EVALUATION OF CAPITAL ADEQUACY RATIO ON MALAYSIAN BANKING EFFICIENCY

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Abstract

Capital adequacy has been constantly growing in the banking sector in Malaysia and is a key factor in determining the continuity of the commercial and islamic banks in Malaysia. Capital adequacy is a cushion for banking institution for ensure they are survived in financial crisis. However capital adequacy is affected by credit risk, market risk and operational risk. The purpose of this study is to evaluate the capital adequacy ratio on Malaysian banking efficiency from year 2009 to 2016. The variables that would like to test are on between total risk weighted assets for credit risk, total risk weighted assets for market risk and total risk weighted assets for operational risk. A research framework and a hypothesis are developed. The hypothesis of this study is tested using regression analysis. It is to examine the fitness and the strength of the model. In this research, 8 serial data comprised of 10 local banks where 8 of them are commercial banks and 2 of them are Islamic banks. From three of independent variables in this research, only two variables gives an impact towards capital adequacy ratio. In a nutshell, this study offered insights to understanding the evaluation of capital adequacy ratio on Malaysian banking efficiency for mitigate any difficulties during financial crisis.

Keywords: Capital adequacy ratio, banking efficiency, credit risk, market risk, operational risk

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Chapter 1: Introduction

1.1 Background of the Study

Bank is a financial institution that provides financial services to customers. It provides a various services such as accepting deposits, issuing loans and others. Based on Financial Services Act 2013, bank has the same meaning as a "banking business" that was defined in subsection 2(1) of the Central Bank of Malaysia Act 2009 [Act 701]. It simply means as a business of accepting deposits on current account, deposit account, savings account or other similar account, paying or collecting cheques drawn by or paid in by customers and provision of finance in Malaysia. The banking system can be divided into two types that can be known as Commercial Banking and Islamic Banking. The banking institution plays a major role as an intermediary between surplus and deficit. In Malaysia, it is controlled by the central bank, which is Bank Negara Malaysia.

Initially, the Companies' Ordinance 1948 was regulating the commercial banks. Then, it was changed to The Banking Act 1973 and followed with combination of Banking and Financial Institution Act 1989 (BAFIA), the Banking Act 1973 and the Finance Companies Act 1969 under a single legislation. Recently, the commercial banks have started to comply with the new regulation which is Financial Service Act (FSA) 2013.

Thus, each of the banks must follow the rules set up by central bank to ensure the businesses that have been conducted are legal and sound. One of the rules that must be complied is to achieve the minimum requirement for capital in banking institution. Based on the Basel Committee on Bank Supervision (BCBS), Basel is a set of international banking regulations that sets out the minimum capital requirements of financial institutions. It is also a goal of minimizing the credit

risk in banking institution. The minimum amounts for each of the banks that operate internationally are 8% of capital based on a percent of risk-weighted assets.

The minimum requirement for capital is needed to mitigate the financial crisis. Financial crisis impacts every industry in a certain level of degree including banking industry where the heat of the crisis are felt the most. Thus, some of the prevention strategy needs to be applied such as reporting or calculation on credit, market and operational risk.

The global financial crises started in the United State (Guisse, 2012). This is due to the inequality and uncontrolled lending activities (Guisse, 2012). In year 2008, the financial institutions were giving mortgages to people who are buying houses as a part of investment strategies (Guisse, 2012). It is within their expectation that the prices of the mortgage continue to climb. Unfortunately, the mortgage price keeps on falling consequently resulting many of the investors to fall in bankruptcy.

Due to this event, the financial institution has to bare all the bankruptcy occurred. Around January in year 2008, the effect of crisis started to hurt the American's economy. This issue also occurred in China, Japan and the European countries even though they are developed countries (Guisse, 2012). Once this crisis flooded these develop countries, it will set a chain reaction to their trading partners and counterparts including the developing countries.

Global financial crisis is one of the reasons why Basel Accords are derived. The Basel Committee comes out with Basel Accords I, II and III. From that, each of financial institutions is able to monitor their risk and capital available in their institutions. One of the components that need to be taken care of is capital adequacy ratio (CAR).

CAR is a measure of the amount of a bank's capital expressed as a percentage of its risk weighted credit exposures. The purpose of applying minimum capital adequacy ratios is to ensure the depositors are protected and to promote the stability of the financial system. This is to minimize the solvency in banks that can impact the liquidity of the banks from time to time.

Creation of capital buffer can be tapped during crisis. That is the main reason why all the banks and financial institution are required to calculate capital adequacy ratio as a part of their reporting process (Isa and Tan, 2015). Theoretically, when the capital requirement is established, the bank will be in a safer position as it will face fewer risks (Shaw, 2014).

Referring to Capital Adequacy Framework; capital adequacy is a part of Basel II. The implementation is due to the observation where an inflow is through the contraction of trade and foreign direct investment (FDI). As a developing country, Malaysia is an active participant in trade and FDI inflows. The global crisis also gives an impact to Malaysia through the trade channel. This is because Malaysia relies a lot on its dominant trade partners. The fluctuation of the trading activity will greatly impact the country's economy.

Bank capital to assets is the ratio of bank capital and reserves to total assets. Capital and reserves include funds contributed by owners, retained earnings, general and special reserves, provisions and valuation adjustments. Capital includes tier 1 capital which is paid-up shares and common stock where included on common feature in all countries' banking systems. In tier 1 capital also include the total regulatory capital where there are several specified types of subordinated debt instruments that need not be repaid if the funds are required to maintain minimum capital levels (these comprise capital tier 2 and tier 3). Total assets include all non-financial and financial assets.

Refer to Figure 1.0, shows the bank capital to asset ratio in Malaysia. From year 2007 until 2016; the bank capital to asset ratio is increasing. Where year 2007 shows the ratio is 8.9% increase to 10.34%. Unfortunately, in year 2012 the ratio is 9.95% decrease to 9.57%.

In year 2015, rating agency Moody's Investors Service highlighted the declining in profit of Malaysian banks continue until year 2016(The Star Online, 2015). One of the example banks that faced declining of profitability is RHB. Moody's Investors Service said profits of RHB has declined for the nine-months in year 2015 and same as other financial institutions' decreased profitability (The Star Online, 2015). Based on Moody's record, RHB Bank's average ROA fell by 24 basis points to 1.03% during the first nine months followed by another six financial institutions (The Star Online, 2015). This shows that the banking institutions are facing the initial stage of financial crisis.

Research house of Credit Suisse reported that, banking system in Malaysia will be expected to face a worse performance than in the 2008 global financial crisis (Malay Mail Online, 2015). Furthermore, they have stated that it will be a bad news for Malaysia if the situation where ringgit keeps on plunges, sell-off in the bond market and falling of oil prices that has been happening in the recent months are not properly dealt with. All that will contribute to the Malaysian banking industry's earnings risk (Malay Mail Online, 2015).

It also mentioned on the volatility in commodity prices and currency rates usually result in greater credit cost for banks. All that symptoms will affect negatively on the overall performance of the banking industry in a long term (Malay Mail Online, 2015).

In addition, Credit Suisse also said Malaysia is currently having higher government debt levels and higher household debt levels. This is along with higher interest rates which are surrounded by lower oil prices in comparison to the global financial crisis period (Malay Mail Online, 2015).

According to Ng (2016), M3 in January 2016 for the monetary and financial developments showed the most inclusive definition of money supply. It was lower compared to January 2015. Then, growth in M3 for December 2015 and January 2016 are weakened. Based on data released by Bank Negara on the monetary and financial developments, it was grown by 2.7% and this has been weakening since October 2015.

Refer to International Monetary Fund (2014); even 2013 is recession year but it slowly recover. The growth benchmark with 'V-shaped' real gross domestic product (GDP) growth path was back to the current which is 5%. In initial peak, the credit losses, lower income and revenue generation was decline in real GDP growth in year 2013. It would adversely impact banks' balance sheets. Then, the banks are expected to recover slowly. Not only that, their solvency resilience through capital buildup on the upswing. At the end of year 2016, the real of GDP was recovered by growth up to 5.2%.

Not only that, issues on increasing on unemployment and decreasing of property and asset prices affects the banking industry. It has to utilize capital adequacy regulations and relationship banking systematically. This is due to soundness and effectiveness of business management (International Monetary Fund, 2014). The prevention is needed to ensure the capital is able to act as a shield when the financial institutions are facing a critical situation. If not in crisis situation, the purpose of internal ratings-based approaches is to help banks to estimate and evaluate their risk weights towards the riskier borrowers (International Monetary Fund, 2014).

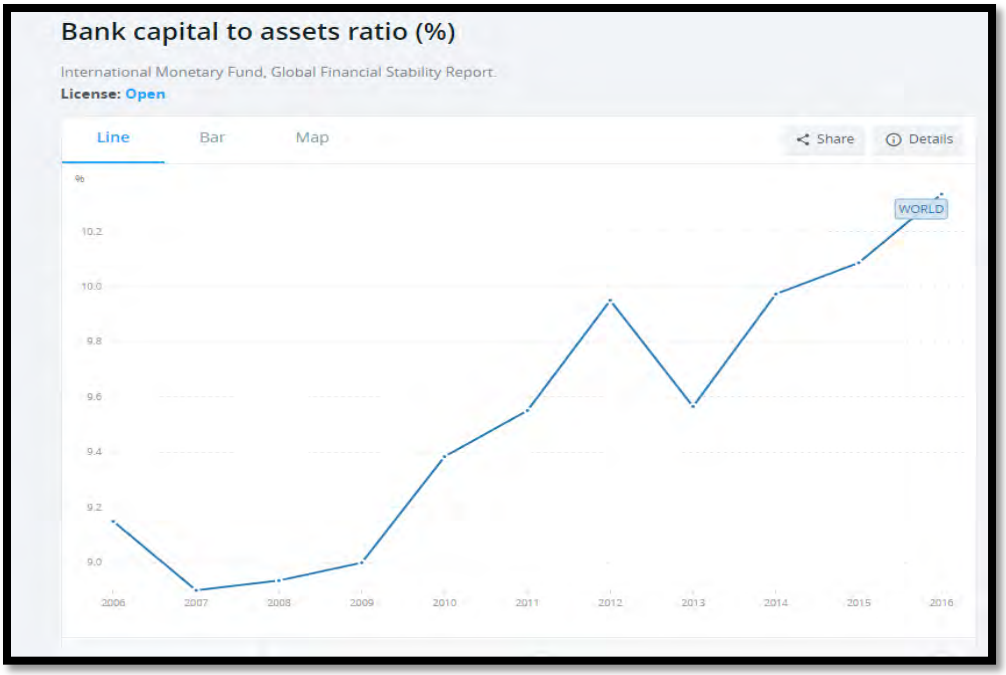

Figure 1.1

The bank capital to asset ratio in Malaysia

1.2 Problem Statement

In modern world, the percentage of a bank faces an inherent risk of insolvency is high. If banks exposed to highly leverage hence to ensure the available reserve during critical time is significant for banking industry (Cernohorska, 2015). A financial crisis occurs due to panic or run out of money when the investors sell off the assets. Not only that, the depositor's withdrawn money from their saving accounts in short period or frequently. Thus, bank will run out of money to make it in their daily businesses (Cernohorska, 2015).

In year 1988, the Basel committee on banking supervision introduced the Basel 1 Accord (Bank for International Settlements, 2016). This is one of the steps to mitigate the financial crisis. The Basel Accord highlights on the risk-based capital requirements. It is a measurement for solvency towards the weaknesses in the leverage ratio (Bank for International Settlements, 2016). Thus, they require each of internationally active banks to hold minimum 8% capital of assets. Each of assets is measured in different ways based on respective riskiness (Bank for International Settlements, 2016).

In Malaysia, the guideline imposed by Bank Negara Malaysia, the Financial Housing Companies (FHC) must be complied with the same strict capital requirements that are already imposed towards banks (Isa and Tan, 2015). This shows that all the financial institution must be aware on their capital adequacy ratio as it is the main component to determine the level of the risk in any of the institutions.

According to Fitch Ratings (2015), the capital adequacy ratio extended to financial holding companies. Previously, it is just implemented to licensed bank entities only. The measures will

strengthen the capital framework for FHCs, and address regulatory arbitrage between parent and subsidiary capital. In any event, Fitch expects a continued focus on core equity capital by banks and FHCs in the years ahead in light of these new regulations (Fitch Ratings, 2015).

One of the methods to absorb the losses or reduce the default risk is by increase the capital buffer of the banks. However, it will cause changing on portfolio composition if indirect outcomes of capital stringency on default risk (Abou-El-Sood, 2016).

Based on previous researcher; the author made an analysis of the influence of the Basel II and III frameworks on financial market stability. The author defined that changes of financial value in market risk may reflect when there are changes in the value of the underlying components (Hermsen, 2012). The main focus of the research on Basel II and III is market risk.

Besides that, there is another research that has been done towards the Basel II. That research was conducted by Bhatti and Misman (2010). It focuses on the effectiveness of Basel II when Bank Islam complies with regulation made by Bank Negara for Basel II Reporting (Bhatti and Misman, 2010). Bank Islam Berhad known as "BIMB" is well capitalized and is using the standardized and basic indicator approaches for the calculation of risk weighted assets (Bhatti and Misman, 2010).

In context of Basel II, there are three types of risk which are market, credit and operational. But for the BIIMB, the crucial risk is credit risk (Bhatti and Misman, 2010). This is because in BIMB more than 86% of the proportion in the total risk weighted assets. The reason behind this is because of the excessive dependence of BIMB towards debt instruments in its financing activities where more than 99%, while 0.1% only for equity based financing (Bhatti and Misman, 2010).

During critical time, with the implementation of capital framework, it has grown sensitive to risks through the introduction of internal ratings-based approaches. Thus, banks have less room to exploit lending services for rescuing and reconstructing the borrowers that are facing with difficulties (International Monetary Fund, 2014).

Thus, this research is to study the relationship of capital adequacy ratio with several risks in banking industry. The findings of this study can act as an indicator in banking institutions to survive during financial crisis.

1.3 Research Objectives

The research objectives are:

- To analyze the relationship between total risk weighted assets for credit risk and capital adequacy ratio.
- To analyze the relationship between total risk weighted assets for market risk and capital adequacy ratio.
- To analyze the relationship between total risk weighted assets for operational risk and capital adequacy ratio.

1.4 Research Questions

The research questions are:

- What is the relationship of total risk weighted assets for credit risk with capital adequacy ratio?
- What is the relationship of total risk weighted assets for market risk with capital adequacy ratio?
- What is the relationship of total risk weighted assets for operational risk with capital adequacy ratio?

1.5 Significance of the Study

This study will provide useful information and better understanding about the efficiency of Malaysian banking institution based on capital adequacy ratio evaluation. Thus, banks are able to determine the effectiveness of capital adequacy ratio in order to mitigate the financial crisis in Malaysia.

As a developing country, Malaysia should know the level of the capital adequacy ratio to ensure that the capital is sufficient to curb losses and risks faced during financial crisis. Besides that, this research can be meaningful by evaluating the capital adequacy ratio in banking institution and contribute to the development of banking industry.

Through good management of the CAR, Malaysia is able to have more developed and diversified financial system where large volume of capital can be directed to the economic system. The use of the Statutory Reserve Requirement (SRR) is to provide more long-term sterilization of liquidity in banking institutions. Thus, the banks are able to manage domestic liquidity. It also improved the significantly of bank's liquidity, where is supported by a wider range of instruments for monetary operations.

Besides that, the capital adequacy ratio can act as an indicator for survival during financial crisis. The early detection of potential problems by the movement of capital adequacy ratio is able to help in reducing the expected cost of a bank failure. The function of capital in the bank is to absorb the losses. Thus, the banking institutions have to focus on the movement of tangible equity capital. Thus, the capital adequacy ratio is one of the methods to decrease the chance of the problem spreading more widely in banking industry.

1.6 Organization of Remaining Chapters

There are another 4 chapter to be covered such as Literature Review, Methodology, Findings and Conclusion. In the Literature Review chapter, it consists of explanations on the establishment of the theoretical framework. Besides that, it also provides to the readers on overview of the ideas, theories, and significant literature currently was published.

Next, for the Methodology chapter is a systematic and theoretical analysis in research process. This step is to determine the methods applied during the research have been conducted.

For the Findings chapter, it is focuses on the result based on the methodology process applies. It is a logical sequence without bias or interpretation. So that, in this level the hypothesis can be reject or accept.

Last but not least is Conclusion chapter. It is to restate the research question in this research. This chapter will show the strength of findings either aligned with the significance of the study or not.

Chapter 2: Literature Review

2.1 Introduction

In year 1974, The Basel Committee on Bank Supervision introduced The Basel Accords to all banking institution for regulating their activities. The aim of this committee is "to enhance the financial stability by improving supervisory knowhow and the quality of banking supervision worldwide". Then, they will be focusing more on monitoring the capital adequacy in banking system for ensure the survival level during financial crisis.

The Basel Accords consists of three sets of regulations which are known as Basel I, Basel II and Basel III. It also includes the banking regulation on credit risk, market risk and operational risk. The main point of the Basel Accords is to ensure the banking institution able to meet the obligations provided by central bank and to absorb any of unexpected losses. This is one of the advantages of having sufficient capital in any banking institutions.

In year 1988, Basel I have been introduced to banking industry. The main purpose of the Basel I is to determine the capital adequacy risk and control the unexpected loss. There are few categorizes the assets of banking industry which is 0%, 10%, 20%, 50% and 100%.

Next, another set of regulations is Basel II. It is also known as Revised Capital Framework. Basel II has three scopes which are minimum capital requirements, supervisory review of an institution's capital adequacy and internal assessment process. The combination of these three scopes is known as Pillar 3. The effectiveness of Pillar 3 shows the strength of market discipline and soundness of banking practices.

Due to the collapses of Lehman Brothers in year 2008, the Basel Committee decides to update the Basel Accords. Having good governance and risk management plays an important role in any institutions including financial institutions. If there are any inappropriate incentive structures and over leveraged banking industry, it would definitely place the financial institution in an unfavorable phase.

Thus, the Basel Committee comes out with Basel III where an action to revise and make up overall design for capital and liquidity coverage in banking institutions. In the Basel III, they still remain the Pillar 3 and add on some requirements and safeguards. Not only have that, each of the banks had to maintain the level common equity and liquidity ratio as per the guidelines.

For Asian banks, they had suffered large losses in the late 1990s. It is due to insufficient capital to absorb losses and they became critical for survival (Ibrahim, 2010). How much capital is adequate for financial institution depends on the combination of risk profile, regulatory requirements and other practical considerations. In a financial institution, the economic risk is the risk that is the most significant as the amount of losses that it could suffer are based on the condition of the economy. The amount of capital a bank needs to hold depends on its credit risk, market risk, business risk and targeted equivalent bond rating.

3 decades ago, there are several financial crisis faces by banking sector in Malaysia. First of the financial crisis occurred was in year 1985 to 1986 (Athukorala, 2010). The crisis happened due to some of financial institutions undergo bankruptcy because of default on loans. Then, the following year which is 1987 to 1989; the financial crisis was related to the non-performing loan that so high. The non-performing loan during this time is focusing on financial companies and small banks (Athukorala, 2010).

10 years later, Malaysia faced another crisis known as Asian Financial Crisis (AFC) between years 1997 and 1998 due to effect of the crisis. Latest financial crisis is in year 2008 which is known as Global Financial Crisis; where due to crisis in the subprime mortgage market in the United States (Guisse, 2012)

This crisis starts with unstable economic condition where Malaysia faced difficulty to obtain capital investment. Then, the US investor had loss of confidence towards the value of sub-prime mortgages (Davies, 2017). Due to this event, a large amount of capital has been injected into financial markets (Davies, 2017).

Generally, the Malaysian banking system suffered more impacts during global financial crisis instead of Asian financial crisis. Reflect to that crisis, improvements in the governance structure together with consolidation and restructuring of the banking institutions. Not only that, enhancement on framework of risk management also needed.

Refer to Demirguc-Kunt, Detragiache & Merrouche (2013), before the financial crisis occurs, there are difference in initial capital. It is inconsistency affect towards the bank stock return. Thus capital is important in banking institution. In their research, they found that; holding low level of quality capital is the beginning of the critical financial stage (Demirguc-Kunt, Detragiache & Merrouche, 2013).

During financial crisis, a stronger capital position is needed (Demirguc-Kunt, Detragiache & Merrouche, 2013). So, they are suggesting that the financial institution to keep strengthen their capital requirements. It is difficult to have a proper measurement on risk exposure. A minimum leverage ratio can be used to minimize risk adjusted capital requirement. It is very important to

determine the leverage level in banking institutions. It is needed for large and complex financial organizations (Demirguc-Kunt, Detragiache & Merrouche, 2013).

Buehler, Samandari, and Mazingo (2009), shows the banks are capable to arbitrage the capital ratios watched by regulators. To measure the riskiness and loss absorption capacity, the regulatory ratio is required. Thus, the banks have to focus on targeting capital ratios and refine the risk weight (Buehler, Samandari, and Mazingo, 2009). It is to ensure the regulatory capital is suitable and align with underlying risk.

2.2 Dependent Variable

2.2.1 Capital Adequacy Ratio

In year 1990s, capital became very crucial for in banking institution. In response to the large number of bank failures new capital requirements were instituted for all banks. In additional, they had to raise capital or be acquired or merge with other banks. This is to acquire other banks to become major players nationally or internationally.

The Basel Committee introduces Basel Accord to highlight the important of capital adequacy in financial institution. Capital adequacy ratio is a calculation on ratio of capital to risk where it can be absorbed losses facing by the banking institutions. If the CAR is not in minimum level, it shows the banks do not have enough capital to operate their activities. This ratio plays a role in giving out warning signals for potential huge crisis.

The need of adequate capital to a bank cannot be over-emphasized. With this, a bank can absorb operating losses as the bank continues with its operations. It enables the bank to help banking institution to run their business and to maintain public confidence. It helps shareholders, investor or even the stakeholders to be prepared and ensure funds are always available to support the activities.

In additional, it is also to protect uninsured depositors and other stakeholders. It keeps the cost of deposit insurance low as it reduces the chances of bank collapse. Capital is also important in order to acquire real investments that can allow banks to provide financial services (Thumbi, 2014).

Each of banking institution must hold some of its capital amount as per required by financial regulator. That capital amount is known as capital adequacy. The capital adequacy ratio of equity must be expressed as a percentage of risk-weighted assets.

Technically, the ratio of regulatory capital to risk weighted assets forms the basis to measure the capital adequacy of banks. In regulatory perspective; they tried to match risk-based capital requirements to the real risk of banks. Abou-El-Sood (2016) finds that; the bank vulnerability is reflection when the capital ratio that required by regulator in banking institution at minimum level.

In year 1974, the Basel Committee on Banking Supervision created a forum to discuss global banking supervision. The main purpose of the forum is to know how banking supervisors worldwide can be a global standard setter for financial institutions. This set a framework help the banks and any depository institution to calculate the capital amount.

In 1988, Basel I which is a capital measurement system has been introduced by the Basel Committee. Then, in the middle of year 2004 the Basel Committee replaced the Basel I with Basel II where it is more complex on capital adequacy framework. When the financial crisis was attack the world economic in year 2007–2008, the Basel II upgrade to Basel III. The Basel III will be implementing gradually by year 2013 and 2019.

In line with that, Shaw (2014) highlighted that CAR is able to ensure the stability of global economic through common banking standards. Shaw also mentioned that; CAR is a technique to carried out the management communicate constantly and overseeing the risk management process. The capital adequacy does not make the bank less risk but to have extra or back up money before fail in the business. Therefore, it is significant that financial institution must aware on the capital adequacy ratio (Isa and Tan, 2015).

2.3 Independent Variables

2.3.1 Relationship between Credit Risk and Capital Adequacy Ratio

In financial market, Bank is the major representative. This is because the banks manage the liquidity between borrower and lenders, managing financial risk and to facilitate development of business. By then, most of the authors said the failure of a bank can give a huge impact to the society. In financial history, the bankruptcies and collapsed of the bank may affect the economic conditions (Demirguc-Kunt, Detragiache & Merrouche, 2013).

As a regulator, they are more preferred to have more capital. So that, the banks can helps to minimize the insolvency risk or any of system disruptions in banking institutions. Based on the Regulator's primary concern; the sufficient capital able to cushion any losses in banks. From that, it can make the deposits are not at risk level. Not only that, it is also minimize the disruption towards the financial system.

Refer to Thumbi (2014); the regulatory capital is a standardized calculation for all banks in Kenya. However banks would wish to hold the minimum level of capital that supplies adequate protection, since capital is an expensive form of funding and it also dilutes earnings. This can also be known as economic capital where minimum capital requirement in a going concern for continuous operation. It is only concerned with enough capital to ensure their survival.

A capital allocation or performance assessment was developed by banks to help in determining the capital adequacy. The function of this tool is to help in measuring the risk in a relative sense instead of in an absolute. Over time, the uses of economic capital have extended by advances in risk quantification methodologies and the supporting technological infrastructure. It is require accuracy in the measurement of risk (Thumbi, 2014).

According to Posner (2014); in 2007 the regulators adjusted the risk-based rules by allowing a subset of banks to use internal evaluation process. It is to determine the appropriate capital asset ratio in light of the credit risk of their loans. That process has a possibility to strengthen the security of credit level.

There is a relationship between credit risk and capital adequacy ratio. It is due to the new requirements based on credit risk. If the risk is high, then it is required that more capital needs to be held by institutions with lower credit ratings (Shaw, 2014). According to Management Solutions (2010), it is to provide more coverage during adverse economic conditions. Indeed, there is a significant increase in capital consumption with respect to current capitalization standards.

Furthermore it was shown that because of this effect of capital adequacy regulation, there exists an incentive for banks to engage in active risk management. Base in this case the banks can fully hedge their exposure to risk and can separate decisions on interest rates from hedging decisions. Due to that event, Bank Negara Malaysia takes an action to enhance the credit risk management infrastructure and underwriting practices for the following financial crisis. Furthermore, each of the banking system must manage their balance sheet and the quality of asset. It is by stringent provisioning policies or write-offs of irrecoverable loans

2.3.2 Relationship between Market Risk and Capital Adequacy Ratio

Bank capital requirements together with equity market imperfections (a constant dividend payout ratio) bring the bank capital channel into the model (Chami and Cosimano, 2001). This channel alters the transmission of policy interest rates if banks face a negative shock to their capital. In this event banks seek to accumulate additional capital and hence exercise an influence on interest rate spreads and credit availability independent of monetary policy. A similar mechanism is introduced through working capital

requirements, since changes in the target liquidity ratio affect bank profits and consequently, interest rate spreads (Thumbi, 2014).

Movement in market price may cause losses either on balance sheet or off balance sheet. According to Hermsen (2012) any changes on the value of underlying components may affect in the value of financial positions. The differences between these values is categorize as market risk. There are two factors of risk in business which are the probability of an adverse circumstance will come about and the cost of such adverse circumstance.

Referring to Bis.org (2016); there are changes on measurement of Value-at-Risk (VaR) to an Expected Shortfall (ES). This is a measurement to determine the risk under stress. The function of Expected Shortfall is to help banking institution during period of significant financial market stress whereby prudent capture of "tail risk" and CAR.

Market risk accounts for some external influences such as foreign exchange rates or changes in government policies (Shaw, 2014). The Basel Committee will continue to supervise the consequences on capital requirement for market risk when the implementation has been made. Besides that, it is to ensure consistency in the overall calibration of the Pillar 1 capital framework (Bis.org, 2016)

In the short-term risk management practice, the conventions of using VaR are well established and accepted. There is constraint of accuracy that contains a number of limiting assumptions in VaR. The first assumption in specified period, there is no difference on the composition of the portfolio. Over short time horizons, it is reasonable in limiting of assumption. However, over longer time horizons, the changes may expect. Thus, no longer relevant if the VaR is unchanged (Thumbi, 2014)

The relevancy theory on unchanged of VaR also support by the Variance Covariance and Historical Simulation approach. This approach shows that historical correlations are stable and will not change in the future or breakdown under times of market stress (Thumbi, 2014).

2.3.3 Relationship between Operational Risk and Capital Adequacy Ratio

The efficiency of operational delineate as no scarification quality when to deliver a product or services with effective cost. In the short term perspective, high efficiency of operational is scale economic able to take an advantage at any level of output with efficient. Then, for the long term perspective on operational is the existing system able to achieve more capacity by optimize the level of productivity (Shaw, 2014).

Then, the operational risk is one of the oldest and most common types of risk that financial institutions and banks are facing. The importance of this risk is to the extent that the review of capital adequacy regulations Basel Committee on Banking Supervision (Basel II) of risk as one of the risks in the calculation of the capital adequacy of banks has arrived.

Generally, failure from internal or external even from people or system, it will consider as a risk which categorized as operational risk. The banks need to consider this risk because it has the potential to become a strategic issue. Refer to Pillar 3 guidelines, market risk will attentively increase the volume of public disclosure in scope of risk management where included of credit and operational risk.

The operational risk is the complex infrastructure of banks. There are two ways to calculate the required capital for operational risk either using the standard approach and

the approach stemming from internal ratings (Shaw, 2014). There is a relationship between operational risk and capital adequacy ratio. The operational risk is involves mistakes, error or any crimes that cause losses to the banking system.

Besides that, the operational risk coincides in disclosures required under IFRS 7 where the IFRS standard has to deals with disclosures on financial instruments (Cadiou and Mars, 2014). In IFRS, they need to take care of operational risk also. This is because they define the operational risk give an impact to financial statement.

Over the last decade in Kenya, the performance of the banking industry keeps improving from time to time. There are two banks out of 37 bank-failures have been put under Central Bank of Kenya statutory management. This occurs in between year 1986 and 1998 (Mwega, 2011). However, to pass the commercial banks inefficiency, the commercial banks needs to implement high of interest rate to their customers.

It is a method to reduce their operational cost. Even the Kenyan banking sector is in developing stage, they are also facing some challenges. These challenges are related to management of risks. Thus, the operating efficiency was one of the most critical risks faced by financial institutions in Kenya (Mwega, 2011).

Chapter 3: Methodology

3.1 Introduction

This chapter, highlight on the methodologies which involves in this research. To conduct one research will need some of the procedure to ensure the result collected is correct and achieve the objectives. This chapter shows the ways of conducting this research.

It included the data collections, data sources, variables, research design, theoretical framework, data analysis and treatment, hypotheses statement and conclusion. For the data collection procedures, it explains about where the information is being obtained. Then, the variables explained about what can be tested in the research conducted. The research design is mainly the structure of research.

3.2 Purpose of Study

For this quantitative study, the purpose of study is empirical research. It is defined as to seek connection of ideas, where is to understand cause and effect. Thus, the researchers wants to elaborate what is going on based on this study. This is because to evaluate the efficiency of the ratio towards the banking performance.

3.3 Unit of Analysis

Unit of analysis is referring to the level of aggregation of the data have been collected. It is during the subsequent data analysis stage. Unit of analysis is also the main part that is being analyzed in a study. It is the 'what' or 'whom' that is being studied. There are several of classifications of unit analysis such as individual, dyads, groups, organizational and cultures.

For this research, the unit analysis that have been used is organization because the data or the outcome is to know the performance in Malaysian banking institution which is consider commercial and Islamic banks. Thus, each of organization which is bank will provide the financial report and ratio.

3.4 Data Collection Procedures

3.4.1 Collecting data

Collecting data is the one of the part in research methodology. There are many ways to collect the data such as interviewing, distribute questionnaire, observation and others. Each of this method has their own of benefit as well as a problem from those specific methods. The data is able to gather in different of setting like field or lab.

In this study, the secondary data is being used to ensure the success of the research. The secondary data are where report from banking institutions.

3.4.2 Data source

The source of data can be extract from two parts. It can be done either primary or secondary data. The primary data is referring to information that being obtained first handed by the researcher on the variables of interest for the specific purpose of the study. Another data is secondary data. It is referring to the information gathered from sources that already exist such as Annual report and Pillar III Report

Besides that, academic journal are used to understand the past research. Last but not least, the bank's website. It is to consolidate the data for this research.

3.4.3 Sampling frame

To ensure a specific result in the future, the research needs to determine the right sampling frame. The sampling frame is the narrow done what the sample or the data need to be tested. Collect the data from year 2009 to 2016 by yearly basis. Refer to Appendix 1; there are 27 of commercial banks and 16 Islamic banks in Malaysia. In this study, the sample sizes are 10 banks which are compressed by 8 local commercial banks and 2 local Islamic banks. Therefore, this study focuses on local banks in Malaysia.

3.4.4 Time dimension

Time dimension is the time of the researcher does their research. There are two types of time horizon which are cross sectional and longitudinal. For this research, the dimension is cross sectional. It is because the data being used is 8 serial data for 10 banks. This study just focuses on the data at local Malaysian banking institutions. 8 serial data consist of 8 years data of each variable for 8 commercial banks and 2 Islamic banks where the value of n is 80.

3.5 Measurement/ Operation Definition

In this study, the necessary variables and their measurements are derived from a variety of sources. Ratio analysis is a simple and helpful in showing the performance of a firm based on the financial strengths and weaknesses that can be measured using their financial statement.

Table 3.1

Measurement/ Operation Definition

Variables	**Definition**	**Expected Result**	**Measurement**	**Related past studies**
Capital Adequacy Ratio	CAR is a calculated as a ratio of a bank's capital base to its risk-weighted assets.	Not Available	There are two types of capital are measured which are tier	Refer to Ahmet Büyükşalvarcı (2011); they were investigating the

	The ratio is intended to be a measurement of a bank's capital position in respect of its exposures to credit risk, market risk and operational risk.		one capital and tier two capital. For tier one capital is can absorb losses without a bank being required to cease trading. Then tier two capital is can absorb losses in the event of a winding-up and provides a lesser degree of protection to depositors.	determinants of CAR in the Turkish banks by using data from annual reports from year 2006 to 2011.
Credit Risk	The risk of a borrower or counterparty failing to meet its	Negative relationship with CAR	In banking institution, lending is their core business.	Refer to Ekinci (2016); credit risk is the most important risk exposure for

	obligations.		The source of fund comes from lending activities. So that, the credit risk for each bank slightly same and consistent every year. Credit risk is using business figures compared to operational risk using profit and loss figures.	banks. This is because the strong connection with bank profitability and economic growth.
Market Risk	The risk of losses in on- and off-balance sheet positions arising from movements in market prices and	Negative relationship with CAR	Market risk refers to the investment done by each of bank. If more investment, then	Refer to Ekinci (2016); the market risk consists of interest rate risk and foreign exchange (FX) rate risk. Thus,

	rates. These risks include the risks pertaining to interest rate related instruments and equities in the trading book and foreign exchange risk and commodities risk throughout the authorized institutions.		more market exposure. Besides that, market risk is using replacement cost such as mark to market figures. Then, market risk is exposing to market price and rate. Thus, the bank will manage to handle the market situation.	the fluctuations in the FX rates can affect the bank profits directly by changing the value of net foreign currency position.
Operational risk	The risk of direct or indirect losses resulting from inadequacies or failings in the	Negative relationship with CAR	Operational risk referring to the operation handles by each of the banking	Refer to Hussain & Shafi, (2014); in year 1980's, a global movement of bank capital adequacy

	processes or systems and from any external events.		institutions. It is more to process of managing the company as whole. Operational risk is using profit and loss figures where cannot be big amount as credit risk which is using business figures. Before adjustment on Basel Accord (Basel II), the operational risk is not a part of Basel Accord and not calculated.	started which culminated in recommending risk sensitive capital adequacy requirements for banks initially covering credit risk, later on market risk and finally operational risk as well. These three risks are believed to have systemic implications meaning to say that they have a capacity of disrupting the banking system as a whole which could create wider disturbances in a financial system.

3.6 Data Analysis Techniques

Data analysis was made in order to get a feel for the data collected and test the hypotheses developed for this research. In this research, multiple linear regressions are being used for test connection between independent and dependent variables. So that, this research will use SPSS system which is a software package that have been used for analyze the logical batched and non-batched statistical.

3.6.1 Test on stationary

3.6.1.1 Testing for missing value

Missing value in SPSS is focusing on numeric missing data. Missing value can be categorized in two which is system-missing values or user defined missing values. It is important to know the missing value because it can show the success of managing data in this research.

3.6.2 Test on assumption

3.6.2.1 Testing for serial correlation

Serial correlation is the similarity of a time series over successive time intervals. For this research to measure the serial correlation is using Durbin Watson test. The result from this test is in value between 0 and 4. A value near 2 indicates non-autocorrelation. Then, a value toward 0 indicates positive autocorrelation. Last but not least, a value toward 4 indicates negative autocorrelation.

3.6.2.2 Testing for linearity

Testing for linearity is to determine the relationship between independent and dependent variables either linear or not. If the value sig value is more than 0.05, the relationship between independent and variables are linearly dependent.

3.6.2.3 Testing for normality

The normality tests are used to discover either the data is normal distribute or not. There are two numerical measures of shape which is skewness and kurtosis. Skewness is to measure of the asymmetry of the probability distribution of a random variable about its mean. When the skewness is 0, it shown the data are perfectly symmetrical, even it is quite unlikely for real-world data. Then, the kurtosis is to measure any of the peaks of the probability distribution of a random variable. Kurtosis explains the height and sharpness of the central peak and relative to that of a standard bell curve.

3.6.2.4 Testing for multicollinearity

The function of multicollinearity test is to violate assumption that none of the independent variables have a linear relationship between them. This means that multicollinearity can be perfect or imperfect multicollinearity. To check on multicollinearity, VIF will be chose. The value for centered VIF values is use to identify if any serious multicollinearity problem.

3.6.3 Research Design

3.6.3.1 Descriptive Analysis

Descriptive analysis is summary of set of data collected, which can be as an entire population or a sample. It measures the variability of variables, including the standard deviation. The researcher utilizes the statistical technique in order to determine the data patterns in the forms of minimum, maximum, mean, and standard error of the data sets.

3.6.3.2 Correlation Analysis

Correlation analysis is a method of statistical evaluation to be used in study where to determine the strength of a relationship between two variables. To determine the correlation of the variable, Pearson analysis is needed in this research. The value +1.00 indicates perfect positive correlation between variables. Then, the value of 0.00 indicates no correlation. Lastly, the value -1.00 indicates that there is a perfect negative correlation. Therefore the closer the coefficient to either of

these numbers the stronger the correlation of the data it represents. Therefore, by this scale 0 indicates there is no correlation. So, the values closer to zero is weak correlation.

3.6.3.2 Regression Analysis

Regression analysis is to measure the level of which the independent variables influence the dependent variable. It is to examines the adjusted r-square, the significance level, standardized beta, as well as and t-values. The regression analysis deals with the statistical analysis that predicts the significance of independent variable on the dependent variable of a study. These statistics is useful in finding the independent variables jointly explain the dependent variable in the study and further indicate whether to reject or accept the hypotheses raised earlier.

3.7 An Econometrical Model (Equation)

The econometric framework is a statistical relationship between various variables. Thus, the equation for this research is;

$$\mathbf{Y = \beta_0 + \beta_1 CR + \beta_2 MR + \beta_3 OP + e}$$

Y = dependent variable which represent Capital Adequacy Ratio

β_0 = constant Beta value

β_1CR = coefficient value for Credit Risk

β_2MR = coefficient value for Market Risk

β_3OP = coefficient value for Operational Risk

e = Error term

3.8 Research Framework

Research framework is referring to the conceptual framework and theoretical framework. It is to provide the direction of research and ascertain the compliance to research questions and research objectives.

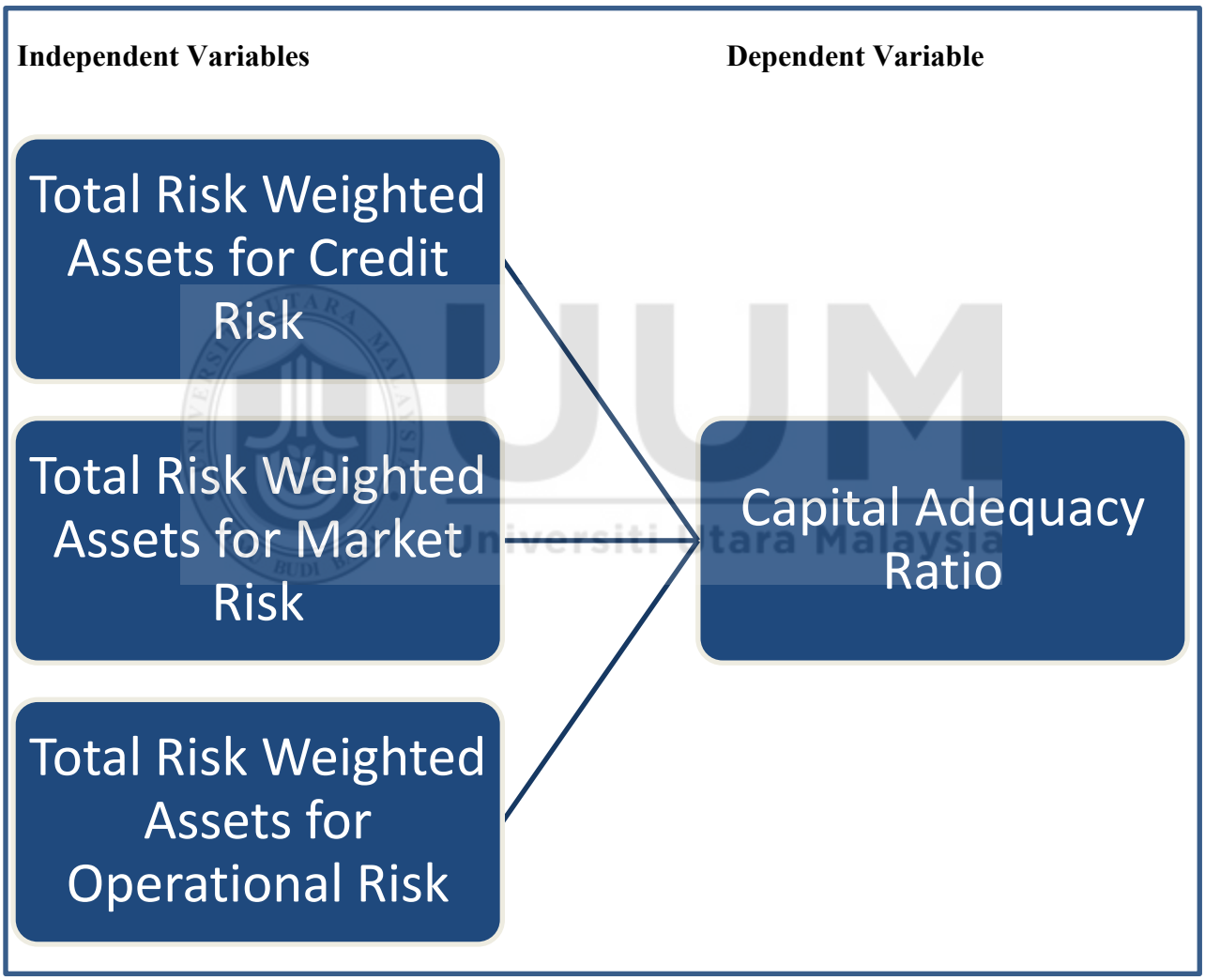

Figure 3.1

Research Framework

3.9 Hypotheses Development

A hypothesis is a logical conjecture statements of the relationship between two or more variables expresses in the form a testable statement, It is may carry clear implications for testing the stated relations. Hypothesis serves as tentative predictions on expected outcome based on existing knowledge, which are stated in such a way that could either accept or reject the probability of the hypothesis. By testing out the hypothesis, the researcher able to found the correct conjunction on problem encountered.

Based on research by Poudel (2012); he found the credit risk management gives an impact towards banks performance in Nepal. He used series data from year 2001 to 2011. Not only that, any empirical approach that is used to model the relationships between capital and credit risk also needs to take account of bank efficiency (Gorton and Winton, 1998). To be more efficient and effective, the government should regulate investment policy for banks. Thus, it wills more globally competitive (Williams, 2011).

Hence hypothesis for credit risk is;

H_1: There is a significant relationship between total risk weighted assets for credit risk and capital adequacy ratio.

Due to the changes in the value of the underlying components, it may effect toward the market condition in banking institutions. It is known as market risk (Hermsen, 2012). Market risk also is a part of the component in Basel II where it can compute the capital adequacy ratio.

Hence hypothesis for market risk is;

H_2: There is a significant relationship between total risk weighted assets for market risk and capital adequacy ratio.

Refer to Odunga (2016), where study has been done on Indian scheduled commercial banks; the operational efficiency is important in each of banking institutions. In their research, the global financial crisis is the key of the efficiency of operational.

Hence hypothesis for operational risk is;

H_3: There is a significant relationship between total risk weighted assets for operational risk and capital adequacy ratio.

Summary of hypothesis:

Table 3.2

Summary of hypothesis

Hypothesis	Relationship
H_1	There is a significant relationship between total risk weighted assets for credit risk and capital adequacy ratio.
H_2	There is a significant relationship between total risk weighted assets for market risk and capital adequacy ratio.
H_3	There is a significant relationship between total risk weighted assets for operational risk and capital adequacy ratio.

Chapter 4: Findings

4.1 Introduction

The fourth chapter discusses the data analysis of the study which was obtained from the findings and results of the study. Specifically, this chapter delineates the results of influential of credit risk, market risk and operational risk towards capital adequacy ratio in banking institution. A range of statistical tests were run in this study for analysis purposes, namely descriptive analysis, correlation analysis, and regression analysis along with the consistency of data assessment which was gathered in this study. The salient features discussed in this chapter are the data analysis and assessment of the research hypothesis. Data analysis refers to the processes and procedures involved in gathering and analyzing the empirical information collected, which the researcher may want to look into very closely to draw accurate conclusions by means of the findings.

4.2 Test of Stationary

4.2.1 Testing for missing value

Table 4.1

Statistic for Missing Value

		CREDIT RISK	MARKET RISK	OPERATIONAL RISK	CAPITAL ADEQUACY RATIO
N	Valid	80	80	80	80
	Missing	0	0	0	0

Test for missing value analysis caused by incomplete data. For this research, there is no missing data. Each of the variables indicates as '0' and all data is valid. If there any missing data, it may reduce the precision of calculated statistics. This is because there is less information than originally planned. Thus, the data is complete collected. It may reduce any complication of research and an inaccurate inference about the data. No missing value in this research because data is full provided by published report from each of banks.

4.3 Test of Assumptions

4.3.1 Testing for Serial Correlation

Table 4.2

Model Summary for Serial Correlation Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.432[a]	.187	.155	.0196993	1.732

a. Predictors: (Constant), OPERATIONAL RISK, MARKET RISK, CREDIT RISK

b. Dependent Variable: CAPITAL ADEQUACY RATIO

Table 4.3

Annova for Serial Correlation Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.007	3	.002	5.818	.001[b]
	Residual	.029	76	.000		
	Total	.036	79			

a. Dependent Variable: CAPITAL ADEQUACY RATIO

b. Predictors: (Constant), OPERATIONAL RISK, MARKET RISK, CREDIT RISK

The serial correlation by Durbin-Watson has shown 1.732. Based on rule of thumb is that test statistic values in the range of 1.5 to 2.5 are relatively normal. So that, the value is near 2 where indicated as non-auto correlation between the variables. The results as discussed in the foregoing clearly indicate that no presence of autocorrelation was detected in the regression analysis.

R squared is a statistic term to predict future outcomes or testing of hypothesis. This is to measure how significant in this research. The R squared explains the correlation between the observed and predicted values of dependent variable. Refer to the result, R square has shown 18.7% where is do not have goodness of fit for these variables because less than 75%. So, the independent variables not fully impacted to capital adequacy ratio. Besides that, it is also due to the data is small range. This is because no availability data more than 10 years for all banks. Most of the banks published their data 5 to 8 years only.

Then, the adjusted R squared is how the variable really able to influence the dependent variable in this research. When there is some variance in this research, then it will show how far an impact to each other's. On this research, the adjusted R squared is 15.6% influential independent variables. This is not high because the value of data is high variance between credit risk and market or operational risk. Besides that, the data is in small range due to availability of data.

ANOVA compares the variance between different groups with the variability within each of the groups. Refer to ANOVA table; the data is significant with 0.001 where less than 0.05. Thus, the model is fit between independent and dependent variables.

4.3.2 Testing for Linearity

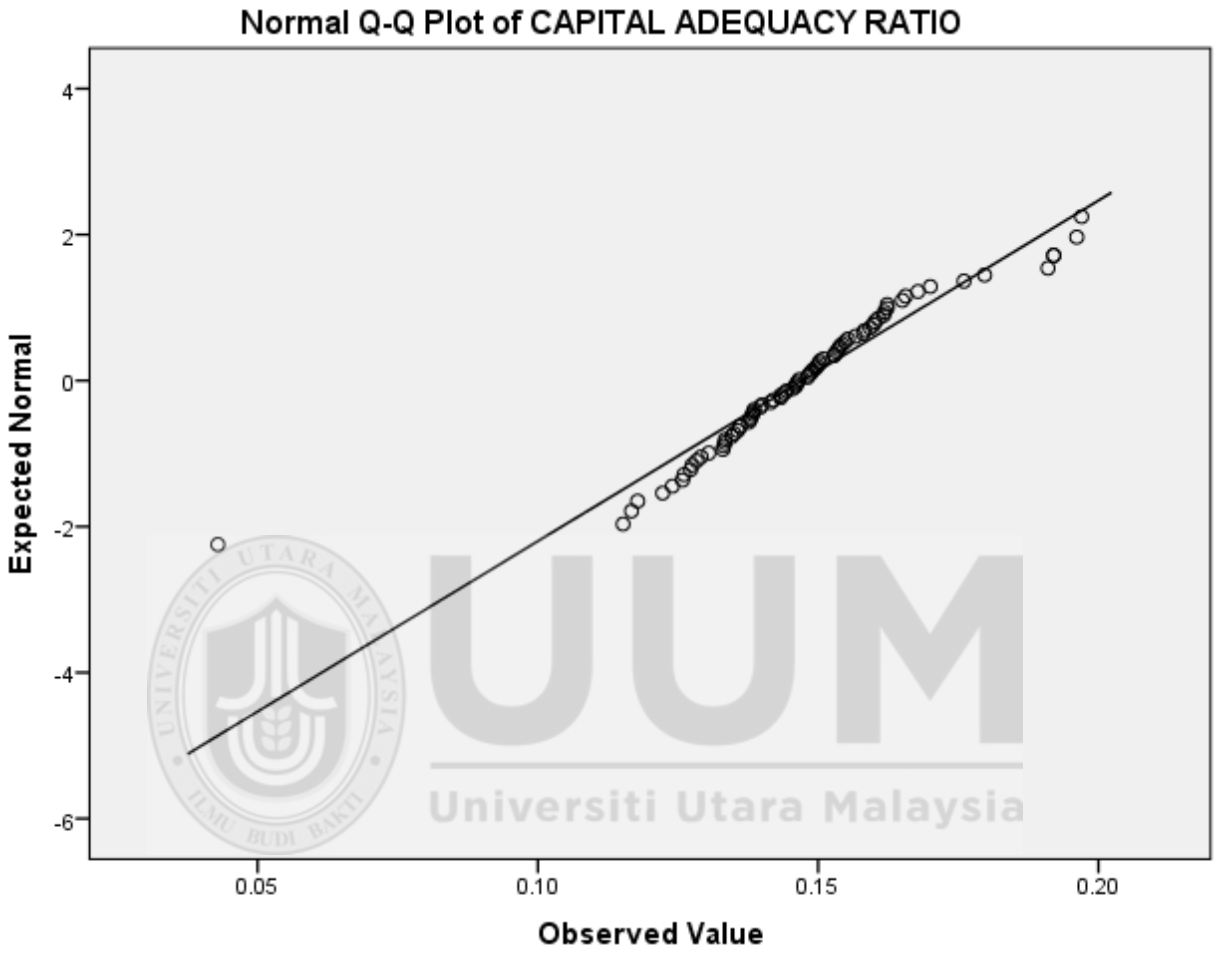

Figure 4.1

Q Plot for Linearity Test

Q-Q plot is to make the data collected is more useful diagnostics when the specified theoretical distribution will fits on a set of measurements. Indeed, Q-Q plot will be used to see the linearity of data. On the other hand, this kind of probability plots will help to estimate percentiles or probabilities on data collected. The scatterplot is where plotting two sets of quantiles against one another. If both sets of quantiles came from the same distribution, then the points scattered in Q- Q will be in straight line.

For normal distribution, the mean will come as 0. In general, the 0.5 quantile or 50th percentile; the mean will consider as 0. Refer to Figure 4.1, the scattered plot shows more than 50% above 0.10 in observed value. The Q-Q plot clearly showed, there is one extreme outlier where is below than 0.05 observed value. Based on this result, the relationship for capital adequacy ratio can be assumed as linear with the exception of one point at the beginning in scatterplot. Thus, the assumptions on the error terms are normally distributed.

4.3.3 Testing for Normality

Table 4.4

Summary of Normality Test

Variable	Skewness	Kurtosis
Capital Adequacy Ratio	-0.918	6.555
Credit Risk	0.865	-0.276
Market Risk (Log10)	-0.414	-0.912
Operational Risk	1.283	1.139

For normality test, credit risk and operational risk is normally distributed. The result for their skewness and kurtosis is less than 2. The skewness for risk weight of assets for credit risk and operational risk is 0.865 and 1.283 respectively. By then, risk weight of assets for credit risk is more perfectly symmetric distribution even both is normally distributed.

Refer to Table 4.4, it shown statistic on skewness and kurtosis for market risk is 2.552 and 8.014 respectively. It is more than 2. Thus, a risk weight asset for market is not normally distributed. Due to the event, risk weight of assets for market risk need to do some transformation for ensures the statistic value is less than 2.

The transformation process is done by arithmetic with Log 10 function in order to make this variable become as normal distribution. Result from the transformation, the statistic for skewness and kurtosis reduced where the standard error remain same 0.269 and 0.532 respectively. Thus, risk weight of assets for market risk become normally distributed after transformation by Log 10 where the skewness is -0.414 which in range between -2 to 2.

4.3.4 Testing for Multicollinearity

Table 4.5

Coefficients for Multicollinearity Test

Model		Collinearity Statistics	
		Tolerance	VIF
1	CREDIT RISK	.310	3.224
	MARKET RISK	.562	1.781
	OPERATIONAL RISK	.436	2.291

a. Dependent Variable: CAPITAL ADEQUACY RATIO

Multicollinearity violates assumption that none of the independent variables have a linear relationship. This means that multicollinearity can be perfect or imperfect multicollinearity. The threshold value for VIF should be less than 10 and tolerance value (1/VIF) should be higher than 0.10.

Thus, the results shown above indicate that there is no problem of multicollinearity among the variables involved in this study. So, the variables shown good regression model. Data between independent variables is not related to each other. Each of risk has their own purpose and calculation. In that, the decision making process regarding independent variables on dependent variable will be avoided.

4.4 Descriptive Statistics

Table 4.6

Statistic for Descriptive Analysis

		CREDIT RISK	MARKET RISK	OPERATIONAL RISK	CAPITAL ADEQUACY RATIO
N	Valid	80	80	80	80
	Missing	0	0	0	0
Mean		71345119.4000	3635944.2000	5815111.1130	.147129
Median		71345119.4000	2162334.0000	3890503.0000	.146515
Std. Deviation		57299219.64000	5099054.99900	5272031.33300	.0214257
Minimum		7359696.00	19663.00	.00	.0429
Maximum		222059505.00	27922999.00	21611245.00	.1970

It is defined as the process of analyzing statistical information in a meaningful pattern. A statistical technique may assist researchers to determine the data patterns in the form of minimum, maximum, mean and standard errors of the data sets. In this regard, Cruz (2013)

argued that descriptive analysis may help data analysts to accurately represent the samples involved and conclude the results in relation to the data patterns and other sub groups which may derive by means of analyzing the information.

In this study, descriptive analysis was carried out in order to summarize the gathered data sets. The data analysis notably contributed to the interpretation of the data findings. The results obtained from the descriptive analysis were reported in the form of minimum, maximum, mean and standard deviation.

Refer Table 4.6, the highest mean among the variable is credit risk with result RM 71,345,119.40. This is because credit risk is the main risk in the bank. As shown on previous chapter, the main focus in bank is lending. Thus, credit risk will be high. Compared to market and operational risk, credit risk is more significance in banking industry. The lowest standard deviation among the variable is market risk which is RM 5,099,054.99.

Maximum is the highest figure in time series on each of variables. Data for the credit risk is risk is the highest maximum compared to other maximum of variables with RM 222,059,505.00. Then, minimum is the lowest value in the time series for each of the variables. On this research, the variable that indicates the minimum among the variables is operational risk. The value of operational risk is 0. This is shows the minimum value among the years collected. This is because operational risk is no relevance on that year. It is the beginning year when to report the operational risk to central bank. The consistency reporting on the operational risk begins in year 2010 onwards.

4.5 Correlation Analysis

Table 4.7

Correlation for Correlation Analysis

		CREDIT RISK	MARKET RISK	OPERATIONAL RISK	CAPITAL ADEQUACY RATIO
CREDIT RISK	Pearson Correlation	1	.659**	.749**	-.020
	Sig. (2-tailed)		.000	.000	.863
	N	80	80	80	80
MARKET RISK	Pearson Correlation	.659**	1	.452**	-.159
	Sig. (2-tailed)	.000		.000	.160
	N	80	80	80	80
OPERATIONAL RISK	Pearson Correlation	.749**	.452**	1	.251*
	Sig. (2-tailed)	.000	.000		.025
	N	80	80	80	80
CAPITAL ADEQUACY	Pearson Correlation	-.020	-.159	.251*	1

RATIO	Sig. (2-tailed)	.863	.160	.025	
	N	80	80	80	80

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

In this study, the correlation analysis was administered among the variables shown credit risk and market risk have negative insignificant correlation with capital adequacy ratio where person correlation is -0.020 and -0.159 respectively. There is no statistically significant correlation between these variables. That means, increases or decreases in credit risk or market risk do not significantly relate to increases or decreases in credit adequacy ratio. The sig value has shown more than 0.05.

Meanwhile, the operational risk is the variable that have positive correlation but in weak correlation with 5% level of significant level. This means that changes in operational risk correlated with capital adequacy ratio. Any changes in operational risk will impact to capital adequacy ratio with significant of 0.025%.

4.6 Regression Analysis

Table 4.8

Model Summary for Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.432[a]	.187	.155	0196993

Table 4.9

ANOVA for Regression Analysis

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.007	3	.002	5.818	.001[b]
	Residual	.029	76	.000		
	Total	.036	79			

Table 4.10

Coefficients for Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	
		B	Std. Error	Beta		Sig.
1	(Constant)	.145	.004		40.431	.000
	CREDIT RISK	-1.180E-10	.000	-.316	-1.699	.093
	MARKET RISK	-9.012E-10	.000	-.214	-1.554	.124
	OPERATIONAL RISK	2.374E-9	.000	.584	3.730	.000

4.6.1 Discussion of the results

In relation to statistical analysis, the regression technique helps data analysts to evaluate the effect of the independent variable on the dependent variable of the study. The extracted information indicates that the regression analysis is analyzing the information in support of its influence on other variables. The regression analysis is statistical analyses that may help researchers predict the significance of independent variable on the dependent variable involved in studies.

Refer to Table 4.8, Adjusted R square shown 15.5% have influential by significant independent variables towards the changes capital adequacy ratio. The result also

impacted due to small range of data collection. Besides that, in banking industry; there are many factors lead the changes of the capital adequacy ratio such as paid-up share.

Indeed, Table 4.10: Coefficients for Regression Analysis indicates that total risk weighted assets for credit risk and total risk weighted assets for operational risk is significantly related to capital adequacy ratio. Meanwhile, total risk weighted assets for market risk is not significantly related to capital adequacy ratio.

The total risk weighted assets for credit risk is significant as shown in Table 4.10 but in negative relationship with CAR where β is -0.316 and t value is -1.699 at 10% significant level. According to Heydari and Abdoli, (2015); they found credit risk gives an impact to bank's performance. In that research, they highlighted bank's performance reflected from liquidity ratio and capital adequacy ratio.

In banking institution their main business is lending. Every lending transaction or process comes out with a risk. Thus, they need to aware the existence of risk in their business. If they overlook on the risk, it will ruin up their organization. The capital is needed to rollover their daily business. Thus, they must to ensure the availability of capital to back up on any emergency situation.

Besides that, the total risk weighted assets for operational risk is positively and significantly related with capital adequacy ratio. The β value is 0.584 and t value is 3.730 at 1% significant level. It shows that the higher operational risk will impact on higher capital adequacy ratio. This finding is contra to Odunga et al., (2013). In their research on the efficiency commercial banks in Kenya, operational risk does not gives an impact to operational risk. So those, the commercial bank in Kenya do not need to focus on operational risk to monitor their capability of capital in their banking institutions. The

difference of country also gives an impact towards the result. Based on this research where focus on commercial banks in Malaysia, the operational risk gives an impact to capital adequacy ratio.

The reason behind of the significances between operational risk and capital adequacy ratio is operational activities must in smooth condition where the smoothness come with capability of their capital to support the operation. The total risk weight for operational risk is figures from profit and loss where the actual amounts in business instead of using mark to market figures. Due to that, in this research we are able to find out the relevancy between operational risk and capital adequacy. The Basel Community found functional of risk weighted assets of operational risk in banking institution and included in Basel III where previously not involve in any calculation in Basel I and II.

Lastly, the total risk weighted assets for markets risk shows insignificant result with capital adequacy ratio. The β value is -0.214 and t value is -1.554, where the significant level is more than 10%.

4.11

Result on Hypothesis

Hypothesis	Result
H_1: There is a significant relationship between total risk weighted assets for credit risk and capital adequacy ratio.	Support the hypothesis.
H_2: There is a significant relationship between total risk weighted assets for market risk and capital adequacy ratio.	Failed to reject the null hypothesis.
H_3: There is a significant relationship between total risk weighted assets for operational risk and capital adequacy ratio.	Support the hypothesis.

Chapter 5: Discussion, Conclusions and Recommendations

5.1 Introduction

A capital guideline in each of the banks is to maintain an adequate level of capital to support business growth strategies under an acceptable risk framework and to meet regulatory requirements and market expectations. The capital requirement is to support business growth and the source of capital from financial performance. The bank regularly assesses its capital adequacy for the purpose of capital planning and management to ensure that the capital is at the level suitable for the prevailing business conditions. The bank recognizes that the operations of the bank could be affected by certain risk factors. The bank has continuously analyzed major risk factors which could affect its financial operations and reshaped its organizational structure and risk management processes. This is to ensure that its risk management system is in line with industry practices and is in accordance with the guidelines set out by BNM.

5.2 Conclusions

5.2.1 Objective 1: To analyze the significant relationship between total risk weighted assets for credit risk and capital adequacy ratio.

The credit risk is the risk comes from any failure or inability of borrowers to refund or perform their obligations with any financial institutions. Usually the obligation has been done by long period of contractual agreement. For example, the borrowers' failure to repay principal and interest as agreed with the bank.

From this research, there is a significant relationship between total risk weighted assets for credit risk and capital adequacy ratio. Refer Table 4.10: Coefficients for Regression Analysis, t value is -1.699 where the significant value at 10%. Even the total risk weighted assets for credit risk and capital adequacy ratio have negative relationship, but significant to each other's. If the total risk weighted assets for credit risk is high, the capital adequacy ratio is low. From that, the banking institution needs to monitor their funds for ensure there is no deficit occurs and avoid to any financial crucial. If public know, there is financial crucial occurs in the banking, they will feel unsecured to invest or do any transactions.

5.2.2 Objective 2: To analyze the significant relationship between total risk weighted assets for market risk and capital adequacy ratio.

In banking institution, they are also need to face market fluctuation and instability market condition. Thus, they need to aware of any market risk. It is any unfavorable causes on earnings or capital arising. This is occurs when there are changes in level of market rates or prices. In daily basis, all financial institution deal up with movement of prices such as interest rates, foreign exchange rates, commodity prices and equity prices.

Based on this research, there is no significant relationship between total risk weighted assets for market risk and capital adequacy ratio. Refer Table 4.10: Coefficients for Regression Analysis, t value is -1.554 with significant value is 12.4%. It clearly shows there is no significant between these two variables. In theoretical concept, market risk is a part of risk to be aware by financial institution. For this research, there is limitation data source where the availability data for limited year only. Besides that, this research focusing on Malaysian banking institutions only.

Besides that, refer to Ekinci (2016); the market risk consists of interest rate risk and foreign exchange (FX) rate risk. Thus, the fluctuations in the FX rates can affect the bank profits directly by changing the value of net foreign currency position. For market risk, it is more focusing on the changes of prices instead of capital adequacy ratio. So, there is probability market risk gives impact to CAR but very minimal especially in Malaysia condition.

5.2.3 Objective 3: To analyze the significant relationship between total risk weighted assets for operational risk and capital adequacy ratio.

Another risk to be covered in CAR calculation is operational risk. It is the risk of loss from failed or inadequate internal processes, people and systems, or from external events. This includes legal risks, but does not include strategic risks and reputational risks. The bank understands that good operational risk management is vital to sustainable business success in domestic and international. It is importance on effective operational risk management with sufficient coverage of all aspects of operations and is well-prepared to deal promptly with any unpredictable event.

Refer to SPSS result; there is significant relationship between total risk weighted assets for operational risk and capital adequacy ratio. Besides that, there is positive relationship between total risk weighted asset for operational risk and capital adequacy ratio. Refer Table 4.10: Coefficients for Regression Analysis, t value is 3.730 with significant value is 0%.

It clearly shown there is bank capital very sensitive to operational risk. Supported research done by Hussain & Shafi, (2014); in year 1980's, a global movement of bank capital adequacy started which culminated in recommending risk sensitive capital adequacy requirements for banks initially covering credit risk, later on market risk and finally operational risk as well. These three risks are believed to have systemic implications meaning to say that they have a capacity of disrupting the banking system as a whole which could create wider disturbances in a financial system.

5.3 Implications

5.3.1 Academic

The objective of the current research was addressed by the research is comprehensive review of literature; the suggestions have been presented for the new researchers to conduct their research. Those who are in academic sector, they are suggested to add on the literature review about Basel. This is to fill gap during conduct a research in education field where Basel information is still not enough. Most of the Basel information comes from the guidelines or published by central bank.

In term of academic purpose, the banking students' have to know important of Basel Accord in banking industry. This is because Basel is one of the tools to monitor the movement of the bank performance. Thus, academician should increase their awareness to help their students to explore on Basel Accord. The academician needs to encourage their students to conduct research to know the relationship between each of variables.

5.3.2 Industry players

The risk management plays a significant role in prescribing the risk management policy, reviewing the sufficiency of the risk management policy and system. This is defining the strategy for risk management and monitoring the bank's risk to an appropriate level in compliance with risk management policy in each of banks.

The objective of risk management is to manage the relevant risks within designated boundaries, in particular strengthening the quality of capital in accordance with the revised capital adequacy requirements under the Basel III guidelines. Due that, the banks must have great emphasis on continually improving its risk management processes. It is

to ensure that at all times its capital reserves are sufficient to support its operations and absorb potential losses from the risks it is taking. Knowing the effectiveness of the bank's risk management can be improved and further enhanced through improved market discipline

5.3.3 Policy makers

Policy or guidelines is needed to be updated time to time. It is because to match the current situation where is relevant to be applied. The changes of Basel Accord from the beginning where they noticed other risk also impact towards banks performance. The changes of Basel I and Basel II is additional of Operational risk and method for banks are required to use ratings from External Credit Rating Agencies. Then, they need to quantify the capital for credit risk based on rating given to each category.

For Malaysia, Bank Negara Malaysia needs to take in charge to monitor and revise the guidelines. For example: by 1st of February 2016, BNM reduce the statutory reserve requirement (SRR) ratio from 4.00% to 3.50%. This is to ensure sufficient liquidity in the domestic financial system. All this changes must relevant in current situation. The liquidity is needed in banking system for ensure the performance bank is in good condition.

5.4 Recommendations

The prime objective of this research was to analyze relationship of between risk weighted average and capital adequacy ratio. On the basis of results, certain recommendations have been made to researchers where they may help bank performance in future.

In future research, those who are interested to use this topic, they are suggested to add more variables. This is because to observe the relevancy each of the relationship between independent and dependent variables. The more variable will give better result and may be the akaike info criterion is good.

The next researcher is suggested to do research on other countries because to observe the pattern and relevancy of Capital Adequacy Ratio in that country. Each country may have different economic situation due to their country condition. So that, it is definitely reflect on banking's pattern.

Not only that, they are also can increase sample size to achieve accuracy of result. On this research, it focuses on local banks only with 8 years data. Large number of sample size, may able to give huge impact to regression results. The result will be more accurate. By then, the evaluation of capital adequacy ratio is more relevant.

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Appendix 1

Commercial Banks in Malaysia		
No.	**Name**	**Ownership**
1	Affin Bank Berhad	L
2	Alliance Bank Malaysia Berhad	L
3	AmBank (M) Berhad	L
4	BNP Paribas Malaysia Berhad	F
5	Bangkok Bank Berhad	F
6	Bank of America Malaysia Berhad	F
7	Bank of China (Malaysia) Berhad	F
8	Bank of Tokyo-Mitsubishi UFJ (Malaysia) Berhad	F
9	CIMB Bank Berhad	L
10	Citibank Berhad	F
11	Deutsche Bank (Malaysia) Berhad	F
12	HSBC Bank Malaysia Berhad	F

13	Hong Leong Bank Berhad	L
14	India International Bank (Malaysia) Berhad	F
15	Industrial and Commercial Bank of China (Malaysia) Berhad	F
16	J.P. Morgan Chase Bank Berhad	F
17	Malayan Banking Berhad	L
18	Mizuho Bank (Malaysia) Berhad	F
19	National Bank of Abu Dhabi Malaysia Berhad	F
20	OCBC Bank (Malaysia) Berhad	F
21	Public Bank Berhad	L
22	RHB Bank Berhad	L
23	Standard Chartered Bank Malaysia Berhad	F
24	Sumitomo Mitsui Banking Corporation Malaysia Berhad	F
25	The Bank of Nova Scotia Berhad	F
26	The Royal Bank of Scotland Berhad	F
27	United Overseas Bank (Malaysia) Bhd.	F

Islamic Banks in Malaysia		
No.	**Name**	**Ownership**
1	Affin Islamic Bank Berhad	L
2	Al Rajhi Banking & Investment Corporation (Malaysia) Berhad	F
3	Alliance Islamic Bank Berhad	L
4	AmBank Islamic Berhad	L
5	Asian Finance Bank Berhad	F
6	Bank Islam Malaysia Berhad	L
7	Bank Muamalat Malaysia Berhad	L
8	CIMB Islamic Bank Berhad	L
9	HSBC Amanah Malaysia Berhad	F
10	Hong Leong Islamic Bank Berhad	L
11	Kuwait Finance House (Malaysia) Berhad	F
12	Maybank Islamic Berhad	L
13	OCBC Al-Amin Bank Berhad	F

14	Public Islamic Bank Berhad	L
15	RHB Islamic Bank Berhad	L
16	Standard Chartered SaadiqBerhad	F

L is local bank

F is foreign bank