is insignificant, where the $\beta_i=0$, $i=1,2,3…$
H1: Dependent variable will be influenced by at least one of the independent variables.

The value of F test represented true slope of coefficients was simultaneously zero. $H_0$ will be rejected if value of $\alpha$ percentage (1%,5% or 10%) exceeded critical F value (Gujarati, 2004). By employing p-value method, $H_0$ will be eliminated if p-value for the test was smaller than the significance level, $\alpha$. This indicates that there might be at least one of the explanatory variables was affecting dependent variable significantly; or else, do not reject $H_0$ (Gujarati, 2004).

3.5.3.7 Autocorrelation

Autocorrelation is the problem when error terms are correlated in time or space (Gujarati & Porter, 2009). The autocorrelation in time series data is defined as the error term is correlated as in the time series. However, the error term in cross-sectional data is correlated at the same time but different space.

According to Gujarati and Porter (2009), there were two types of autocorrelation, which are pure autocorrelation and impure serial autocorrelation. For pure correlation, it will occur when there is an irrelevant observation found in the error term, and this will disobey the classical assumption of the equation. On the other hand, the impure serial correlation will take place when there are a specification bias and wrong functional form.
Besides, there are some factors that caused autocorrelation. First, the specification bias will lead to autocorrelation problem (Gujarati & Porter, 2009). The error term included in the regression model considered as the omitted variables. Therefore, if the error term is correlated with another error term continuously, it may cause correlation problem. Second, the deviation of mathematical form will also cause autocorrelation problem as the inaccurate mathematical form is different with the real form of relationship, and hence, serial correlation occurred. Third, manipulation of data also considered as one of the factors of autocorrelation. Miscalculation of independent variables will lead to the disturbance error to be correlated.

The first consequence of autocorrelation is that the estimators will maintain unbiased and consistent to safeguard the unbiasedness of the estimator. However, the estimators are not efficient, and this will cause variance to be underestimated. Moreover, a more substantial t-statistic will be acquired due to the high standard error, and this will lead the variables that are not significant to become significant.

The most common ways to detect autocorrelation problem is using Durbin Watson d Test and Breusch-Godfrey LM test. Durbin-Watson d Test is only tested for first-order autocorrelation (Gurarati & Porter, 2009). The hypothesis testing is stated below:

H₀: There is no first-order autocorrelation.

H₁: There is first-order autocorrelation.

For Breusch-Godfrey (BG) test, it is also known as LM test and only estimated for a higher order of autocorrelation. There is a formula which is \((n-p)R^2 \sim \chi^2_p\) to determine and test for autocorrelation problem. The hypothesis testing for BG test is as followed:
H₀: There is no higher order of autocorrelation.

H₁: There is a higher order of autocorrelation.

The decision rule for BG test: Reject H₀ if the value of BG test is higher than the chi-square value. Otherwise, do not reject H₀.

3.5.3.8 Heteroscedasticity

Heteroscedasticity may occur when there is some misspecification due to unnoticed nonlinear predictor terms or overlooked predictors excluded in regression model. The parametric model is required for determining heteroscedasticity's structure although methods existed in testing heteroscedasticity (Klein, Gerhard, Büchner, Diestel & Schermelleh-Engel, 2016). Heteroscedasticity can be detected by two ways which are the graphical method or formal test.

<table>
<thead>
<tr>
<th>H₀: Homoscedasticity</th>
<th>E(uᵢ²) = σᵢ² (i=1,2,3...)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H₁: Heteroscedasticity</td>
<td>E(uᵢ²) ≠ σᵢ² (i=1,2,3...)</td>
</tr>
</tbody>
</table>

When the answer equals zero, assumption is proved which the homoscedasticity is convinced. However, if the result is not zero, it can be assumed that there is heteroscedasticity problem. This may indicate that OLS estimators are unbiased and inefficient.
3.6 Conclusion

In this chapter, we had generated the econometric model and processed the data gathered from different sources with STATA and EVIEWS 9 to verify significance of explanatory variables, presence of econometric problem and correct model to be adopted. In short, this chapter provided comprehensive clarification on research design, data collection method as well as data processing steps. Besides, it discussed the most important elements involved in panel data regression which also utilised secondary data in this study. Besides, all tests deployed to examine the best-fitted model in this study were also being described in this chapter. The following chapter, Chapter 4, will proceed with discussion and interpretation of outcomes from STATA and EVIEWS 9 accordingly.
CHAPTER 4: DATA ANALYSIS

4.0 Introduction

In this chapter, presentation and interpretation of empirical results extracted from methodologies discussed in Chapter 3 via hypothesis testing would be highlighted. STATA and EVIEWS 9 were adopted to carry out test analyses to examine whether the model confronted econometric problems. Based on the study’s statistical result, FER model was found to be more proper to be deployed in this research. The explanations and effects of exogenous variables on dependent variables were explained and displayed in this chapter as well. The data and result will be depicted in table and graph form.

4.1 Descriptive Analysis

The samples deployed in this study are 50 banks in ASEAN countries from the year 2011 to 2016. Table 4.1 depicts mean, median, standard deviation, skewness and kurtosis for banks’ profitability as well as banking risks. The respective explanatory variables namely capital ratio, regulatory pressure, liquidity ratio, leverage ratio, non-performing loan, off-balance sheet item, board size, non-executive director on board, corruption freedom, business freedom, GDP and inflation.
Table 4.1: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>ZSCORE</th>
<th>ROA</th>
<th>CAR</th>
<th>REG</th>
<th>LIQ</th>
<th>LEV</th>
<th>NPL</th>
<th>LNOBS</th>
<th>BOARD</th>
<th>NONEXE</th>
<th>CORRUPT</th>
<th>BUSFREE</th>
<th>GDP</th>
<th>INF</th>
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<tbody>
<tr>
<td>Mean</td>
<td>66.53</td>
<td>1.54</td>
<td>10.34</td>
<td>0.88</td>
<td>11.48</td>
<td>79.51</td>
<td>0.79</td>
<td>10.93</td>
<td>10.36</td>
<td>86.31</td>
<td>40.81</td>
<td>69.00</td>
<td>4.84</td>
<td>114.75</td>
</tr>
<tr>
<td>Median</td>
<td>55.45</td>
<td>1.33</td>
<td>9.71</td>
<td>1.00</td>
<td>8.98</td>
<td>80.13</td>
<td>0.51</td>
<td>11.00</td>
<td>11.00</td>
<td>88.89</td>
<td>34.00</td>
<td>69.90</td>
<td>5.01</td>
<td>111.35</td>
</tr>
<tr>
<td>Maximum</td>
<td>192.52</td>
<td>3.87</td>
<td>20.90</td>
<td>1.00</td>
<td>48.39</td>
<td>110.36</td>
<td>4.03</td>
<td>13.14</td>
<td>20.00</td>
<td>100.00</td>
<td>93.00</td>
<td>98.20</td>
<td>7.24</td>
<td>139.14</td>
</tr>
<tr>
<td>Minimum</td>
<td>5.87</td>
<td>0.13</td>
<td>1.38</td>
<td>0.00</td>
<td>0.04</td>
<td>6.74</td>
<td>-0.27</td>
<td>8.61</td>
<td>4.00</td>
<td>57.14</td>
<td>24.00</td>
<td>43.30</td>
<td>0.84</td>
<td>103.20</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>39.57</td>
<td>0.72</td>
<td>2.62</td>
<td>0.33</td>
<td>11.38</td>
<td>12.49</td>
<td>0.79</td>
<td>1.09</td>
<td>3.44</td>
<td>11.57</td>
<td>18.52</td>
<td>16.43</td>
<td>1.63</td>
<td>9.42</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.12</td>
<td>1.28</td>
<td>0.95</td>
<td>-2.29</td>
<td>0.93</td>
<td>-1.14</td>
<td>1.67</td>
<td>0.06</td>
<td>0.41</td>
<td>-0.71</td>
<td>1.87</td>
<td>0.36</td>
<td>-0.84</td>
<td>1.07</td>
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<tr>
<td>Kurtosis</td>
<td>3.53</td>
<td>4.45</td>
<td>5.14</td>
<td>6.24</td>
<td>3.21</td>
<td>8.95</td>
<td>6.20</td>
<td>2.41</td>
<td>2.63</td>
<td>2.86</td>
<td>5.53</td>
<td>1.85</td>
<td>3.12</td>
<td>3.19</td>
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<tr>
<td>Jarque-Bera</td>
<td>37.55</td>
<td>61.59</td>
<td>57.93</td>
<td>222.54</td>
<td>24.94</td>
<td>287.48</td>
<td>151.91</td>
<td>2.56</td>
<td>5.72</td>
<td>14.44</td>
<td>144.63</td>
<td>13.02</td>
<td>20.08</td>
<td>32.61</td>
</tr>
<tr>
<td>Probability</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.28</td>
<td>0.06</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Sum</td>
<td>11,309.82</td>
<td>261.10</td>
<td>1,757.81</td>
<td>149.00</td>
<td>1,951.46</td>
<td>13,517.43</td>
<td>133.56</td>
<td>1,857.30</td>
<td>1,762.00</td>
<td>14,673.36</td>
<td>6,936.90</td>
<td>11,730.50</td>
<td>823.59</td>
<td>19,508.10</td>
</tr>
<tr>
<td>Sum Sq. Dev.</td>
<td>264,681.60</td>
<td>86.42</td>
<td>1,159.98</td>
<td>18.41</td>
<td>21,888.06</td>
<td>26,384.32</td>
<td>104.30</td>
<td>200.46</td>
<td>2,003.39</td>
<td>22,605.81</td>
<td>57,956.83</td>
<td>45,629.99</td>
<td>448.63</td>
<td>14,997.58</td>
</tr>
<tr>
<td>Observations</td>
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<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
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<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
</tr>
</tbody>
</table>
4.1.1 Risks

According to table 4.1 above, the mean value of risk is 66.53%, while value of median is 55.45%. The standard deviation portrait is 39.57%. Apart from that, risks of banks skewed to right at value of 1.12. Also, kurtosis value of risk is 3.5, which will be known as leptokurtic distribution.

4.1.2 Profitability

Based on the results in table 4.1, it is shown that average value of profitability of the banks is about 1.54% and median value is 1.33%. Subsequently, the standard deviation is 0.72%. Besides, profitability of banks is rightly skewed for about 1.28. The positive value of skewness determines its direction, which is skewed to the right. Moreover, the kurtosis coefficient is approximately 4.45.

4.1.3 Capital Ratio

Based on table above, the mean of capital ratio demonstrated is 0.1034 (10.34%). The value of median showed 9.71%, meanwhile standard deviation value is 2.62%. Moreover, skewness value portrait from the given table is 0.95 which is skewed to right. The capital ratio’s kurtosis value is 5.14 which specify the excessive of negative kurtosis in data.
4.1.4 Regulatory Pressure

The mean value of regulatory pressure is 0.88 while the value of median is approximately 1.0. The descriptive data shows that standard deviation value is 1.0. Besides, regulatory pressure is skewed lefty as the value is -2.29 which indicated a negative skewness. The result also shows that kurtosis value, 6.24 which illustrated that heavier tails is discovered than a normal distribution.

4.1.5 Off-Balance Sheet Items

The results obtained from research showed that off-balance sheet item has 10.93% mean value while for median value is nearly 11%. The value of standard deviation for off-balance sheet item captured from the result is 1.09%. The value of skewness of this variable is 0.06 which indicated that it is skewed to the right or in another word, positively skewed. Following that, 2.41 is the value of kurtosis for this variable.

4.1.6 Size of The Board

From the outcome above, mean value of board size is 10.36% and 11% for median. Besides, standard deviation observed is 3.44. The value of skewness is 0.41 which can be defined as right-tailed. Next, the kurtosis value of size of the board is equal to 2.63 that is near to standard value of 3.
4.1.7 Liquidity ratio

This study shows that liquidity ratio has a mean value of 11.48% whereas median shows a value of 8.98%. This variable also possessed a standard deviation value of 11.38%. From the result, liquidity ratio is 0.93 that showed a positive skewness while kurtosis value is 3.21 which indicated a leptokurtic distribution as it is slightly greater than 3.

4.1.8 Leverage Ratio

Mean value of leverage ratio indicated above is 79.51%. While at the same pace, the values of median as well as standard deviation of leverage ratio are 80.13% and 12.49% respectively. A negative value of skewness had been found, -1.14, while kurtosis value presented is 8.95.

4.1.9 Non-Performing Loan

For non-performing loan, the mean value is 0.79% meanwhile its median is about 0.51%. Besides, standard deviation of this variable is approximately 0.79%. Also, the skewness and kurtosis coefficient are 1.67 and 6.20 respectively.

4.1.10 Non-Executive Director on Board

Mean value of non-executive director on board is 86.31%, while median value demonstrated is 88.89%. The standard deviation value is around 11.57%. Non-executive director on board is
skewing to the left as negative value of -0.71 has been detected. Non-executive director on board has lessor in tails compared to a normal distribution as result showed is 2.86 which is slightly lower than 3.

### 4.1.11 Corruption Freedom

40.81% of average of corruption had been detected while median value indicated is 34%. The value of standard deviation illustrated above is around 18.52% and skewness’s value is 1.87 which is skewed to the right. The kurtosis value is 5.53 showed a heavier tail than normal distribution.

### 4.1.12 Business Freedom

Based on the result, average value of business freedom is 69%. The median and standard deviation’s values are 69% and 16.43% respectively. The skewness of business freedom is 0.36 that is skew to the right; meanwhile kurtosis’s value is 1.85 which is lower than 3.

### 4.1.13 GDP

The mean value of GDP is 4.84% while median value is 5.01%. The value of standard deviation is 1.63%. The negative value of skewness, -0.84 has been discovered from the result above; the kurtosis value is 3.12.
4.1.14 Inflation

Based on result generated, mean value of inflation is 114.75%. The value of median and standard deviation generated is 111.35% as well as 9.42% approximately. A positive value of skewness had been shown, 1.07, meanwhile kurtosis value is around 3.19.
### 4.2 Panel Data Analysis

Table 4.2: Banks’ Risk and Profitability Evaluated in Different Models with Robust Standard Error

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>RISK</th>
<th></th>
<th></th>
<th></th>
<th>RETURN</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) POLS</td>
<td>ZSCORE</td>
<td>(2) FE</td>
<td>ZSCORE</td>
<td>(3) FER</td>
<td>ZSCORE</td>
<td>(4) RE</td>
<td>(1) POLS</td>
<td>(2) FE</td>
</tr>
<tr>
<td>Basel</td>
<td>CAR</td>
<td>3.78329***</td>
<td>2.59453***</td>
<td>2.59453**</td>
<td>2.68839***</td>
<td>0.11866***</td>
<td>-0.02339</td>
<td>-0.02339</td>
</tr>
<tr>
<td></td>
<td>REG</td>
<td>11.83510</td>
<td>6.08043***</td>
<td>6.08043**</td>
<td>4.88330***</td>
<td>-0.09484</td>
<td>0.13671</td>
<td>1.3671***</td>
</tr>
<tr>
<td></td>
<td>LIQ</td>
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<td>-0.03931</td>
<td>-0.00961</td>
<td>-0.00247</td>
<td>-0.00559*</td>
<td>-0.00559</td>
</tr>
<tr>
<td>Asset</td>
<td>LEV</td>
<td>0.42551*</td>
<td>0.10514</td>
<td>0.10514</td>
<td>0.12154</td>
<td>-0.00605</td>
<td>0.00393</td>
<td>0.00393</td>
</tr>
<tr>
<td>Liabilities</td>
<td>NPL</td>
<td>-18.81595***</td>
<td>-0.44364</td>
<td>-0.44364</td>
<td>-0.70984</td>
<td>-0.22243***</td>
<td>-0.27721***</td>
<td>-0.27721***</td>
</tr>
<tr>
<td>Off</td>
<td>LNOBS</td>
<td>20.56091***</td>
<td>-12.11091***</td>
<td>-12.11091**</td>
<td>-6.33544**</td>
<td>0.36525***</td>
<td>-0.39611***</td>
<td>-0.39611*</td>
</tr>
<tr>
<td>Balance</td>
<td>BOARD</td>
<td>-2.17828**</td>
<td>-0.40837</td>
<td>-0.40837</td>
<td>-0.36739</td>
<td>-0.00035</td>
<td>0.07401***</td>
<td>0.07401***</td>
</tr>
<tr>
<td>Sheet</td>
<td></td>
<td>(3.58393)</td>
<td>(2.73831)</td>
<td>(4.77861)</td>
<td>(2.76241)</td>
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<td>0.04705</td>
<td>0.03445</td>
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<td>(0.06107)</td>
<td>(0.06015)</td>
<td>(0.00421)</td>
<td>(0.00295)</td>
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<tr>
<td>Institutional</td>
<td>CORRUPT</td>
<td>0.17696</td>
<td>0.00259</td>
<td>0.00259</td>
<td>0.19208</td>
<td>-0.00884*</td>
<td>-0.01877***</td>
<td>-0.01877***</td>
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<tr>
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<td></td>
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<td>(0.12478)</td>
<td>(0.14579)</td>
<td>(0.00496)</td>
<td>(0.00752)</td>
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<td></td>
<td>BUSFREE</td>
<td>-0.03515</td>
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<td>0.34898**</td>
<td>0.29489**</td>
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<td>-0.00071</td>
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<tr>
<td></td>
<td></td>
<td>(0.34971)</td>
<td>(0.11537)</td>
<td>(0.16967)</td>
<td>(0.12396)</td>
<td>(0.00620)</td>
<td>(0.00617)</td>
<td>(0.00738)</td>
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</tbody>
</table>
### Meticulous Discovery of Risk and Return Nexus ASEAN Banking Industry

<table>
<thead>
<tr>
<th>Economics</th>
<th>GDP</th>
<th>INF</th>
<th>Constant</th>
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<tbody>
<tr>
<td></td>
<td>-0.08610</td>
<td>0.01685</td>
<td>-154.31288***</td>
</tr>
<tr>
<td></td>
<td>(1.64502)</td>
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<td>(58.56037)</td>
</tr>
<tr>
<td>GDP</td>
<td>-0.72654**</td>
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<td>(0.31096)</td>
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<tr>
<td>GDP</td>
<td>-0.72654*</td>
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</tr>
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<td></td>
<td>(0.36906)</td>
<td>(0.11795)</td>
<td>(39.37323)</td>
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<td>GDP</td>
<td>0.91422***</td>
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<td>(0.33629)</td>
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<td>GDP</td>
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<td>GDP</td>
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<td>6.27491***</td>
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<tr>
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<td>(0.01662)</td>
<td>(0.00461)</td>
<td>(1.34306)</td>
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<tr>
<td>GDP</td>
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<td>-0.00829*</td>
<td>6.27491***</td>
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<tr>
<td></td>
<td>(0.01543)</td>
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<td>(2.15871)</td>
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<td>GDP</td>
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<td>2.47992**</td>
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<td>(0.00420)</td>
<td>(1.01123)</td>
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### Additional Statistics

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<td>Sargan-Hansen statistic</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breusch and Pagan Lagrange multiplier</td>
<td>300.75***</td>
<td>46.878***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.50260</td>
<td>0.48771</td>
<td>0.48771</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of banks</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>

Standard errors and standard error that are clustered by bank are presented in parentheses under the coefficients.

*** p<0.01, ** p<0.05, * p<0.1
The primary role of Reluctant F-test, Breusch-Pagan Lagrange Multiplier Test (BPLM Test) and Hausman Test are to allow the adoption of the most suitable model between Pooled OLS, FEM and REM for this study.

Firstly, two regression models under Reluctant F-test namely Pooled OLS model and FEM. This test is used to determine the most suitable model between Pooled OLS and FEM. The result in table depicts the testing for banking risk and profitability are significant at 1% significance level. Hence null hypothesis is rejected and can conclude that there is sufficient evidence to show that FEM is more applicable than Pooled OLS model at 1% significance level in determining banking risks and profits.

Secondly, BPLM Test is to determine whether Pooled OLS or REM is appropriate to be chosen. Based on the result, null hypothesis will be objected due to both risks probability (0.0000) and profitability (p=0.0000) are less than significance level at 1% Therefore, REM is highly preferable instead of Pooled OLS model in BPLM Test for banks’ risk and profitability.

Lastly, Hausman test can be used to investigate which model is better between FEM and REM to be adopted for estimation of equation. According to previous tests, FEM is preferable in Reluctant F-test test and REM is preferred in BPLM test. Based on previous chapter, it mentioned that null hypothesis should not be rejected in the situation where probability is larger than 5% significance level. Referring to results obtained, probability of dependent variable, risk and banks’ profitability are 0.0006 and 0.0003 respectively, which both are smaller than 0.01 and indicated that null hypothesis should be rejected. Thus, there is sufficient evidence to prove that REM is not suitable in this case but FEM. In conclusion, the final test shows that FEM is the best model to be applied in testing for banks’ risks and return among all models tested.

Finally, with Sargan-Hansen test, we justified that FER is the best model to be adopted after robust to standard error cluster by banks, with p value of 0.0000 less than significance level.
4.3 Diagnostic Checking

4.3.1 Normality test

Figure 4.1: Normality test: Risks as dependent variable

<table>
<thead>
<tr>
<th>Jarque-Bera Statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.23485</td>
<td>0.005991</td>
</tr>
</tbody>
</table>

H0 = The Error terms are normally distributed
H1 = The Error terms are not normally distributed

Level of Significance, $\alpha = 0.05$

Decision Rule: Reject null hypothesis, $H_0$ if p-value is lower than level of significance, $\alpha$

Jarque-Bera test is employed to determine the normality of the error term's distribution. The probability that obtained from the result is 0.005991 which is lower than the level of significance. The null hypothesis will be rejected since the p-value is smaller. From the result obtained in figure 4.1, there is enough evidence to conclude that the error term is not normally distributed at 5% significance level.
The probability obtained from the result in figure 4.2 is 0.000000 which is lower than the level of significance. The null hypothesis should be rejected since the p-value is lower than 5% significance level. Based on the result obtained, there is enough evidence to conclude that the error term is not normally distributed at 5% significance level.

However, the sample size taken in this study is larger than 30, which are 50 banks. According to Central Limit Theorem, the sampling means approaches normal distribution when the sample size gets larger, where this fact holds true for sample sizes over 30. The normality assumption’s violation assumed that it would not lead to major problems since the sample sizes are large enough. The normality parameter may also turn out uncontroversial when the sample size used is large. Difficulty in disclosing data used is normally distributed may occur although the sample size is big. In case same statistical measure for the sample sizes, an assumption can be made which the population that we collected data is normal. The normality tends to be normal in this case.

Hence, we assume the error term is normally distributed at 5% significance level in both normality tests above with dependent variables.
4.3.2 Multicollinearity

According to Gujarati and Porter (2009), when the value of $R^2$ is high, there is a high probability for the model to have multicollinearity problem. Besides, the F test normally will reject the null hypothesis ($\beta_2 = \beta_3 = \ldots \beta_k = 0$) due to the high $R^2$. With this situation, it will lead t-ratio to be none or few $\beta_2$ to be insignificant, reject $\beta_2 = 0$.

Gujarati and Porter (2009) claimed that the equation of nearly perfect multicollinearity can be written as:

$$\lambda_1X_1 + \lambda_2X_2 + \ldots \lambda_kX_k + v_i = 0$$

where the $v_i$ is considered as the error term and $\lambda \neq 0$. The equation can also be written as:

$$X_{ki} = \lambda X_{ki} + v_i$$

Based on the rule of thumb, given that the pair-wise or zero-order correlation coefficient is high between two variables (excess 0.8), there could be a multicollinearity problem (Gujarati & Porter, 2009). However, there is a problem for this statement which is although there is a collinearity for the high pair-wise correlation coefficient, it does not mean that there is a serious multicollinearity problem. With this, to improve the reliability of multicollinearity, partial correlation coefficient can be adopted for more than two explanatory variables.

Based on result in Table 4.3, the relationship between the business freedom and corruption freedom can be written as:

$$R_{BUSFREE, CORRUPT} \neq 0$$
The result showed that the business freedom and corruption freedom are correlated with each other and the value of coefficient of correlation is equal to 0.8308, thus, exceeding 0.8 coefficient correlation revealed a high multicollinearity problem between the variables.

Moreover, based on the result computed in table 4.3, it is revealed that the pair of CAR and REG has the second highest significant positive correlation among all after BUSFREE and CORRUPT, which is +0.6503 while the lowest significant positive correlation exists between CORRUPT and LIQ, which is 0.1295. Following that, the match of NONEXE and BOARD possessed the highest weak negative correlation, which is -0.4889 while the combination of INF and CORRUPT maintained the lowest significant weak negative association, which is – 0.1169.
### 4.3.2.1 Correlation Analysis

**Table 4.3: Pairwise Comparisons (Correlated Observations)**

<table>
<thead>
<tr>
<th></th>
<th>ZSCORE</th>
<th>ROA</th>
<th>CAR</th>
<th>REG</th>
<th>LIQ</th>
<th>LEV</th>
<th>NPL</th>
<th>LNOBS</th>
<th>BOARD</th>
<th>NONEXE</th>
<th>CORRUPT</th>
<th>BUSFREE</th>
<th>GDP</th>
<th>INF</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSCORE</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>ROA</td>
<td>-0.1462*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAR</td>
<td>-0.0682</td>
<td>0.4515*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REG</td>
<td>-0.1307*</td>
<td>0.2992*</td>
<td>0.6503*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>LIQ</td>
<td>-0.1052</td>
<td>-0.2208*</td>
<td>-0.2169*</td>
<td>-0.1736*</td>
<td>1.0000</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>LEV</td>
<td>-0.0857</td>
<td>0.0386</td>
<td>0.2938*</td>
<td>0.2938*</td>
<td>-0.0088</td>
<td>1.0000</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>NPL</td>
<td>-0.1343*</td>
<td>-0.1565*</td>
<td>0.3173*</td>
<td>0.1071</td>
<td>0.0113</td>
<td>0.2458*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNOBS</td>
<td>-0.0222</td>
<td>0.1452*</td>
<td>-0.0333</td>
<td>0.1336*</td>
<td>-0.0239</td>
<td>0.1857*</td>
<td>-0.1909*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOARD</td>
<td>0.0210</td>
<td>-0.1724*</td>
<td>-0.2184*</td>
<td>-0.0169</td>
<td>0.1689*</td>
<td>-0.2293*</td>
<td>-0.1645*</td>
<td>0.1989*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NONEXE</td>
<td>-0.0742</td>
<td>0.2450*</td>
<td>0.1555*</td>
<td>0.0660</td>
<td>-0.0804</td>
<td>0.2108*</td>
<td>0.1468</td>
<td>0.0041</td>
<td>-0.4889*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORRUPT</td>
<td>0.0396</td>
<td>-0.1817*</td>
<td>-0.1692*</td>
<td>-0.0487</td>
<td>0.1295*</td>
<td>-0.0358</td>
<td>-0.2854*</td>
<td>0.5886*</td>
<td>0.0653</td>
<td>0.0976</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUSFREE</td>
<td>0.0622</td>
<td>-0.2724*</td>
<td>-0.3214*</td>
<td>-0.0971</td>
<td>0.1690*</td>
<td>0.0411</td>
<td>-0.3570*</td>
<td>0.6135*</td>
<td>0.2945*</td>
<td>-0.0944</td>
<td>0.8308*</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>0.0114</td>
<td>0.0761</td>
<td>-0.0856</td>
<td>-0.1764*</td>
<td>-0.3069*</td>
<td>-0.0252</td>
<td>-0.3139*</td>
<td>-0.2205*</td>
<td>0.1131</td>
<td>-0.2867*</td>
<td>-0.3425*</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INF</td>
<td>0.1099</td>
<td>-0.2502*</td>
<td>-0.0503</td>
<td>-0.1880*</td>
<td>0.0302</td>
<td>-0.0357</td>
<td>0.3001*</td>
<td>-0.2042*</td>
<td>-0.3427*</td>
<td>0.3520*</td>
<td>-0.1169*</td>
<td>-0.2491*</td>
<td>0.2073*</td>
<td>1.0000</td>
</tr>
</tbody>
</table>
Table 4.4: Result of VIF test

<table>
<thead>
<tr>
<th>Risks and Profitability as Dependent Variables</th>
<th>VIF</th>
<th>1/VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSFREE</td>
<td>6.40</td>
<td>0.156235</td>
</tr>
<tr>
<td>CORRUPT</td>
<td>5.21</td>
<td>0.191938</td>
</tr>
<tr>
<td>LNOBS</td>
<td>2.95</td>
<td>0.338613</td>
</tr>
<tr>
<td>CAR</td>
<td>2.24</td>
<td>0.446166</td>
</tr>
<tr>
<td>NPL</td>
<td>2.21</td>
<td>0.451936</td>
</tr>
<tr>
<td>INF</td>
<td>1.90</td>
<td>0.525031</td>
</tr>
<tr>
<td>BOARD</td>
<td>1.74</td>
<td>0.573446</td>
</tr>
<tr>
<td>LEV</td>
<td>1.72</td>
<td>0.582057</td>
</tr>
<tr>
<td>NONEXE</td>
<td>1.47</td>
<td>0.682036</td>
</tr>
<tr>
<td>GDP</td>
<td>1.39</td>
<td>0.718139</td>
</tr>
<tr>
<td>REG</td>
<td>1.35</td>
<td>0.738773</td>
</tr>
<tr>
<td>LIQ</td>
<td>1.20</td>
<td>0.836630</td>
</tr>
</tbody>
</table>

Mean VIF 2.48

Besides informal testing, formal testing such as VIF and TOL are deployed to further evaluate the existence of multicollinearity problem between the independent variables. In this case, with the computed results, based on table 4.4, it is seen that all VIF results are less than 10 and the TOL outcomes are greater than 0.1. Hence, the model is said to be free from multicollinearity problem.

4.3.3 Heteroscedasticity Problem

Breusch-Pagan/Cook-Weisberg test is used to examine heteroscedasticity problem. When studying for Risk (Z-Score), the probability value is 0.0000, which is lower than 5% significance level. This shows that the null hypothesis is rejected and therefore the model of risk contains Heteroscedasticity problem.
On the other hand, when researching for the dependent variable, profitability (ROA), the probability value obtained is 0.0070, which is lower than 5% significance level. Similar to risks model, the profitability model suffers heteroscedasticity problem.

4.3.4 Autocorrelation Problem

Based on the diagnostic testing for autocorrelation problem, Wooldridge test is exerted to explore the question in panel data. Based on results obtained, the probability is 0.0001 and 0.0000 for risk model and profitability model respectively. Both are lesser than significance level of 5%, hence can conclude that both models suffer autocorrelation problem.

Since heteroscedasticity and autocorrelation problem exists in both models, hence this is rectified by using Robust Standard Errors in Fixed Effects, referring to Fixed Effect Robustness (FER) model.

4.4 Inferential Analyses

4.4.1 R-square

The coefficient of determination which is R-square can be defined as the goodness of fit of a model. R-square is inferring that the dependent variable can be explained by every single independent variable. In other words, it is defined as the risks and profitability of the banks that can be explained by capital ratio, regulatory pressure, liquidity ratio, leverage ratio, non-performing loan, off-balance sheet items, size of the board, non-executive director on board, corruption freedom, business freedom, GDP and inflation. From the result above, the value of R-square of risk model is 0.6435, which representing that about 64.35% of the banks' risks variation can be illustrated by the variation of variables stated above from the year 2011 to
2016, meanwhile 48.77% of variation of banks’ profitability can be explained by the independent variables variation.

### 4.4.2 F Test

<table>
<thead>
<tr>
<th>F-Statistic</th>
<th>0.0000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability (F-statistic) of risks and profitability</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

The null hypothesis is rejected as the F-statistic’s probability (0.0000) is smaller than the significance level at 5%. Thence, there is adequate evidence to conclude that at least one of the independent variables is significant at 5% significance level in interpreting both risks and profitability for 50 banks in ASEAN countries from the year 2011 to 2016.
4.4.3 Divergent Effects of variables on Risks and Profitability

According to results generated from table 4.2 above, it is defined clearly that each of the variables under six different categories that opt for this study has an impact on either risk or profitability respectively or both regressands determined.

Under Basel, it is easily detected that variables, capital ratio and regulatory pressure have a relationship with both risks and profitability. First of all, capital ratio showed a negative relationship with risks (high Z-score indicates lesser risks), but profitability of banks is not affected. Given this, when bank reserved more equity, they will face lesser risks as there are adequate funds available for liquidation. This can be justified by studies conducted by Demirgüç-Kunt and Huizinga (1999), well-capitalized banks managed to cut their funding costs and able to withstand insolvency costs. Other supporting journals include Konishi and Yasuda (2004), Bourke (1989), and Mokni et al. (2016) which all justified that well-capitalized banks lower down banks chances to meet failure.

Apart from that, regulatory pressure is a dummy dataset determined by value of capital ratio. There is a strong bond of relationship between capital ratio and regulatory pressure. Based on our result obtained in Table 4.2, regulatory pressure helped banks to minimize their risks taking and boost up their profits. Aggarwal and Jacques (2001) presented that implementation in regulatory capital standards will lead to an expansion of off-setting risk on banks. When regulatory pressure existed, it signified banks met capital reserve requirements. This showed that banks maintained sufficient funds to combat unsound activities, hence possessed lesser risks and led banks to be stable.

Three elements classified under asset liabilities are not significant. There is an inverse relationship between liquidity ratio and profitability of banks. Higher liquidity ratio suggests a company or bank has great ability to recover their debts and obligations. However, this action indicated that more assets and profit gained will be used therefore profitability of banks will be diminished indirectly and earned nothing in the market (Hays, De Lurgio & Jr, 2017). Besides,
banks will have higher capacity to meet customers withdrawal demand and hence retain lesser fund to do other investments to gain return.

Non-performing loan is another determinant that showed a negative relationship with bank’s profitability. Poor quality loan led banks to have difficulty in collecting back the money and hence reduce interest revenue and increase provisioning costs. This was supported by Roman and Tomuleasa (2012), Akter and Roy (2017), Kadioglu et al. (2017) and Ozurumba (2016). Banks with high credit risks (high NPL) obtained lesser profits. The leverage ratio is not significant to both bank’s risk and profitability.

Furthermore, off-balance sheet (OBS) item illustrates an enthusiastic relationship with both bank’s risk and profitability. The result demonstrated that increase of off-balance sheet items would increase the risk of bank (decreased Z-score) as LNOBS exerted negative influence on Z-score. This can be explained by the finding of Aktan et al. (2013), which revealed a positive association between OBS and bank’s risks. This resulted from the speculative activities of banks to generate higher income using OBS transactions in the market, hence rising the risks faced by banks. This hence caused higher risks due to the use of OBS products by banks. This was also justified by the issuing of OBS did not possess risks transfer, but on the contrary, it increased the risks because banks tended to engage in more OBS events instead of risks management program.

Also, LNOBS exerted negative impacts on profitability. This can be explained by increase in OBS activities increased profits. However, assets grew more than profits increment, hence lower down the profits earning (Md Amin, Sanusi, Kusairi & Abdallah, 2014). When banks suffered higher risks due to engagement with OBS activities, therefore restrict banks from earning higher earnings.

Moreover, under component of bank governance, both sizes of the board and non-executive director on board presented an optimistic relationship with profitability of banks. Kiel and Nicholson (2003) suggested that expansion of board size will provide more incentives for
networking as well as additional skilled personnel which leads to a better earning performance of banks. In addition, grow in number of non-executive director on board will strengthen a bank’s profitability as they are the outsiders who do not manage the operation of company but hold a share in the company. Therefore, more external sources of funds and knowledge can be obtained. This action will enable bank to enhance their profit. This was in line with findings of El-Chaarani (2014) and Al Manaseer et al. (2012). Nonetheless, they possessed insignificant influence on banks risks.

Next, corruption freedom showed an inverse relationship with bank’s profitability (high corruption freedom signified low corruption) in table 4.2, which meant less corrupted country would cause banks to have lesser profits. Meanwhile, business freedom possessed a negative relationship with risks. This showcased that when business freedom is high (less restriction imposed), Z score is high (lower risks). Hence banks would be stable and faced lesser insolvency risks. This illustrated that ASEAN projects development relied more on low government integrity financing. Besides, corruption would stimulate stronger incentives for banks to adjust their earning relative to the corrupted economy, hence led them to generate greater earnings (Lourenço et al., 2018). In this case, the low corruption did not prompt ASEAN banks to manipulate their returns concerning the corrupt economy.

At the same time, business freedom demonstrated a significant relationship with risk of bank. When less restriction imposed on activities that banks can undertake, banks tend to find ways to boost their return and stabilized their position to be vulnerable to risks and can subsequently be engaged in various activities to exploit economies of scale (Sufian & Habibullah, 2010; Shahabadi & Samari, 2013).

Finally yet important, GDP and INF also played an essential role in determining a bank’s profitability and risk. GDP exerted positive influence on risks (low Z-score depicted banks unstable and high risks). High GDP growth rate indicated a higher insolvency risk of a bank. Though a country will face a high level of insolvency risk when the growth of a nation is gradual, a bank would not bankrupt easily due to the support provided by the federal
government of a country. The action that federal government of Malaysia took during financial crisis in 2008 is good evidence to support the statement above.

In the nutshell, high inflation rate will escalate risk encountered by bank and cut down bank’s profitability at the same time. During inflation, the amount of non-performing loan will be rising which cause the bank to suffer from losses and thus increase the insolvency risk while decreasing the profitability of a bank (Perry, 1992). However, based on the result showed, it is not significant.
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</tr>
</thead>
<tbody>
<tr>
<td>CAR</td>
<td>7.350**</td>
<td>6.270*</td>
<td>6.376**</td>
<td>2.948**</td>
<td>2.873**</td>
<td>2.595**</td>
<td>-0.0631*</td>
<td>-0.028</td>
<td>-0.0271</td>
<td>-0.0434*</td>
<td>-0.0343</td>
<td>-0.0234</td>
</tr>
<tr>
<td>REG</td>
<td>-3.188</td>
<td>-2.17</td>
<td>-1.268</td>
<td>6.751*</td>
<td>5.631*</td>
<td>6.080**</td>
<td>0.0763</td>
<td>-0.0407</td>
<td>-0.0328</td>
<td>0.160**</td>
<td>0.152***</td>
<td>0.137**</td>
</tr>
<tr>
<td>LIQ</td>
<td>-0.033</td>
<td>-0.0661</td>
<td>-0.0991</td>
<td>-0.0571</td>
<td>-0.0393</td>
<td>-0.0113</td>
<td>-0.0016</td>
<td>-0.00134</td>
<td>-0.00311</td>
<td>-0.00502</td>
<td>-0.00559</td>
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</tr>
<tr>
<td>LEV</td>
<td>0.0724</td>
<td>0.0906</td>
<td>0.165</td>
<td>0.18</td>
<td>0.105</td>
<td>0.00958</td>
<td>0.00974</td>
<td>0.00281</td>
<td>0.00171</td>
<td>0.00393</td>
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<tr>
<td>NPL</td>
<td>0.458</td>
<td>0.22</td>
<td>0.126</td>
<td>0.12</td>
<td>-0.444</td>
<td>-0.364***</td>
<td>-0.366***</td>
<td>-0.338***</td>
<td>-0.310***</td>
<td>-0.277***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNOBS</td>
<td>-24.94</td>
<td>(23.2500)</td>
<td>-5.671**</td>
<td>-9.350**</td>
<td>-12.11**</td>
<td>-2.218</td>
<td>-0.218</td>
<td>-0.646***</td>
<td>-0.508**</td>
<td>-0.396*</td>
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</tr>
<tr>
<td>BOARD</td>
<td>-0.522</td>
<td>-0.644</td>
<td>-0.408</td>
<td>-0.6290</td>
<td>-0.620</td>
<td>-0.00560*</td>
<td>0.00748**</td>
<td>0.00785**</td>
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<tr>
<td>NONEXE</td>
<td>0.0509</td>
<td>0.0584</td>
<td>0.047</td>
<td>0.0628</td>
<td>(0.0611)</td>
<td>(0.0033)</td>
<td>(0.0032)</td>
<td>-0.0245***</td>
<td>-0.018***</td>
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<tr>
<td>CORRUPT</td>
<td>0.0818</td>
<td>0.00259</td>
<td>(0.1700)</td>
<td>(0.1650)</td>
<td>(0.1700)</td>
<td>(0.0064)</td>
<td>(0.0068)</td>
<td>(0.00034)</td>
<td>(0.0154)</td>
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<tr>
<td>BUSFREE</td>
<td>0.256</td>
<td>0.349**</td>
<td>(0.1580)</td>
<td>(0.1580)</td>
<td>(0.1580)</td>
<td>(0.00154)</td>
<td>(0.0007)</td>
<td>(0.00034)</td>
<td>(0.0154)</td>
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<td>GDP</td>
<td>0.0727</td>
<td>(0.3690)</td>
<td>(0.1180)</td>
<td>(0.1180)</td>
<td>(0.1180)</td>
<td>(0.0063)</td>
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<td>INF</td>
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<td>(0.146)</td>
<td>(0.146)</td>
<td>(0.146)</td>
<td>(0.146)</td>
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<td>Constant</td>
<td>11.17</td>
<td>12.09</td>
<td>271.5</td>
<td>81.06***</td>
<td>100.9*</td>
<td>121.9***</td>
<td>1.851***</td>
<td>1.181***</td>
<td>3.45</td>
<td>7.739***</td>
<td>6.930***</td>
<td>6.275***</td>
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<tr>
<td>R-squared</td>
<td>0.113</td>
<td>0.112</td>
<td>0.157</td>
<td>0.592</td>
<td>0.613</td>
<td>0.644</td>
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<td>0.419</td>
<td>0.416</td>
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<td>YES</td>
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<td>YES</td>
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<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

Robust standard errors that are clustered by bank are presented in parentheses under the coefficients. *** p<0.01, ** p<0.05, * p<0.1
4.4.4 Exploring the Outstanding Decisive Variables of Banks’ Risks and Profitability

4.4.4.1 Risk (ZSCORE)

Based on the results in table 4.5, it is seen that Basel variables, capital ratio (CAR) is significant to bank’s risks at 10% significance level throughout the whole regression model plus it is significant to risks at 5% after introducing off-balance sheet items, governance of banks, sound institutional quality and economics variables. CAR is helpful in assisting banks to reduce risk, which high ZSCORE denotes stable banks and lesser risks. This was argued in studies done by Konishi and Yasuda (2004), Bourke (1989), Mokni et al. (2016) and Demirgüç-Kunt and Huizinga (1999). It is justified that well capitalized banks reserve more equity and will have sufficient funds made available to finance their operation and less likely to meet failure.

Besides, another Basel variable, regulatory pressure (REG) is not significant at the very first place although banks met its capital requirement. Nonetheless, when bank force strengthened their governance, the regulatory pressure turned out to be notable and outstanding in explaining risks of banks negatively. When REG is strong, Z-score went up and banks own lesser risks. This might be greatly due to the control and monitor of board comes into effects. With this, additional skilled personnel would provide better guidance and supervision to effect capital allocation, hence assist banks to minimize risks taking (Kiel & Nicholson, 2003).

Three components under asset liabilities namely liquidity ratio (LIQ), leverage ratio (LEV) and non-performing loan (NPL) were surprisingly found to be insignificant in determining risks assuming of banks throughout the entire regression mode regardless banks enforced their governance or when economy is good or bad either. LIQ was justified to exert positive influence on risk (low ZSCORE) despite the insignificant effect. LEV and NPL however, affecting risks negatively, high NPL and LEV caused the banks to be even stable and possess lesser risks, although insignificant.
Talking about off balance sheet items (LNOBS), it was first found insignificant at influencing risks. Nonetheless, when banks adopted strong governance, LNOBS became significant to risks. It affected risks positively (low score denotes high risks). Even so, it remained stable as it was significant to risks at 5% significance level comprising strong bank governance, institutional quality and economic impacts. This positive connection between LNOBS and risks was justified by Duran and Lozano-Vivas (2013) and Aktan et al. (2013). The involvement of OBS activities exposed banks to greater risks taking, even with supervision from board of director or non-executive directors, regardless of corruption freedom and good economy condition.

Both banks governance variables, size of the board (BOARD) and non-executive director on board (NONEXE) turned out to be not notable in assuming risks notwithstanding institutional quality and economic impacts. Generally, banks governance exerted indirect effects on risks as when it comes into effect, variables like CAR, REG and LNOBS however significant to decide risks of banks.

Similarly, corruption freedom (CORRUPT) brought insignificant result to risks as well. Conversely, being in the same category of institutional quality, business freedom (BUSFREE) was found negatively crucial to risks at 5% significance level when mixed with the effect of economy, be it good economy or high-price level market. When business freedom is high in a country, banks will be stable in operation and own lesser risk, as agreed by Amir (2013). When mixed with a good economy condition, banks tended to be even stable and less probable to be exposed to insolvency.

Last category to explain risks was economics variables, inclusive of GDP and inflation. In this vein, only GDP was justified to be significant in affecting risks but not inflation. GDP associated positively with risks, which meant banks possessed higher risks in a well-doing economy. In a healthy economy, banks able to undertake different activities to generate returns, hence exposed themselves to assuming higher risk projects for better returns.
4.4.4.2 Return (ROA)

Different from the case in risks model, CAR is significant to profitability at 10% significance level although negatively associated. This negative connection was supported by Mokni et al. (2016), Bitar et al. (2018), Mathuva (2009), Wasiuzzaman and Tarmizi (2010) and Gul, Irshad and Zaman (2011). Guru, Staunton and Shanmugam (2002) argued that bank with high capital ratio less likely involved with high-risks activities hence generate lesser return. However, CAR was discovered to be greatly inconsistent as it only notable when Basel and bank governance come into effect. CAR is affecting profit of banks adversely at 10% significance level. The supervision of director and board restricted banks from high-risk events hence restrained banks from earning high-risk returns.

REG was not significant to profitability initially. It turned out to be outstanding positively when banks reinforced its governance. The positive relation was agreed by Ahmad et al. (2008), Koehn and Santomero (1980) and Guru et al. (2002). REG was somehow not parallel as it rose to become significant at 1% significance level when introducing institutional quality variables like corruption freedom and business freedom and reverse to 5% significance level when mixed with macroeconomic variables. When directors and board in place, they might administer banks’ operation and ensure banks to have excess funds to loan out and make greater returns. Things got even better when economy is good to support the banks or when customers demand more loan from banks which banks can earn interest as return.

After discussing Basel variables, we will proceed to asset liabilities management. One out of three variables in this category was declared significant, which was NPL. NPL determines profitability significantly and negatively. It is significantly at 1% significance level consistently throughout the regression model. When NPL increased, profits of banks tended to go down. This had been justified by a few scholars (Roman & Tomuleasa, 2012, Akter & Roy, 2017, Kadioglu et al., 2017 & Ozurumba, 2016). Bad quality loan led banks to have problems in collecting back money and raise the provisioning costs and banks with high credit risks (NPL) earned lesser returns.
LNOBS was stable in testing risks but not return. It declined from 1% significance level to 10% significance level gradually ranging from effects of bank governance, institutional quality and macroeconomic impacts. Active adoption of off-balance sheet activities tended to slow down banks’ return. This result was supported by Aktan et al. (2013). They declared OBS items improve banks’ stock return of bank as they perceived that the off-balance sheet item might reduce the risk of bank. With this, stock return may limit the profitability of bank to expand.

In addition, BOARD and NONEXE directed positive effects on profitability of banks throughout the whole regression model. In this case, Kiel and Nicholson (2003) claimed that expansion of board size provides greater incentives for networking whereas additional skilled personnel constitutes a sound performance of banks. Besides, greater number of non-executive director on board enforced a bank’s profitability as these outsiders do not manage the company’s operation but hold a share of the company. Hence, greater external funds and knowledge can be injected. This enables bank to increase their profit. This was in line with findings of El-Chaarani (2014) and Al Manaseer et al. (2012).

The institutional quality variable, corruption freedom is statistically significant to profitability of banks at all levels negatively. In this case, it caused direct impact on banks’ return. When corruption freedom is high in a country (low corruption), profits would generate lesser return. Lourenço et al. (2018) argued that banks obtained greater incentives to adjust their earning in a highly corrupted country relevant to the corrupt circumstances. Lastly, macroeconomic variables herein direct no significant results on banks’ profit.
4.5 Bank Performance Management Comparison between Countries

Table 4.6: Banks’ Performance Comparison between ASEAN Countries

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>ZSCORE</th>
<th>ROA</th>
<th>ZSCORE</th>
<th>ROA</th>
<th>ZSCORE</th>
<th>ROA</th>
<th>ZSCORE</th>
<th>ROA</th>
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<th>ROA</th>
<th>ZSCORE</th>
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<td>Basel</td>
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</tr>
<tr>
<td>CAR</td>
<td>5.90588** (2.25555)</td>
<td>0.00799 (0.03175)</td>
<td>7.79152*** (1.88964)</td>
<td>0.01243** (0.05103)</td>
<td>1.94064** (0.53972)</td>
<td>-0.02697 (0.01735)</td>
<td>11.32471** (2.41918)</td>
<td>-0.16964 (0.14410)</td>
<td>4.82792*** (0.24616)</td>
<td>0.03275 (0.02781)</td>
<td>21.58053 (15.60226)</td>
<td>0.02332 (0.04930)</td>
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<td></td>
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<tr>
<td>REG</td>
<td>- (2.39140)</td>
<td>- (0.06557)</td>
<td>- (2.68279)</td>
<td>- (0.18294)</td>
<td>- (1.99702)</td>
<td>- (0.14483)</td>
<td>- (1.42107)</td>
<td>- (0.10325)</td>
<td>- (57.78002)</td>
<td>- (0.30236)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Asset Liabilities</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>LIQ</td>
<td>-0.05178 (0.05753)</td>
<td>-0.00437 (0.00631)</td>
<td>-0.19502 (0.14988)</td>
<td>-0.00457 (0.00370)</td>
<td>-0.08948 (0.13113)</td>
<td>-0.00858 (0.00730)</td>
<td>0.11002 (0.07636)</td>
<td>0.00021 (0.00090)</td>
<td>-0.05074*** (0.01910)</td>
<td>-0.01304*** (0.00549)</td>
<td>0.67676 (0.07988)</td>
<td>0.00599 (0.0881)</td>
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<td></td>
</tr>
<tr>
<td>LEV</td>
<td>-0.22038 (0.33147)</td>
<td>-0.00587 (0.01119)</td>
<td>0.32384 (0.35856)</td>
<td>-0.00566 (0.00732)</td>
<td>0.09480 (0.00287)</td>
<td>0.00473 (0.07774)</td>
<td>0.03174 (0.00374)</td>
<td>0.00742 (0.00742)</td>
<td>0.00079 (0.01193)</td>
<td>0.24568 (1.14639)</td>
<td>0.00056 (0.01071)</td>
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<td></td>
</tr>
<tr>
<td>NPL</td>
<td>-2.18306*** (1.05883)</td>
<td>-0.51326*** (0.03026)</td>
<td>-5.53564 (0.05902)</td>
<td>-0.35126*** (0.12323)</td>
<td>0.82980 (1.36454)</td>
<td>0.42748 (0.37840)</td>
<td>-21.21011*** (3.95238)</td>
<td>-0.60461*** (0.20771)</td>
<td>-0.37119 (0.62504)</td>
<td>-0.23092 (0.15185)</td>
<td>11.03393 (17.07453)</td>
<td>0.25765*** (0.06729)</td>
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</tr>
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<td>Off Balance Sheet</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNOBS</td>
<td>11.44064 (13.54148)</td>
<td>0.23173 (0.43628)</td>
<td>-6.12150 (3.42166)</td>
<td>-0.19095*** (0.06210)</td>
<td>-7.48748*** (1.60691)</td>
<td>-0.96644*** (0.38400)</td>
<td>0.13136 (3.46300)</td>
<td>0.16078*** (0.01970)</td>
<td>2.30942 (2.09561)</td>
<td>-0.20905 (1.86760)</td>
<td>-82.27578 (68.96816)</td>
<td>0.17893 (0.23491)</td>
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</tr>
<tr>
<td>Constant</td>
<td>-99.41073 (130.75370)</td>
<td>0.68216 (3.92163)</td>
<td>67.63893*** (22.99905)</td>
<td>5.27831*** (0.72594)</td>
<td>92.79155*** (14.00631)</td>
<td>11.27624*** (3.77651)</td>
<td>35.75866 (45.38442)</td>
<td>4.10515*** (0.90424)</td>
<td>-1.11066 (23.57502)</td>
<td>3.40098 (2.75962)</td>
<td>725.49031 (541.38203)</td>
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<td>60</td>
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<td>42</td>
<td>42</td>
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<td>48</td>
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<tr>
<td>R-squared</td>
<td>0.54877</td>
<td>0.85787</td>
<td>0.77829</td>
<td>0.54882</td>
<td>0.75200</td>
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<td>YES</td>
<td>YES</td>
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</tr>
</tbody>
</table>
4.5.1 Indonesia

As can discern from the preceding results in table 4.6, the banks in Indonesia show significant relation between capital ratio and risks of banks, after robust to standard error. For Indonesia, capital ratio will affect the risk at 5% significance level, and it, however, did not affect banks’ return. CAR tends to direct positive effects on Indonesian banks’ stability, in other words, reduce the risks taking of Indonesia banks, which the capital requirement imposed do help banks to shield from insolvency risks. This could be due to Indonesia banks reserved sufficient equity and have adequate fund used for liquidation. Besides, liquidity ratio and leverage ratio exhibited negative sign for both risks and return but not significant in affecting them.

Another variable, non-performing loan (NPL), was found to be vital in determining risk and return of bank. NPL is highly significant in explaining the association with bank's profitability which it has a negative coefficient of 0.51326 at 1% significance level, and it also concluded that bank's risk and NPL are positively associated at 10% significance level (low Z-score depicts high risks). It indicates that with an increment in NPL, it will cause risk to increase but profits to decline. This was discussed in the study of Kadioglu et al. (2017) and Ozurumba (2016). This signified that Indonesia banks faced difficulties in collecting back the loan given out probably due to moral hazard problem and forced the banks to have lower returns and assume rising risks. Also, for off-balance sheet item, the result shows that it is insignificant to both risk and return in Indonesia although they displayed positive signs.

Hence, it can be concluded that Indonesia banks will be exposed to lower risks with high capital ratio but low non-performing loan and will be better off with higher earning when NPL declines.
4.5.2 Malaysia

According to the result computed in table 4.6, it reveals that Capital ratio (CAR) can affect both risks and profitability of banks in Malaysia. It is because the result shows that capital ratio, is significant at 1% significance level which proves that it can influence the risk of banks in Malaysia. Besides, there is a significant nexus between capital ratio and profitability as it is significant towards profitability at 5% significance level. Other than that, regulatory pressure (REG) has a positive coefficient (0.13185) at 10% significance level. This result reveals that regulatory pressure is sensitive towards bank’s profitability in Malaysia. Generally, banks with high capital ratio tends to have adequate fund ready to face insolvent events, which protected the banks from unfruitful circumstances. However, it is negatively associated with profitability in Malaysia banks. This was proved by Mokni et al. (2016) and Bitar et al. (2018), where high capital banks reserve their capital and infrequently involve with high margin activities to earn immense return. It is highly possible that the board of directors come into effect to supervise the activities undertake by banks.

Moreover, based on the result, liquidity ratio (LIQ) does not have any relationship towards profitability in Malaysia. Nevertheless, both leverage ratio (LEV) and non-performing loan (NPL) have a negative relationship with the bank’s profits. The coefficient of LEV, -0.01182 is significant at 10% significance level, and NPL is highly significant at 5% significance level. It can somehow be said that the moral hazard problem arises from asymmetric information led banks to have complication to collect back loan, thus give rise to banks having low return due to the moral hazard trouble. Additionally, the variables in the asset liability category do not affect the banks’ risks in Malaysia which this can be concluded that there is insignificant relationship between the asset liabilities categories variables and risk in Malaysia banks.

From the result computed in table 4.6, off-balanced sheet items (LNOBS) have a negative coefficient of -0.19095, and there is a significant nexus between off-balance sheet items and bank’s profitability at 5% significance level. This is so because assets nurtured faster than profits hiking (Md Amin et al., 2014). The off-balanced sheet item is insensitive to the bank’s risk in Malaysia.
In sum, risks in Malaysia banks are minimized when capital ratio goes up and it’s profits rise with CAR, LEV and NPL reduced; and with REG existed.

4.5.3 Philippines

Same goes to Philippines, different variables are used to test the association of variables with risk and profitability and the result presented that capital ratio is outstanding to reduce the risk of banks in Philippines and it affects bank' profits negatively although no significant relationship is found. In others word, with a single change of capital ratio value, it will bring 1.94064-unit changes to risks at 5% significance level. For regulatory pressure, it is statistically significant in influencing the return but not the bank's risk. It displays adverse relationship with return and shows -0.38703 coefficients at 10% significance level. In Philippines, liquidity ratio, leverage ratio and non-performing loan show insignificant result to both risks and profitability which showcased that Philippines banks are less likely to encounter moral hazard problem.

Besides, off-balance sheet item is found to have significant and positive relationship with risks exposure and negative connection with profitability of bank in which the association with risk shows coefficient of −7.48748 and −0.96644 for return. LNOBS affects risks positively, which meant Philippines banks had substantial involvement in OBS activities, which lead them to be unstable and possess higher risks (low Z-score indicates banks unstable and suffer greater insolvency risk. The banks in the Philippines are sensitive to off-balance sheet items as it has strong linkage with performance of banks as it is significant to risk and return at 1% and 5% level of significance respectively. This could be greatly due to the poor banks management in Philippines.

In short, Philippines banks will be exposed to lesser risks with high CAR and low off-balance sheet activities and will earn better return when it has low OBS as well.
4.5.4 Singapore

For Singapore, the null hypothesis of the relationship between capital ratio and bank’s risk is rejected as the coefficient of capital ratio in Singapore, 11.32471 is highly significant to bank’s risks at 5% significance level. Therefore, it can be proved that capital ratio can affect bank's risk in Singapore. This is justified by Konishi and Yasuda (2004), Bourke (1989), and Mokni et al. (2016) whereby strong capital banks would have diminished probability to meet insolvency. This situation is contrast to the regulatory pressure. REG in Singapore has effects on profitability of bank, but it does not affect the bank's risk. The result possesses a positive coefficient of 0.34140 between REG and bank's return at 10% level of significance which showcased that when banks met 8% capital requirement, it is better off with higher earnings.

For asset liability category, the liquidity ratio and leverage ratio do not affect both bank’s risk and profitability in Singapore. However, non-performing loan is highly sensitive to both risk and return. The coefficient of NPL, -21.21101 indicates a significant linkage to risks at 5% significance level and profits, -0.60461 at 10% significance level. NPL exposed Singapore banks to assume higher risks and slow down their return. Again, this reaffirmed that banks that faced moral hazard problems falls upon asymmetric information. This led banks to have difficulty to have their loan repaid by customers and forced banks to have high risks and low returns.

For LNOBS, it has marked impact on profitability of banks as the coefficient, -0.16078 is highly significant at 1% significance level which reveals that there is a negative relationship between LNOBS and profits. No significant relationship is found between LNOBS and risks in Singapore banks.

In sum, high capital ratio and low NPL helped Singapore banks to assume lesser risks; while meeting capital requirement, low NPL and low OBS activities involvement helped Singapore banks to raise profits.
4.5.5 Thailand

In our empirical result in table 4.6, capital ratio, under Basel category, is proved to have significant impact on bank's risk. High capital ratio was generally found to be helpful in helping banks to minimize their risk exposure. Conversely, profits of bank in Thailand shows insignificant outcome when tested with capital ratio. Regulatory pressure, as investigated, it reveals positive linkage with profits at 5% significance level, but it shows insignificant connection with risk. This result indicates that when banks meet capital requirement of 8%, the greater return the bank can generate. Also, both risk and return of Thailand banks are proved to be affected significantly by liquidity ratio. Liquidity ratio exposed Thailand banks to high risks assuming and low return earnings. The banks that operate in Thailand are sensitive to liquidity ratio as liquidity ratio is affecting both dependent variables. Thailand banks had high liquid to meet customers’ withdrawal which hinder them from using the funds to generate extra enormous return. The coefficient of liquidity ratio is \(-0.05074\) and \(-0.01304\) on the risks and return severally at 5% level of significance.

The leverage ratio, non-performing loan and off-balance sheet items show insignificant result on risk and return in Thailand which this shows that banks in Thailand will be less affected by these variables and the variables will not bring any major impact on the operation of banks in Thailand.

To sum up, Thailand banks’ risks are lowered with high CAR and low LIQ; and able to earn better profits with lower liquidity and when capital requirement is met.

4.5.6 Vietnam

Both variables in Basel categories namely CAR and REG do not affect the bank's risk and profitability in Vietnam as the result shows that there is an insignificant relationship between...
the independent and dependent variables. Similarly, this situation applies to the LIQ and LEV in asset liability category. Both variables are not sensitive towards the risks and earning of banks. However, NPL has a significant relationship with bank’s profitability, and it has a positive coefficient of 0.25765 at 1% level of significance. Off-balanced sheet has the same result with Basel as LNOBLS shows an insignificant relationship with bank’s risk and profitability.

As a conclusion, capital ratio was generally found to be significant in exposing banks to lower risks assuming especially in Indonesia, Malaysia, Philippines, Singapore and Thailand. Non-performing loan is a sensitive variable to the bank’s profitability and risk as it has a significant relationship for both risks and returns in two different countries which are Indonesia and Singapore. It revealed that moral hazard problem possessed a great influence on banks’ risk and return since it tends to expose the banks to trouble of collecting back loans. Besides, capital ratio, off-balanced sheet item and liquidity ratio also have high influence towards bank's profit and risk in several countries. For CAR, it is stable in influencing both risk and profitability in Malaysia, LNOBS is sensitive to both profitability and risk in Philippines, and lastly, liquidity ratio brings major impact towards bank’s risk and return in Thailand.

### 4.6 Conclusion

The collection of data accumulated from 50 top assets banks from several ASEAN countries had been figured out in chapter 4. The significant components were analysed in an unbalanced panel data form and with secondary data included. With the samples included in this chapter, several tests like Reluctant F-test, Breusch-pagan LM test and Hausman test were adopted to detect the most significant model to be used for this study by using STATA and EVIEWS 9. In sum, FEM is preferable to be adopted among the models after the analysis of Hausman test. However, with Sargan-Hansen test, it is revealed that FER is the most suitable model to be adopted after robust to standard error. The results of FER indicated that three explanatory variables entirely insignificant to both banks’ profitability and banking risks, which are liquidity ratio, leverage ratio and inflation, and the rest of the variables were significant in
affecting either profitability and risks of the banks from the period of 2011 to 2016. With this, it is well reported that banks will possess lower risks and remain stable with high capital ratio, regulatory pressure, business freedom; low off-balance sheet items and low GDP. Meanwhile banks profitability will be enlarged when there are high levels of regulatory pressure, board size, non-executive director on board, and low levels of non-performing loan, corruption freedom and off-balance sheet items.
CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

In this chapter, findings of study will be discussed together with a discussion on justifications for the outcome. A summary of result regarding relationship between each independent variable with the banks' risks and profitability will be presented. This will be followed by analysis of implications of this research. Besides, limitation of study and recommendation for future researches will be reviewed as well.

5.1 Summary of Statistical Analysis

<table>
<thead>
<tr>
<th>Diagnostic Checking</th>
<th>Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jarque-Bera Statistic</td>
<td>10.23485 (Risk)</td>
<td>The error term is normally distributed</td>
</tr>
<tr>
<td></td>
<td>125.3813 (Profitability)</td>
<td></td>
</tr>
<tr>
<td>Variance Inflating Factor (VIF)</td>
<td>Highest value= 6.40</td>
<td>No serious multicollinearity</td>
</tr>
<tr>
<td>Tolerance Factor (TOL)</td>
<td>Lowest value= 0.156235</td>
<td>No serious multicollinearity</td>
</tr>
<tr>
<td>R-square</td>
<td>0.64359 (Risks)</td>
<td>64% of variation of risk can be illustrated by variation of the explanatory variables.</td>
</tr>
<tr>
<td></td>
<td>0.48771 (Return)</td>
<td>48.77% of variation of profitability of bank is</td>
</tr>
</tbody>
</table>
shown by the variation of independent variables. At least one of the independent variables is significant at 5% significance level in interpreting risks and profitability.

Table 5.1 above depicted the summary of the diagnostic checking result that had been done during the previous finding part. As stated above, the result can conclude that the model set was free from multicollinearity problem. Besides, 64% of the variation of bank’s risk can be explained by the variation of explanatory variables chosen meanwhile 48.77% of bank’s profitability variation can be defined by variation of independent variables selected. From the F-test result above, it presented that at least one of the independent variables is significant towards the risks as well as profitability ratio of banks.

5.2 Discussion of Major Findings

5.2.1 Capital Ratio

Our research indicated that the capital ratio was negatively and significantly related with risks. This result was in line with the research done by Obaid (2011) and Korbi and Bougatef (2017). They concluded that the higher the Z-score, the lower the bank’s risk. When the capital ratio increased, ZSCORE increased and hence, the risk of the bank is reduced. Therefore, capital ratio was very important for banks as they can use the capital to safeguard their financial losses and increase the confidence of depositor to deposit their funds.
In contrast, our result in table 4.2 showed that there was a negative relationship between the capital ratio and the profitability. The finding can be actively supported with few journals such as Mokni et al. (2016), Bitar et al. (2018), Mathuva (2009), Guru et al. (2002), Wasiuzzaman and Tarmizi (2010) and Gul et al. (2011). Mathuva (2009) proved that there was a negative relationship between the capital ratio and bank profitability. Other than that, bank with high capital ratio will have lower chances to meet bank insolvency. Therefore, this assumed that bank will not participate in the high-risk activities and hence, generate the result of negative relationship between capital ratio and profitability (Guru et al., 2002). However, our result showed that the capital ratio was insignificantly related to the bank’s profitability.

5.2.2 Regulatory Pressure

Regulatory pressure was proved to have a negative and significant relationship with the bank’s risks (Tanda, 2015; Korbi & Bougatet, 2017). According to the researchers, the high capital ratio of a bank will lead them to experience a low regulatory pressure. This was because that the bank had the sufficient amount of fund in absorbing the risk and shocks. Therefore, it could be proved that low regulatory pressure will increase the bank stability, thus possess lower risks.

Besides, this paper’s result justified that the regulatory pressure was positively and significantly related to the bank's profitability. There were various results in supporting the finding in our research. For example, the analysis from Ahmad et al. (2008), Koehn and Santomero (1980) and Guru et al. (2002) also found the same result with this research. Cost of the capital of bank will increase if more capital regulations were imposed. Therefore, to support the cost of capital, the bank will choose to associate in high-risk business activities as these businesses could help the bank to generate more income and return.
5.2.3 Liquidity ratio

Liquidity ratio exposed banks to higher risks assuming. It can be assumed that bank with high liquidity ratio will convert the liquidity asset into cash uncontrollably. Thus, the bank may lose their liquidity asset easily especially when the customer withdraws their money frequently. Therefore, it is difficult for banks to resist the financial crisis as their asset in hand is insufficient. Anyhow, the result showed that the relationship was insignificant.

Other than that, liquidity ratio was found to be negatively related to the profitability of bank. The result was supported by Roman and Tomuleasa (2012) and Tan (2017). According to Tan (2017), high amount of liquidity asset will control the bank to generate profit as they could not utilize the liquidity asset to invest in high return business. Besides, bank will hold high liquidity asset to withstand during financial crisis. With this, the bank had limited fund to generate the day-to-day business. However, this relationship was found to be insignificant in this paper.

5.2.4 Leverage ratio

Our result revealed that there was a negative but insignificant relationship between the leverage ratio and bank’s risks. Although the bank had high leverage ratio, it indicated a good phenomenon to the bank as this outcome resulted from customer sentiment. Therefore, it can be predicted that high leverage ratio will lead to a lower bank risk. However, this research possessed an insignificant relationship between the leverage ratio and bank’s stability.

Same result was showed between the leverage ratio and bank profitability. This result was justified by Berger and Patti (2006). The researchers claimed that by inducing the bank’s manager to bring more interest to shareholders, the high leverage ratio of banks would indirectly reduce the agency cost outside equity and this will lead to an improvement of the
value of firm. With this, profitability of bank will increase when the leverage ratio increase. However, the leverage ratio was not significant in influencing the bank profitability.

5.2.5 Non-Performing Loan (NPL)

Based on the result, NPL had a positive but insignificant effect on risks. A low Z-score value indicated a higher risk for the bank. Therefore, Adeolu (2014) reported that asset quality is an important tool in assisting the financial performance of a bank and maintaining the soundness of the financial system. With this, bank with high NPL will be exposed to high risk as NPL was an essential factor that caused bank insolvency. Anyhow, the result revealed that the non-performing loan has an insignificant relationship with the bank’s risk.

On the other hand, the profitability of bank was significantly and negatively affected by the non-performing loan. The results were in line with findings of Roman and Tomuleasa (2012), Akter and Roy (2017), Kadioglu et al. (2017) and Ozurumba (2016) which clarified that banks with high credit risks (NPL) earned lesser returns. Poor quality loan caused banks to face problems in collecting back money and raise the cost of provisioning.

5.2.6 Off-balance Sheet Items (LNOBS)

According to the result of this paper, off-balance sheet item is significant in exposing banks to assume higher risks. This statement indicated that when off balance sheet increased, ZSCORE decreased and the risk of the bank will be increased (low Z-score indicated high risk and low stability of banks). The result was supported by Duran and Lozano-Vivas (2013) as their result show a positive connection between the off-balance sheet item and risk. High profitability can be generated as the banks involved in a high volume of off-balance sheet activities. Therefore, higher risk will be imposed to the banks due to the excessive off-balance-sheet business. Aktan
et al. (2013) provided the same result on their research in which the OBS activities will cause risk on the operation and management of the bank. With this, banks have to evaluate the off-balance sheet item more carefully to improve the bank stability. With this, the conclusion that can be given is that there will be a positive relationship between the off-balance sheet item and risk.

Besides, this research also revealed the same result between off-balance sheet item and profitability. This result was supported by Aktan et al. (2013) as their result showed that the off-balance sheet would improve the stock return of bank as they think that the off-balance sheet item will decrease the risk exposure of bank. With this, stock return may induce the profitability of bank to grow.

5.2.7 Size of Board (BOARD)

Results presented in table 4.2 justified that BOARD exerted positive influence on risks, which means huge board size leads to low Z-score and hence higher risks taking of banks. The positive correlation between BOARD and risks is supported by Fich and Slezak (2008). They claimed that board size would affect banking risks positively. Given this, it affected the bankruptcy probability positively. It is notified that smaller boards seemed more effective at rectifying value during a period of distress, and the hazard of insolvency would raise for every additional number of director. Anyhow, BOARD was found insignificant in discussing risks in this study.

With regard to profits, result found that BOARD positively and significantly influencing profitability of banks. This meant that a large size board tended to help banks in gaining extra returns. This was supported by finding of Ozili and Uadiale (2017) and Petchsakulwong and Jansakul (2017). A large group of board of directors able to provide wealth, knowledge, and supervision of the company. The strong governing helped banks to sustain a high-profit making.
5.2.8 Non-executive Director on Board (NONEXE)

This study revealed that NONEXE helped reduce risks of banks (high Z-score signified stable banks and lesser risks). This can be justified by Mathew et al. (2016) as they illustrated that non-executive director on board tended to reduce firm risks but not related significantly. Their monitoring role to provide challenge toward board executive decisions did not have vital influence on banks’ risks. This might be greatly due to the part-time NONEXE did not have sufficient critical information to produce provocations to the executive directors.

Looking at profits, NONEXE affected profits of banks positively and significantly. Large NONEXE helped banks to increase their profits. This was in line with findings of El-Chaarani (2014) and Al Manaseer et al. (2012). They emphasized that NONEXE independent from the bank owner, hence they can run their tasks effectively and wisely. NONEXE recruitment helped reduce conflict between shareholders and strengthen management control, and a wise decision will be obtained from a knowledgeable director which ends up helping banks in ASEAN countries to raise profits.

5.2.9 Corruption Freedom (CORRUPT)

With the aid of robustness test, this study discovered that corruption freedom influenced risks negatively, which meant less corrupt country assisted banks to have lesser risks. Banks would involve less risky activities in a less corrupt country, and this relationship between corruption freedom and risk was proved in a few studies (Chen et al., 2015; Habibov et al., 2017; Sharma & Mitra, 2015). However, the result justified an insignificant relationship for corruption freedom and risks.

Conversely, corruption freedom exerted adverse effect on return. This showcased that in a less corrupt country, banks would profit lesser. This is because corruption increased cost efficiency.
Low corruption level stimulated lesser incentives for banks to adjust their earning relative to the corruption condition. Hence, they made lesser returns. This was justified in the study of Lourenço et al. (2018).

5.2.10 Business Freedom (BUSFREE)

From the results obtained, it was evident that BUSFREE is significant at influencing risks negatively. This depicted that when lesser restriction imposed on banks activities, banks will face lesser risk subsequently (high Z-score). When a country business freedom is high, the banks will be stable regarding their operation, and hence they will own lesser risks. This was proved by Amir (2013).

Regarding profits, BUSFREE affected profits negatively although insignificant. This showed that when lesser restriction imposed on bank activities, banks tend to make a lower return. Sufian and Habibullah (2014) and Sufian and Hassan (2011) obtained a similar result with this finding. They stated that the easiness of obtaining licences to start, operate and close a business would hinder a bank to make profit. This is because the great potential of getting licence caused severe competition, and returns would decrease in conjunction with high competition among banks to offer loan and to receive deposits from customers.

5.2.11 Gross Domestic Product (GDP)

The robustness test result proved that GDP exerted positive impact on risks, this meant that banks in high GDP country would have higher risks (low Z-score). The impact is significant. This disclosed that in a healthy economy country, banks tend to involve with many activities that can generate higher returns, hence possessed greater risks taking as greater risks activities linked with higher profits.
As for profits, GDP influenced profits positively despite insignificant relationship. This was well supported by findings of Alper and Anbar (2011), Bikker and Hu (2002), Demirgue-Kunt and Huizinga (1999) and Garcia and Guerreiro (2016). The high demand for borrowing in the market when economy is blooming led banks to make more enormous profits. However, this may cause banks to involve with higher risks and become less stable due to the high-volume lending.

5.2.12 Inflation (INF)

Inflation was found to be negative but insignificant to risks in this finding. This unveiled that high inflation country led banks to be stable (high Z-score and fewer risks). Clark et al. (2018) conveyed that when inflation is predicted correctly, the banks can take sufficient precautionary steps to combat inflation and thus there will be no adverse effect on banks stability (Khan et al., 2018). A bank would be unstable given the inflation is unexpected. Besides, high inflation represented a booming economy, hence higher chance for banks to be stable and possessed lesser risks. Additionally, high inflation signified great volume of money available in the market. Hence, banks will have nearly no liquidity problem and stable. Anyhow, the result of this variable is not significant in explaining banks’ risks.

About profits, inflation is found to be insignificant in explaining it although the impact is negative. This showed that banks would generate lesser profits in an inflated country. This was supported by Tan and Floros (2013) and Bouzgarrou et al. (2017). Unexpected high rise in inflation will cause difficulties of cash flow for borrower, which led to early termination of loan and ended up with losses.
5.3 Implication of study

This research aimed to investigate the relationship between the variables chosen and the banks’ risk as well as profitability encountered by banks in ASEAN countries which consists of Thailand, Malaysia, Singapore, Indonesia, Vietnam and Philippines. Based on the result done, six out of twelve variables were found significant to the profitability ratio while five out of twelve are significant to risk, after robust. By having this conclusion, this study might provide some beneficial and supportive information to the major players in the financial sector for example bank management, policy makers and future researchers to cope more regarding the relationship between the independent variables and dependent variables studied. Future researchers are encouraged to review this research as some guidance will be provided.

5.3.1 Capital Ratio

There was a negative and significant relationship between capital ratio and risks after processing the test. This shows that lower risks will be faced by banks in ASEAN countries. In this case, future researchers should take note on this while conducting future study that is related to this topic. Moreover, policymakers can establish some new guidelines to maintain the stability of the bank.

5.3.2 Regulatory Pressure

According to the results in table 4.2, the regulatory pressure is significantly influencing the profitability and risk of banks. Bank can take advantage on this and evaluate the stability of banks by using this result. Besides, future researchers may move towards this direction as it is related to capital ratio and can include this variable in their research.
5.3.3 Liquidity Ratio

Similarly, there was a negative relationship between liquidity ratio and banks’ profitability. Based on the outcome, it proved that liquidity ratio was negatively significant to the return. The higher the liquidity ratio, the lower the bank profitability. Bank management team can treat this as their guideline to manage their bank as liquidity ratio would bring significant impacts toward the performance of banks. Future researchers can include this variable in their future study as it is important in determining the profitability of banks.

5.3.4 Leverage ratio

In this paper, leverage ratio is not significant to both risk and return. In other words, this ratio will not bring any impacts towards risk and return. Thus, the management team and future researchers are suggested not to include this variable in coming research as it was not significant to both dependent variables.

5.3.5 Non-performing loan (NPL)

Non-performing loan can be defined as the bad debt that debtors unable to repay to the banks. Thus, the profitability of bank will upturn due to the downturn of non-performing loan. Bank management team can take advantage on this as they can take this study as protocol to make lending decision in the future. Besides, they can also refer to the research when evaluating their bank stability and performance.
5.3.6 Off-balance sheet item

In addition, the study also showed that the off-balance sheet item had a negative relationship with profitability ratio and will expose banks to assume greater risks. It can be a guideline for the investors to determine their investment decision making in the banks according to their off-balance sheet items.

5.3.7 Size of the board

Besides, the size of board has a positive impact towards profitability of banks. In other words, the large board size will lead to higher profitability due to the accuracy of investment decision. However, there were different explanations conducted by previous researchers as they mentioned that board size had nonlinear relationship with risk. In this case, future researchers can refer to this paper as their guideline and further investigate this variable in their research.

5.3.8 Non-Executive Director on Board (NONEXE)

Based on the result, non-executive director is positively significant to banks profitability. This paper can be treated as references and help bank management in monitoring the return of banks and reduce the probability of default indirectly.
5.3.9 Corruption Freedom (CORRUPT)

Corruption freedom is inversely affecting the profitability of banks. In other words, when the corruption freedom is high, the levels of bank profitability will be downturn, as banks are not stimulated to earn higher earning to combat the circumstances. This result provided some beneficial information to the policy makers to restrict some policies to reduce the corruption problem. In this case, future researchers can include this variable and further investigate in their research.

5.3.10 Business Freedom (BUSFREE)

According to the result, business freedom is significant to the banks’ risk, and it helped banks to minimize the risks taking. In this case, policy makers are suggested to refer to this research when designing political decision as a higher risk occurred when business freedom is restricted.

5.3.11 GDP

GDP is positively significant to the bank risks. In other words, in a healthy economy, banks will have to assume higher risks since it can undertake different activities to earn return in a gradual growth nation. Policy makers can create some policies in controlling GDP to maintain the bank’s stability and reduce the risk to default.
5.3.12 Inflation

Inflation is used to measure inflation rate of a country. There is a negative relationship between inflation and profitability. When inflation rate present unanticipated, a bank will suffer the losses. Inflation causes difficulties of cash flows for borrower, which would result in premature termination of loan. Thus, profitability of bank will be decreased sharply due to occurrence of high default loan. Besides, inflation helps reduce risks of banks. In this case, policymakers can generate some new guidelines to maintain the stability of the banks according to the research.

5.4 Limitation of Study

Throughout the process of completing this study, some limitation had been detected. The existence of these limitations might cause the result of our study to be less accurate and precise.

5.4.1 Constraint of Data

This study draws attention to secondary data that is restricted to obtain the data from the bank’s yearly financial reports. However, a problem is found whereby some banks in ASEAN countries, namely Indonesia and Myanmar do not have a complete set of annual reports or there is some missing years of the annual report. Some hardship had undergone while information was adopted from the financial report; therefore, some of the banks had been forced to strike out within the ASEAN countries.
5.4.2 Number of Sample Bank

According to the research that had been carried out, there are more than 60 banks available within the ASEAN countries. However, due to incomplete of annual reports that caused failure in acquiring some important data, therefore only a total of 50 banks had been selected in this study. The final result of this research might be less accurate or imprecise as there are only small numbers of sample bank adopted. Therefore, this study could hardly represent the whole banking sector in ASEAN countries.

5.4.3 Presence of Endogeneity Problem

One of the econometric problems, endogeneity had been discovered for the duration of accomplishing this study. From Ullah, Akhtar and Zaefarian (2017), bias of endogeneity will cause non-consistent in estimation and false inference that might misguide final result as well as unsuitable theoretical interpretation. This problem was encountered during the process of completing this study.

5.5 Recommendation for Future Research

Some limitations had been observed throughout the process of this research. Therefore, some suggestions were provided to the future researcher.

First of all, this study suggested that banks provide a complete financial report for the future researchers. Due to the incomplete set of annual report, it is difficult for the researcher to have a full data collection. With this, the result of the relevant research will be less precise. It is because that a smaller sample data will cause the result to be less accurate. Besides, banks are encouraged to provide more data collection method instead of providing annual report. With
this, it could ease the future researcher to obtain the data more efficiently. We proposed that the country's central bank to supervise the banks to update their annual report regularly and ensure all the information provided are complete and accurate. A penalty can be given to the banks who are failed to comply.

Apart from that, future researcher is suggested to increase the sample size of the banks. According to Gujarati and Porter (2009) indicated that accurate, as well as precise result, will be generated if a large sample size is provided and adopted. By employing a large sample size, the result produced will be free from most of the macroeconomic problems such as multicollinearity, heteroscedasticity and autocorrelation problems. The future researcher can carry out the process of research by testing the relationship between the regressand and regressors by using monthly, quarterly or semi-annual data instead of using annual data. Gujarati and Porter (2009) stated that researchers should use at least 50 or more sample size as the small size may dedicate to data constraints problem and would cause the result to be untrustworthy.

According to the limitation stated above, future researchers are recommended to apply some advance econometric methodologies to resolve the problem of Endogeneity. Panel data is employed to carry out this research paper therefore, future researcher is recommended to apply dynamic data to further examine this topic. Dynamic model typically can be presented by differential equations or difference equations which can determine and resolve the endogeneity problem.

## 5.6 Conclusion

The objective of this study was to investigate the connection between capital ratio, regulatory pressure, liquidity ratio, leverage ratio, non-performing loan, off-balance sheet item, board size, non-executive director on board, corruption freedom, business freedom, GDP and inflation with banks' risks and profitability. At the moment, after reviewing robustness test, this study managed to justify that five out of twelve variables namely CAR, REG, LNOBS, BUSFREE,
and GDP had significant impact on ASEAN banks' risks; meanwhile six out of twelve variables, REG, NPL, LNOBS, BOARD, NONEXE and corruption freedom are significant in explaining banks’ profits, for the period of 2011 to 2016. After careful analysis done for various models, FEM is adopted as the most suitable model justified in model specification tests like Hausman test. By applying Sargan-Hansen test, we ensure that FER is the most appropriate model to be employed since it is robust to standard error cluster by banks.

In sum, the research objectives of this paper were generally achieved, as the relation between each variable with banks' risks and profits had been presented clearly, effects of external factors categorised under institutional quality and economics were discussed and the outcome of each decisive variables on banking risks and return in six different ASEAN countries were displayed even this study was restricted by certain limitations. Thus, the results might possess certain deviations with past studies due to different countries, banks and period of study. With this, the researchers of this paper aspired that this will be advancement for future researchers to look into the issue of ASEAN banks’ risks and returns which may end up boosting the economy as a whole and to bring more benefits to the country and its people.

In addition, the effects of external factors categorised under institutional quality and economics on dependent variables, risks and profitability of banks were displayed as well. It is reaffirmed that external variables played a role in exerting influence on the risks and return of banks. In addition, the impacts of each decisive variables were identified separately in six different ASEAN countries namely Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam. In this vein, capital ratio was generally found to be helpful in reducing the risks taking of banks in all countries except Vietnam, NPL is stable in influencing risks and profitability of Indonesia and Singapore banks, CAR is stable for both dependent variables in Malaysia, OBS is outstanding to study both endogeneous variables in Philippines, and lastly LIQ is notable in affecting risks and profitability of Thailand banks.
REFERENCES


Kangarluei, S. J., Motavasel, M., & Rahim, M. S. (2012). The effect of off-balance sheet financing on profitability and leverage ratios. *Editorial Note Words from the Board of Director 2 Profile of Authors Included in this Number 3 Information for Contributors 5, 5*(1), 85.


APPENDICES

Appendix 4.1a: BPLM Test for Risk

Breusch and Pagan Lagrangian multiplier test for random effects

\[ ZSCORE[idc,t] = Xb + u[idc] + e[idc,t] \]

<table>
<thead>
<tr>
<th></th>
<th>Var</th>
<th>sd = sqrt(Var)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSCORE</td>
<td>1566.163</td>
<td>39.57478</td>
</tr>
<tr>
<td>e</td>
<td>20.11756</td>
<td>4.485261</td>
</tr>
<tr>
<td>u</td>
<td>997.507</td>
<td>31.58333</td>
</tr>
</tbody>
</table>

Test: \[ \text{Var}(u) = 0 \]

\[ \text{chibar2}(01) = 300.75 \]
\[ \text{Prob > chibar2} = 0.0000 \]

Test of overidentifying restrictions: fixed vs random effects
Cross-section time-series model: xtreg re
Sargan-Hansen statistic 43.177 Chi-sq(12) P-value = 0.0000
Appendix 4.1b: BPLM Test for Profitability

Breusch and Pagan Lagrangian multiplier test for random effects

\[ \text{ROA}_{idc,t} = \beta X + \epsilon_{idc,t} \]

Estimated results:

<table>
<thead>
<tr>
<th></th>
<th>Var</th>
<th>sd - sqrt(Var)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>.5113581</td>
<td>.7150931</td>
</tr>
<tr>
<td>( \epsilon )</td>
<td>.0574873</td>
<td>.2397651</td>
</tr>
<tr>
<td>( u )</td>
<td>.2257814</td>
<td>.4751646</td>
</tr>
</tbody>
</table>

Test: \( \text{Var}(u) = 0 \)

\[ \text{chibar2}(H1) = 130.84 \]

Prob > chibar2 = 0.0000

Test of overidentifying restrictions: fixed vs random effects
Cross-section time-series model: xtreg re
Sargan-Hansen statistic 46.878 Chi-sq(12) P-value = 0.0000
### Appendix 4.2a: Hausman Test for Risks

<table>
<thead>
<tr>
<th></th>
<th>FE</th>
<th>RE</th>
<th>(b-B)</th>
<th>sqrt(diag(V_b-V_B))</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR</td>
<td>2.594534</td>
<td>2.688386</td>
<td>-0.0938314</td>
<td>0.045498</td>
<td></td>
</tr>
<tr>
<td>REG</td>
<td>6.080431</td>
<td>4.883299</td>
<td>1.197131</td>
<td>0.2774967</td>
<td></td>
</tr>
<tr>
<td>LIQ</td>
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<td>-0.0096083</td>
<td>-0.0297036</td>
<td>0.0093426</td>
<td></td>
</tr>
<tr>
<td>LEV</td>
<td>0.1051445</td>
<td>0.1215432</td>
<td>-0.0163988</td>
<td>0.0151366</td>
<td></td>
</tr>
<tr>
<td>NPL</td>
<td>-0.4436361</td>
<td>-0.7098399</td>
<td>0.2662037</td>
<td>0.1649389</td>
<td></td>
</tr>
<tr>
<td>LNOBS</td>
<td>-12.11091</td>
<td>-6.33544</td>
<td>-5.775455</td>
<td>1.152168</td>
<td></td>
</tr>
<tr>
<td>BOARD</td>
<td>-0.408366</td>
<td>-0.3673854</td>
<td>-0.0409807</td>
<td>0.1299445</td>
<td></td>
</tr>
<tr>
<td>NONEXE</td>
<td>0.0470485</td>
<td>0.0344487</td>
<td>0.0126</td>
<td>0.004735</td>
<td></td>
</tr>
<tr>
<td>CORRUPT</td>
<td>0.0025875</td>
<td>0.1920764</td>
<td>-0.1894889</td>
<td>0.0499375</td>
<td></td>
</tr>
<tr>
<td>BUSFREE</td>
<td>0.3489805</td>
<td>0.2948857</td>
<td>0.0540948</td>
<td>0.0242555</td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>-0.7265367</td>
<td>-0.9142159</td>
<td>0.1876792</td>
<td>0.0530431</td>
<td></td>
</tr>
<tr>
<td>INF</td>
<td>0.1459261</td>
<td>0.016235</td>
<td>0.1296911</td>
<td>0.0274802</td>
<td></td>
</tr>
<tr>
<td>_cons</td>
<td>121.8855</td>
<td>66.05257</td>
<td>55.83293</td>
<td>8.891395</td>
<td></td>
</tr>
</tbody>
</table>

b = consistent under $H_0$ and $H_a$; obtained from xtreg
B - inconsistent under $H_a$, efficient under $H_0$; obtained from xtreg

Test: $H_0$: difference in coefficients not systematic

$$\text{chi}^2(13) = (b-B)'[(V_b-V_B)^{-1}](b-B)$$

$$= 36.02$$

Prob$\text{chi}^2 = 0.0006$

$(V_b-V_B$ is not positive definite)
Appendix 4.2b: Hausman Test for Profitability

<table>
<thead>
<tr>
<th></th>
<th>FE</th>
<th>RE</th>
<th>(b-B)</th>
<th>sqrt(diag(V_b-V_B))</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR</td>
<td>-0.233932</td>
<td>0.126276</td>
<td>-0.360207</td>
<td>0.0072131</td>
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</tr>
<tr>
<td>REG</td>
<td>0.1367138</td>
<td>0.0554445</td>
<td>0.0812693</td>
<td>0.0342282</td>
<td></td>
</tr>
<tr>
<td>LIQ</td>
<td>-0.0055904</td>
<td>-0.0057517</td>
<td>0.0001613</td>
<td>0.0013147</td>
<td></td>
</tr>
<tr>
<td>LEV</td>
<td>0.03935</td>
<td>0.038924</td>
<td>0.000425</td>
<td>0.0022726</td>
<td></td>
</tr>
<tr>
<td>NPL</td>
<td>-0.277206</td>
<td>-0.2529084</td>
<td>-0.0242966</td>
<td>0.0262525</td>
<td></td>
</tr>
<tr>
<td>LNOBS</td>
<td>-0.3961093</td>
<td>0.0834684</td>
<td>-0.4795778</td>
<td>0.1254845</td>
<td></td>
</tr>
<tr>
<td>BOARD</td>
<td>0.0740135</td>
<td>0.0322705</td>
<td>0.041743</td>
<td>0.0179278</td>
<td></td>
</tr>
<tr>
<td>NONEXE</td>
<td>0.0078507</td>
<td>0.0085774</td>
<td>-0.0007267</td>
<td>0.0008254</td>
<td></td>
</tr>
<tr>
<td>CORRUPT</td>
<td>-0.0187678</td>
<td>-0.0103203</td>
<td>-0.0084474</td>
<td>0.0056907</td>
<td></td>
</tr>
<tr>
<td>BUSFREE</td>
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<td>-0.0149249</td>
<td>0.0142124</td>
<td>0.0035421</td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>0.00034</td>
<td>0.0077207</td>
<td>-0.0073807</td>
<td>0.0063224</td>
<td></td>
</tr>
<tr>
<td>INF</td>
<td>-0.0082933</td>
<td>-0.0155856</td>
<td>0.0072923</td>
<td>0.0028756</td>
<td></td>
</tr>
<tr>
<td>_cons</td>
<td>6.274907</td>
<td>2.479918</td>
<td>3.794089</td>
<td>1.086254</td>
<td></td>
</tr>
</tbody>
</table>

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

\[
\chi^2(13) = (b-B)'[(V_{b-V_B})^{-1}](b-B)
\]

\[
= 38.32
\]

Prob>chi2 = 0.0003

(V_{b-V_B} is not positive definite)
Appendix 4.3a: Inferential Analysis under Risks

| ZSCORE | Coef.  | Std. Err. | t     | P>|t|   | [95% Conf. Interval] |
|--------|--------|-----------|-------|-------|----------------------|
| CAR    | 2.594534 | 1.062121  | 2.44  | 0.020 | .4283236 - 4.760745  |
| REG    | 6.080431  | 2.809267  | 2.16  | 0.038 | .3508922 - 11.80997 |
| LTQ    | -.0393119 | .0649271  | -0.61 | 0.549 | -.1171316 - 0.093079 |
| LEV    | .1051445  | .0658917  | 1.60  | .121  | -.0292425 - .2395314 |
| NPL    | -.4438361 | .9388968  | -0.47 | 0.640 | -2.358529 - 1.471256 |
| LNROBS | -.1211091 | 4.778506  | -2.53 | 0.017 | -.21.85694 - 2.364875 |
| BOARD  | -.408366  | .6119613  | -0.67 | 0.510 | -1.656649 - .8397373 |
| NONEX  | .0470486  | .0610727  | 0.77  | 0.447 | -.0775099 - 0.1716071 |
| CORRUPT | .0025875  | .1247757  | 0.02  | 0.984 | -.2518942 - 0.2578692 |
| BUSFREE| .3489005  | .1696721  | 2.06  | 0.048 | .0029319 - .6950291 |
| GDP    | -.7265367 | .3690591  | -1.97 | 0.058 | -.14.79238 - .0261644 |
| INF    | .1459261  | .1179463  | 1.24  | 0.225 | -.094627 - .3864792 |
| _cons  | 121.8855  | 39.37323  | 3.10  | 0.004 | 41.58327 - 202.1877  |

\[ \sigma_u = 48.394776 \]
\[ \sigma_e = 4.4852607 \]
\[ \rho = .99148345 \quad \text{(fraction of variance due to } u_i \text{)} \]
Appendix 4.3b: Inferential Analysis under Profitability

Fixed-effects (within) regression
Group variable: idc

R-sq:
- within = 0.4877
- between = 0.0051
- overall = 0.0283

Number of obs = 170
Number of groups = 32

Obs per group:
- min = 1
- avg = 5.3
- max = 6

F(12,31) = 12.35
Prob > F = 0.0000

(Std. Err. adjusted for 32 clusters in idc)

| ROA | Coef. | Std. Err. | t | P>|t| | [95% Conf. Interval] |
|-----|-------|-----------|---|----|------------------|
| CAR | -0.233932 | 0.290706 | -0.80 | 0.427 | -0.82683, 0.353967 |
| REG | 0.1367138 | 0.0548791 | 2.49 | 0.018 | 0.0247872, 0.2486405 |
| LTQ | 0.0055904 | 0.0043747 | 1.28 | 0.211 | -0.145127, 0.003319 |
| LEV | 0.0033935 | 0.0039562 | 0.99 | 0.328 | -0.0041338, 0.0020338 |
| NPL | -0.277206 | 0.0616173 | -4.19 | 0.000 | -0.4121653, -0.1422466 |
| LNOBS | -0.3961893 | 0.2324528 | -1.70 | 0.098 | -0.8761999, 0.0779812 |
| BOARD | 0.070135 | 0.026378 | 2.58 | 0.015 | 0.0156065, 0.124206 |
| NONE | 0.0078507 | 0.0032021 | 2.45 | 0.020 | 0.00132, 0.0143814 |
| CORRUPT | -0.0188768 | 0.0067612 | -2.78 | 0.009 | -0.032573, -0.0049783 |
| BUSFREE | -0.007126 | 0.0073788 | -0.10 | 0.924 | -0.0157618, 0.0143366 |
| GDP | 0.00034 | 0.0154258 | 0.02 | 0.983 | -0.031212, 0.0318012 |
| INF | -0.002933 | 0.0062756 | -1.32 | 0.196 | -0.0210925, 0.0049059 |
| _cons | 6.274907 | 2.158708 | 2.91 | 0.007 | 1.872192, 10.67762 |

sigma_u | 0.2579691 |
sigma_e | 0.2397651 |
rho | 0.93714399 (fraction of variance due to u_i) |