Determinants of Capital Adequacy Ratio and its Relationship with Risks in Islamic Banks- Case of QISMUT, Kuwait and Bahrain

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ABSTRACT

The study empirically investigates the relationship between the capital adequacy ratio (CAR) and different bank-specific instruments including risk and macroeconomic factors for the selected twenty-eight (28) Islamic banks which are active in Indonesia, Saudi Arabia, Malaysia, United Arab Emirates (UAE), Turkey, Kuwait, and Bahrain. Annual data from 2005 to 2014 is used. This study is the first of its kind to investigate if the CAR in Islamic banks is affected by these such factors mentioned above. The bank-specific control variables in this study are return on assets (ROA), return on equity (ROE), leverage, size, liquidity risk, and credit risk, while the macroeconomic control variables are market capitalization and stocks traded, exchange rate, gross domestic product (GDP), and inflation. In addition, we capture the impacts of the global financial crisis on Islamic banks. Firstly, we employ three methods which are fixed effects, random effects, and ordinary least squares. Then, we employ the Generalized Method of Moments (GMM) dynamic panel data estimator. We find that there are high and statistically significant relationships between the CAR and the bank-specific factors such as ROA, ROE, size, leverage, and credit risk; hence, increases in ROA, leverage, and credit risk of the Islamic banks will lead to increases in the CAR, whereas increases in ROE and size would lead to decline in the CAR. The liquidity risk has an insignificant positive relationship with the capital adequacy ratio. Furthermore, inflation, market capitalization, and exchange rate exert high and statistically significant effects on the CAR, which evidences that higher inflation would result in lower CAR, while an increase in market capitalization and exchange rate would positively contribute to the level of the CAR. On the other hand, GDP is negatively related with capital

adequacy ratio while stocks traded are positively related; however, both relationships are insignificant.

Finally, we run another model where “equity to assets” ratio is dependent variable with similar control variables; results reveal that, except for inflation and GDP, all the variables exert significant effects on the CAR and on the “equity to assets” ratio. In addition, we captured the effects of the global financial crisis (GFC) on Islamic banks and found that Islamic banks are affected by the GFC at high levels.

Keywords: Islamic banks, capital adequacy ratio, bank-specific factors, macroeconomic factors, dynamic panel data, financial crisis.

ÖZ

Bu çalışma, Endonezya, Suudi Arabistan, Malezya, Birleşik Arap Emirlikleri, Türkiye, Kuveyt ve Bahreyn'de faaliyet göstermekte olan 28 Islam Bankası için sermaye yeterlilik oranları (SYO) ile çeşitli banka enstümanları ile makroeconomik göstergeler arasındaki ilişkiyi irdelemeyi amaçlamaktadır. Bu sebeble, 2005 ve 2014 yılları arasını kapsayan yıllık veriler seçilmiştir. Bu vesile ile, bu çalışma ilgili alanda (Islam Bankacılığı) yapılmış ilk çalışma olacaktır. Bu çalışmada, bankalara ait kontrol değişkenleri, varlık getiri oranı (VGO), sermaye getiri oranı (SGO), kaldıraç, büyüklük, nakit riski, ve kredi riski şeklindedir. Diğer taraftan, makroekonomik kontrol değişkenleri ise piyasa sermaye oranı, işlem gören hisse senedi miktarı, döviz kurları, gayri safi yurtiçi hasıla (GSYIH), ve enflasyon şeklindedir. Ek olarak, global krizlerin de Islam Bankaları üzerinde olan etkisi de bu çalışmada tespit edilmiştir. İlk olarak, ekonometrik bağlamda 3 yöntem uygulanmıştır: sabit etki, serbest etki, ve en küçük kareler yöntemi. Bunun ardından, ikinci olarak, Genelleştirilmiş Momentler Yöntemi (GMM) panel very analizi olarak uygulanmıştır. Sonuçlar genel olarak, SYO ve VGO, SGO, büyüklük, kaldıraç ile kredi riskleri arasında anlamlı ilişkiler olduğu yönündedir. Şöyle ki, yukarda bahsi geçen değişkenlerdeki bir artış/azalış, SYO miktarlarında anlamlı artış/azalış değişimine (doğru orantılı ilişki) sebebiyet verecektir. Fakat, SGO ve büyüklük ile SYO arasında ters yönlü ilişkiler tespit edilmiştir. Bulgulara göre, likidite riskinin SYO üzerinde anlamlı bir etkiye sahip olmadığı görülmüştür. Son olarak, enflasyon, piyasa sermaye oranı,ve döviz kurlarının SYO üzerinde yüksek oranda anlamlı etkilerinin olduğu tespit edilmiştir. Şöyle ki, enflasyon oranında bir artış, daha küçük oranda SYO'ya sebebiyet verecektir. Diğer taraftan ise, daha yüksek piyasa sermayesi ile daha yüksek döviz

kurları, daha yüksek SYO miktarlarına sebebiyet verecektir. Fakat, GSYIH ile işlem gören hisse senedi hacmi, SYO ile anlamsız bir etkileşim içerisindedir.

Anahtar Kelimeler: Islam Bankaları, Sermaye Yeterlilik Oranı, Bankalara ait Faktörler, makroekonomik faktörler, dynamic panel veri, finansal kriz.

DEDICATION

To My Wife

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LIST OF ABBREVIATIONS

AAOIFI	Accounting and Auditing Organization for Islamic Financial Institutions
AMA	Advanced Measurement Approach
BCBS	Basel Committee on Banking Supervision
BIA	Basic Indicator Approach
BIS	Bank for International Settlements
CAMELS	Capital adequacy, Assets quality, Management, Earnings, Liquidity, and Sensitivity
CAR	Capital Adequacy Ratio
CCB	Capital Conservation Buffer
CET1	Common Equity Tier 1
CR	Credit Risk
ER	Exchange Rate
ETA	Equity To Assets Ratio
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
G10	Group of Ten
G20	Group of Twenty
IFSB	Islamic Financial Services Board
IIFS	Institutions Offering Islamic Financial Services
IM	Initial Margin
INF	Inflation
IOSCO	International Organization of Securities Commissions

IRB	Internal Ratings Based
LCR	Liquidity Coverage Ratio
LEV	Leverage
LR	Liquidity Risk
MC	Market Capitalization
NIM	Net Interest Margin
NSFR	Net Stable Funding Ratio
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
OTC	Over-The-Counter
PER	Profit Equalization Reserve
PSIA	Profit Sharing Investment Account
QISMUT	Qatar, Indonesia, Saudi Arabia, Malaysia, UAE, and Turkey
ROA	Return on Assets
ROE	Return on Equity
RWAs	Risk Weighted Assets
ST	Stock Traded
VIF	Variance Inflation Factor
VM	Variation Margin
UAE	United Arab Emirates

Chapter 1

INTRODUCTION

1.1 Research Background and Motivation

During the last decades, banks had significant developments in terms of innovating and discovering new financial instruments that meet the increasing needs of customers. This development has been slowed down by some financial crises, which led to not only a decline in the performance of many banks but also to the bankruptcy of some other banks. As a result, the institutions need to develop a system of control and protection mechanisms from financial crises in order to preserve their funds and funds of depositors. Developing such systems is important for the banks due to fact that each institution has a different structure than the other institutions, i.e. the small size of capital compared to the size of depositors' funds.

To maintain or secure the funds of these depositors from the risks of the banks' assets, the banks' capital should be sufficient enough. Trends in the adequacy of capital have faced several developments and international organizations have started to initiate universal standards in order to fight with such problems in the banking industry.

International organizations propose criteria for capital adequacy, but obligating to comply with such standards in the banks is by the regulatory and supervisory authorities of those banks, no matter whether they are Islamic or conventional. In

general, capital adequacy is the proportion of regulatory capital to risk-weighted assets, so that the higher the capital adequacy ratio is, more depositors have greater confidence in securing their money by banks; and achieving a higher capital adequacy ratio is either by raising regulatory capital or reducing risk.

On the other hand, Islamic banks were less vulnerable than conventional banks to the 2008 financial crisis. Therefore, there have been significant developments of the Islamic banking operations in the Qatar, Indonesia, Saudi Arabia, Malaysia, UAE, and Turkey (QISMUT) as well as Kuwait and Bahrain. These developments were either in the forms of (1) new Islamic banks or (2) transferring some conventional banks to Islamic banks, or (3) opening Islamic branches of conventional banks as well as Islamic banks which have already existed. In international markets, some international financial institutions also provide Islamic banking operations. For example, the British Islamic Bank has recently been established in London.

In spite of developments in Islamic banking, these institutions still face many challenges like competition and therefore they show efforts to develop their systems, use modern technological methods, and develop financial instruments to meet the growing needs of customers. Regulatory authorities provided different standards of solvency; however, the most important one is capital adequacy standard which was adopted by the Basel Committee in 1988 and applied by more than 100 countries. The practical application of that Basel I over the past few years has resulted in many weaknesses which lead Basel Committee to make some changes and finally propose a new standard of solvency measurement called Basel II. This standard was consistent with the nature of conventional banking, so Islamic Financial Services Board (IFSB), in collaboration with the Basel Committee, set

international standards to ensure the stability of the Islamic financial services sector, including banks and insurance. This standard has been adopted in December 2005 but it has been implemented after two years in 2007.

1.2 Problem of Study

The factors affecting the capital adequacy of banks are of interest for researches as the CAR is crucial for financial performance and growth of firms. The banks can improve their performances in terms of managing the capital of their institutions and all factors that affect the CAR such as market risk, liquidity risk, credit risk, capital risk, return on equity and return on assets, which will result in the maintenance of return on equity for risky assets, and to maintain bank hedging to deal with investment risk. This enhances the role of banks in their ability to meet their obligations on one hand and to maintain the funds of depositors and owners on the other hand. Therefore, the problems of the study are to answer the following questions:

First main question which focus on bank-specific variables can be:

Is there a statistically significant relationship between bank specific factors and capital adequacy ratio in Islamic banks?

From this question, we conclude several sub- questions that can be as following:

Is there a statistically significant relationship between liquidity risk and capital adequacy ratio in Islamic banks?

Is there a statistically significant relationship between credit risk and capital adequacy ratio in Islamic banks?

Is there a statistically significant relationship between return on assets and capital adequacy ratio in Islamic banks?

Is there a statistically significant relationship between return on equity and capital adequacy ratio in Islamic banks?

Is there a statistically significant relationship between leverage and capital adequacy ratio in Islamic banks?

Is there a statistically significant relationship between bank's size and capital adequacy ratio in Islamic banks?

The second main question which focus on macroeconomic factors is:

Is there a statistically significant relationship between macroeconomic aggregates and capital adequacy ratio in Islamic banks?

From this question, we conclude several sub- questions that can be as following:

Is there a statistically significant relationship between inflation and capital adequacy ratio in Islamic banks?

Is there a statistically significant relationship between market capitalization and capital adequacy ratio in Islamic banks?

Is there a statistically significant relationship between exchange rate and capital adequacy ratio in Islamic banks?

Is there a statistically significant relationship between stock traded and capital adequacy ratio in Islamic banks?

Is there a statistically significant relationship between GDP and capital adequacy ratio in Islamic banks?

1.3 Aim of Study

The importance of this study comes from an increasing interest by researchers and bank managers in achieving higher capital adequacy ratio, especially after the 2008 financial crisis, which resulted in the bankruptcy of many banks around the world.

Also, it is needed to know how the Islamic institutions (such as IFSB) followed the Basel III requirements.

On the other hand, there are limited studies in this area which have been done on Islamic banks of these countries (QISMUT, Kuwait and Bahrain). The results of this study are expected to help a number of parties, whether individuals or institutions, to maintain their investments and achieve the greatest possible returns. While for the depositors it is important to ensure that their deposits are returned on the one hand and the interest imposed on them on the other, the owners aim to maximize their capital and profits from these funds. Also, management of the banking institutions need to identify the indicators of success and failure that enable them to take measures for protecting from the risks of financial leverage. In addition, official institutions have benefits through preventive measurements to avoid financial crises affecting the national economy.

1.4 Objective of Study

The following objectives have been targeted in this study in parallel to discussions made above:

To highlight the trends in the capital adequacy and "equity to assets" ratio of Islamic banks;

To estimate the statistical relationships among the capital adequacy ratio, the bank specific factors, and macroeconomic aggregates;

To identify the effects of risks on the capital adequacy of Islamic banks in the QISMUT, Kuwait, and Bahrain during the period of 2005-2014.

1.5 Population and Sample of Study

The population of this study consists 39 Islamic banks listed in the stock markets of the countries under consideration for the period from 2005 to 2014. However, some banks were excluded due to the insufficient data during the study period. Those banks that were established after 2005 have also been excluded from this study. Thus, out of 28 banks, a sample of 22 of Islamic banks which operate in QISMUT, Kuwait and Bahrain have been selected in this study. Table 1 presents these banks which constitute 67% of the study population. The role of the 2008 financial crisis, which led to the bankruptcy of some banks with low capital adequacy, will be also examined in this study.

Table 1: List of Islamic Banks

1- Qatar International Islamic Bank.	15- Bank Syariah Mandiri.
2- Qatar Islamic Bank SAQ.	16- Bank Indonesia.
3- Masraf Al Rayan (Q.S.C.).	17- PT Bank Maybank Syariah Indonesia.
4- Bank Aljazira.	18- Bank Islam Malaysia Berhad.
5- Al Rajhi Bank.	19- Bank Muamalat Malaysia Berhad.
6- Bank AlBilad.	20- CIMB Islamic Bank Berhad.
7- Dubai Islamic Bank PJSC.	21- RHB Islamic Bank Berhad.
8- Abu Dhabi Islamic Bank - Public Joint Stock Co.	22- Kuwait Finance House (Malaysia) Berhad.
9- Sharjah Islamic Bank.	23- Bahrain Islamic Bank B.S.C.
10- Emirates Islamic Bank PJSC.	24-Albaraka Banking Group B.S.C.
11-Turkiye Finans Katilim Bankasi AS.	25- Kuwait International Bank.
12- Asya Katilim Bankasi AS-Bank.	26- Ahli United Bank KSC.
13- Kuwait Turkish Participation Bank.	27- Kuwait Finance House.
14- Albaraka Turk Katilim Bankasi AS.	28- Boubyan Bank KSCP.

1.6 Methodology and Contributions of Study

This study uses different panel estimation techniques that are employed in social sciences such as fixed effects, random effects, and pooled methods (ordinary least squares). Moreover, in order to check robustness of estimated results we have used the generalized method of moments (GMM) as a panel data estimator developed by Arellano and Bond (1991) which is popular among researchers due to several features: For example, dynamic panel regression accounts for the endogeneity between the variables and the error terms in the model and, can also tackle the presence of unobserved country and firm specific effects.

From the previous overview of literature, we realized that there were no previous researches investigating the determinants of CAR in Islamic banks constituting our sample. Thus, the purpose of our research is to examine the impact of bank-specific and macroeconomic factors on the CAR in the case of Islamic banks and also to examine the effects of 2008 financial crisis on the CAR levels.

The contributions of this study to existing literature can be also summarized as follow:

Firstly, the study provides the impact of both of bank-specific factors and macroeconomic aggregates as well as financial crisis on the capital adequacy ratio in the core markets of Islamic banks.

Secondly, the study investigates the effects of risks, such as credit and liquidity risks, on the capital adequacy ratio of the Islamic banks. It is worth of remembering that

there are several studies in the case of conventional banks which examined this relationship.

1.7 Structure of Study

In order to achieve the objectives of this study, the study is divided into five chapters: We started with the introduction as a first chapter, while in the second chapter, we tried to address an overview of capital adequacy. In the third chapter, we introduce methodology and research data, while in the fourth chapter, we discuss about the empirical results; and finally, in the last chapter, conclusion as well as recommendations for further studies are provided.

Chapter 2

AN OVERVIEW OF CAPITAL ADEQUACY RATIO

2.1 Introduction

In this chapter, we highlight the literature and theoretical works on the capital adequacy ratio (CAR). Bank’s capital is different from that of the other institutions, where the bank's capital is very important, not only for the large size of capital but also with the small size. The bank’s capital saves the depositor’s fund from any risks that may expose to it (Abba 2016). For the banks to be adequately capitalized, they need to address the role that capital of banks plays.

Shah (1996) refers that introduction of the 25 Principles of Basic Core for Banking by Basel Committee on Banking Supervision (BCBS) is a recognition by this committee that banking regulation harmonization could be accomplished if the capital adequacy standard rules were introduced. To identify the capital adequacy; firstly, we will address the bank's capital, regulation of bank capital, then the capital adequacy.

2.2 The Bank’s Capital

The Bank's capital is considered to be the most important element in the bank's internal sources of funds because of its functions when establishing the bank and during its activity. When the bank is established, it is the starting point of the Bank's life, and during its activity it is considered as a protection tool for depositors' funds, and other functions. However, when determining its structure, we

may find some difference in definitions. According to Rose and Hudgins (2008), and Abba (2016) the bank's capital is defined as the money owned by the shareholders, which represent paid in capital; reserves; and retained earnings. Paid in Capital is the money that the bank receives from the project's owners at the beginning of the date of this project, while reserves is the amounts deducted from profits, and the retained Earnings is an accumulated surplus from previous years that has been held and has not been distributed to shareholders for the purpose of financing or capital increase.

Another definition expresses bank's capital as a balance of its shareholders' funds. These funds are a proportion of the bank's assets which are due to the equity shareholders (Nwankwo 1991). According to Choudhry (2007), therefore, the bank capital is defined as long term funds, where the bank capital includes not only shareholders' fund but also long-term borrowings by shareholders or others, which is what the Basel I commitment showed. Basel I divided the bank's capital into two parts, (1) core capital and (2) supplementary capital. The core capital includes shareholders' equity, declared reserves, general and legal reserves and retained earnings while supplementary capital includes undisclosed reserves, revaluation reserves of assets, hybrid instruments, as well as subordinated terms debt (Thadden 2004).

Rose & Hudgins (2008) noticed that the capital structure of the bank is identified into two sides, the first one reflects the capital in terms of ownership; where any resource of the bank belongs to the shareholders reflect as capital. Another side reflects the capital in terms of duration, where the resources requested by the bank from shareholders or others were for long term, both at the beginning or during the

activity is considered as bank's capital. The BCBS has determined the bank's capital, which can be used to estimate the capital adequacy ratio, in addition to this it sets the conditions for the determined capital.

Bank capital is one factor that is usually used to confirm the safety of a given bank. In its simplest definition, it is basically the amount of assets (liquidity) that the bank has no official obligation to pay back to any entity. It is placed as a safe guard for the bank in cases of losses; may they be expected or not, the percentage placed for bank capital usually ensures that in the case of losses the bank has excess liquidity to pay back its depositors and/or creditors even if it means that the banks shareholders literally make no profit.

Baltensperger (2003) argued that the amount of capital held by a bank may vary from country to country due to the regulatory requirements of that country. The introduction of the Basel accords through Basel 1, 2 and 3 were implemented in order to prevent banks from going into debt and not being able to pay its depositors. Its importance was solidified during the financial crisis of 2008 whereas banks held a low percentage of bank capital and when the mortgage bubble bursts were unable to pay back their depositors. This led to a panic that not only affected the economy of the United States but literally affected the economies and banks all over the world showing how closely interlinked they are and that they need a governing body to place regulations of bank capital and requirement in order to avoid such incidents in the future.

In conclusion, the purpose of bank capital is mainly to protect banks by providing the followings:

1- Bank capital fulfills the duties of a saver when the bank faces cash flow problems;

2- It is a safety net for depositors and creditors if the bank ever closes;

3- It signals to investors that the greater the bank capital in any given bank automatically means that the banks do not operate in any risky investment but it also shows how the profit is lower due to lower risky investments usually yielding low returns;

4- Finally, governments impose regulations on banks to ensure that bad consequences that would affect the banks and the economy would be minimized.

2.3 The Regulation of Banks' Capital

Bank capital plays an important role in stabilizing the banking sector. Therefore, it deems it necessary that banks have to be regulated. Santos (2001) argued why bank capital should be regulated by providing the following three factors: (1) the ever-important role that bank capital plays in promoting banks; thus, ultimately it ensures financial stability; (2) bank capital provides the appeal of risk-taking incentives that banks cannot resist and end up undertaking; and finally, (3) bank capital plays a very important role in the corporate governance of banks and; therefore, it should be regulated. Rime (2001) suggests that regulatory pressures motivate banks to raise their capital; but these do not affect the risk level. Baltensperger (2003) argued that bank regulation is vital for financial stability and if banks are not regulated, there might be serious consequence. On the other hand, Baltensperger and Dermine (1987), in their study, demonstrated that capital regulation has become the main form of regulatory response which has been developed to counter the difficult practical issues that a 'bank's balance sheet structure' presents. Baltensperger and Dermine (1987) explore the following three features characterizing the bank's balance sheet

structure; (1) a source of 'financial fragility and the cause of regulatory concern'; (2) the issue of low cash to assets due to fractional reserve banking; and (3) excessive leverage activity resulting in low capital to assets ratio and finally the maturity mismatches that typically characterizes bank lending in contrast to its assets. Indeed, it's important for banks' capital to be regulated in order to fulfil its role and function efficiently (Fama 1980).

2.4 Bank's Capital Adequacy

Capital adequacy is one of the most important terms used in evaluating the performance of banks no matter if they are conventional or Islamic banks. The term of capital adequacy can be divided into two terms: (1) capital and (2) adequacy. After we have identified the capital in the previous section, adequacy means "state of being adequate or sufficient" for particular purpose.

As much as the bank capital is important, also the adequate capital for all banking operation is important; however, this importance cannot be overemphasized. Al-Sabbagh (2004) suggests that the importance of bank adequate capital is widely crucial, especially with global financial meltdowns where bailout measures now become employed by the authorities of regulatory to keep the solidity of financial system. Aspal & Dhawan (2016) and Abba (2016) noted that capital adequacy came the first in "CAMELS: where C stands for capital adequacy, A for assets quality, M for management, E for earnings, L for Liquidity, and S for sensitivity". Additionally, it is a key variable which is considered as important in the framework of Basel to ensure healthy banks. In general, the capital will be adequate if it reduces the future insolvency risk to several predetermined levels or if the amount of premium that is paid by banks to the insurers is fair (Abba 2016).

Baltensperger (2003) stated that the adequate capital can be referred as the fund quantum that banks should have or will maintain to conduct their business in a wise manner. According to Choudhry (2007), the capital adequacy is the ability of capital to pay off obligations and preserve the depositors' funds, as well as to maintain the relationship between the bank and its customers. The capital adequacy reflects as the capital that is sufficient and can meet risks, and leads to attracting deposits and profitability and growth of the bank (Koehn and Santomero, 1980).

From the previous discussions, we conclude that bank's capital adequacy is very important for many reasons such as the followings:

Capital adequacy is the safety valve that prevents banks from falling into financial crises;

Capital adequacy helps to achieve a balance between the risks that the bank expects to face and the capital size;

Capital adequacy is a confidence source for current and potential depositors.

For current depositors, the greater the capital adequacy, it will reassure them of their money with the bank. While for potential depositors, the greater the capital adequacy, it will encourage them to deposit their money in the bank.

2.4.1 Historical Development in the Calculation of CAR

In this section, we will discuss about trends in capital adequacy under the Basel III. The reason why we discuss the about historical development calculation is to see the importance of capital adequacy ratio itself, as well as to see if the banking industry can follow this development. As a banking regulation tool, the requirements of capital adequacy are old (Baltensperger and Dermine, 1987). The

first ratio fund to measure capital adequacy is the ratio of capital to total deposits, which is written as follows (Baltensperger and Dermine, 1987):

$$\frac{capital}{total\ deposits}\ 100\% \geq 10\%$$

This ratio reflects the Bank's ability to repay deposits from its own funds. Therefore, the higher this ratio is, the lower risk that the bank exposes will be, and vice versa. It can also reflect the bank's dependence on its capital as a source of funding. This ratio does not take the risk's source of the assets into consideration when depositors' funds invested and also ignoring the bank size during calculating the ratio.

In order to avoid these shortcomings, which have been widely used for about twenty-eight years from 1900 to 1930, the second capital adequacy ratio was introduced, which takes the source of assets risk into consideration; it can be calculated as follows (Bernanke 1981)

$$\frac{capital}{total\ assets}\ 100\% \geq 10\%$$

After a wide use of this ratio by the monetary authorities and bankers, they found that it did not take the risks associated with these assets into consideration. To solve this disadvantage, a third capital adequacy ratio was introduced in 1945, which takes the risks associated with the Bank's assets into account and is calculated as follows (Bernanke 1981)

$$\frac{capital}{total\ risky\ assets}\ 100\% \geq 10\%$$

This ratio reflects the capital contribution to risky assets, excluding non-risky assets, such as some of current assets, whether they are in the Central Bank or the Bank itself, and they are guaranteed loans by the Central Bank, as these assets are

not risky. After the wide use of this ratio, it is noted that it does not take the degree of different risk depending on different assets into account, because there are high risky assets and low risky assets (Mili et al., 2014).

In order to avoid the disadvantages of capital adequacy, a new capital adequacy ratio has been introduced, taking the degree of different risk depending on the different assets into account, where a certain degree of risk is identified for each type of assets and was adopted by the Basel Committee. This has been done for the development of a unified standard for the measurement of capital adequacy, which passed through several stages (Baltensperger 2003).

However, with the economic development and the development of banks' performance by expanding their banking activity through establishing branches in the other countries, an international agreement was required to establish a standard that would be acceptable to central banks. This is what happened with Basel in 1974 to establish the Basel committee (Charles 2011).

Finally, it is clear that capital adequacy is the most important criterion that measures the bank's ability to save the depositors' funds (Abdul Karim et al., 2013).

2.4.2 Capital Adequacy under Basel I

The capital adequacy before Basel Accord failed to protect banks from failure; it led to the rising of external debt of developing countries, the increasing proportion of doubtful debts, and the bankruptcy of HERSTATT Bank in western Germany (Baltensperger and Dermine, 1987). Baltensperger & Dermine (1987) and Goodhart (2011) noted that under the economic globalization, the American and European banks increased the spread of branches across the world and outside their countries

due to the strong competition of Japanese banks which caused to losses in the US and European banks.

Goodhart (2011) argued that the rise of banking risks has pushed the major industrial countries, especially the U.S and European ones, to the search for mechanisms and international agreements between the central banks in different countries to deal with such risks. For this reason, at the end of 1974, the Basel Committee was established by the 10 industrialized countries called G10, as result of a decision of the central bank governors of this group and under the Bank for International Settlements (BIS). Al-Sabbagh (2004) summarized the objectives of the Basel committee as the followings:

Maintaining the stability of the global banking system, especially after increasing the external debt dilemma in developing countries. This was due to the expansion of international banks, especially the US and European banks that have fallen into the debt problem in Latin America, Africa, and Asia and has weakened their financial position;

To eliminate the differences in the requirements of control over the bank's capital; this led to unfair competition among banks. The reason is that the Japanese banks were more superior in the global banking markets than the US banks and European banks, as Japanese banks were offering very low-profit margins and high-profit rates for shareholders due to lower capital. This prompted the Basel Committee to define a minimum capital adequacy for banks;

To create mechanisms adapted to banking developments, including legislation, regulations, and constraints that limit the expansion of banking across the world as banking technology expands;

To improve the technical methods to control the work of banks and facilitate the circulation of information about these methods among the various monetary authorities.

The BCBS has established a risk weighting system through the classification of countries using their risk. The first group of countries includes low-risk countries, which represented by the full member countries of the Organization for Economic Cooperation and Development (OECD), in addition to Saudi Arabia. The second group includes the high-risk countries from the rest of the world. On the other hand, the BCBS classifies the bank's assets according to its risk into five buckets of risk depending on the assets type even if the asset was an on-balance sheet or off-balance sheet.

Thus, under Basel I, the Committee has set a minimum capital ratio on risk weighted assets of 8%, and the equation was represented as follows (BCBS, 2004):

$$CAR = \frac{Capital\ (\ Tier\ 1 + Tier\ 2)}{Risk\ Weighted\ Assets}\ 100\% \geq 8\%$$

Tier 1 capital is the core capital of banks, and it consists of shareholders' equity and retained earnings. On the other hand, Tier 2 capital is the supplementary capital, and it includes revaluation reserves, hybrid capital instruments and subordinated term debts, general loan loss reserves, and undisclosed reserves. And, the denominator of the formula is credit risk.

In 1996, the BCBS made some amendments to the CAR to include market risk owing to increases in using the modern financial instruments that were highly affected by

the market value. These amendments are shown on the following formula to calculate CAR (BCBS, 1996)

$$\frac{Capital\ (Tier\ 1 + Tier\ 2 + Tier\ 3)}{Risk\ Weighted\ Assets + Market\ Risk\ Measurment\ \times 12.5}\ 100\% \geq 8\%$$

Where Tier 3 capital may include a greater number of subordinated issues, undisclosed reserves, and general loss reserves. Many banks hold Tier 3 capital in order to support their market and commodities' risks.

Market risk is represented by the market price fluctuations, such as interest rates, exchange rates, stock prices and good's prices (Adaoglu & Katircioglu, 2013; Berument & Dogan, 2011; Barisik & Tay, 2010; Agu, 2008). This committee allowed banks to choose between the regulatory set by the committee to measure the market risk and the bank's internal models that they set to face their market risk.

Allen (2003) showed that in order to protect the depositors' funds from these market risks, the committee has added subordinated debts to capital as tier 3, and they should have a maximum maturity of two years; not exceed 250% of Tier 1 capital of banks; should be allocated to cover market risk only, including foreign exchange risk; and the Tier 1 capital should be greater than or equal to Tier 2 and Tier 3.

As mentioned earlier, the reason behind the establishment of Basel I was to regulate the banking sector which was mainly due to the financial crisis that the developing countries faced. It has also been established if competitive advantage or unfair competition among the banks in Japan, Europe, and the United States were not eliminated. By that time, it was very obvious that an international regulatory system had to be established to unify the working activities of the banking sector. Also this

regulatory needed to achieve financial stability across the board. For this reason, the BCBS introduced the Basel I agreement in the year of 1988 (Al-Sabbagh 2004; Quansah 2014).

By studying and evaluating the Basel I agreement which intended to measure capital requirements in the banks, we conclude that the agreement has managed to reach some of its overall goals. This can be confirmed by how it managed to regulate the operational systems of the banks. It also worked on advancing and developing the technical procedures required for regulating banks. On the other hand, other factors had to be further studied due to the disadvantages of the agreement caused by not factoring other issues a bank might face such as liquidity and operational costs. It also fell short of its expectations because it did not manage to maintain an updated look at the advancements in the money market and banking sector. In addition to that, it did not take into consideration "how some developed countries were going through a period of economic and financial stress yet as they are grouped the same with countries having low risk exposure. Furthermore, countries from the developing world that were economically stable in groups of countries with high risk exposure have been also placed.

All these disadvantages that caused obstacles for Basel I as mentioned earlier made it fall short in reaching its proposed goals. This was because of developing and unifying a global standard that banks had to adhere with to reach an overall stable financial system and reducing competitive advantage among themselves. All those negative aspects in Basel I were proven during the Mexican financial crisis of 1994/95 and the Asian Pacific countries crisis in 1997/98. Due to those crises, it was clear that the Basel I agreement had to be reconsidered and/or amended in

order to ensure it reached to its original proposed goals. This was actually implemented in the year 1999 whereas Basel II was introduced as a substitute to the Basel I agreement (Abba 2016).

2.4.3 Capital Adequacy under Basel II

The criticism that Basel I faced and the disadvantages that emerged from its implementation in the banking sector such as during the crises of Mexico and Asian Pacific countries, and the emergence of new financial instruments and the overall technological and communication advancements forced the Basel committee to reexamine all aspects of the accord and change them accordingly (Quansah, 2014).

In the year 1999 the proposed changes were presented in a new form and named as Basel II. The new amended version was presented to various financial and economic institutions such as the World Bank. Basel II was amended several times to embody the proposals of these financial and economic institutions. By the year 2004 a final approved draft was formed which took into consideration all aspects of risk exposure that a bank might go through. It had three main pillars that it adhered too in order to calculate CAR and reduce risk; these pillars are shown in the following graph (Abba, 2016):

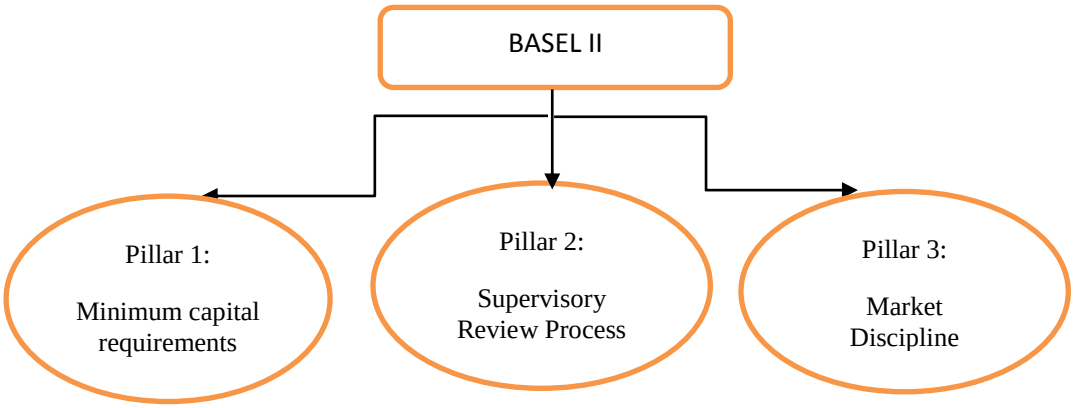

Figure 1: The Pillars of Basel II

The standard and level of capital adequacy is concentrated on implementing three pillars of Basel II which are as follows:

First Pillar (**Minimum Capital Requirements)**

The first pillar under Basel II encompasses minimum capital requirements. The Basel committee did not change the minimum capital requirements of banks which is 8% of risk weighted assets. The banks have to maintain a minimum required percentage to shield it from credit risk, operational risk, and market risk. Tier 2 capital is still limited to 100% of the first tier. Under pillar 1, Basel II includes the operational risk, and it introduces new alternatives and methods in calculating the weight of each risk factor (Quansah, 2014).

Second Pillar (**Supervisory Review Process)**

Al-Sabbagh (2004) noticed that the supervisory review process in Basel II did not merely focus on whether the level of capital adequacy was sufficient but also banks were advised to develop an internal capital assessment process and set targets for capital to commensurate with the bank's risk profile. The Supervisory authority is responsible for evaluating how well banks are assessing their capital adequacy. The Basel committee also placed four main principles for banks as the followings (BCBS, 2001)

Banks ought to have a process to assess their overall capital adequacy in relation to their risk profile and a proper strategy for keeping their capital levels stable;

Supervisors (usually the central bank of the specified country) should evaluate and review the internal capital adequacy of banks and periodically assess their strategies as well as their ability to ensure and monitor that they follow the proper capital ratios;

Supervisors should have the ability to ensure that banks hold a level of capital adequacy above the minimum requirements;

Supervisors should have the ability to intervene at any stage to ensure that the capital requirement does not fall below the specified percentage that would ensure that the banks does not face large exposures which might affect its operations.

Third Pillar (Market Discipline)

This pillar is considered to be the completion of the first pillar, which is the measurement of the minimum capital requirement and the second pillar which is a process of supervision and review. It aims to reinforce market discipline through enhanced disclosure by banks. It is an indirect approach that assumes sufficient competition within the banking sector. Williams (2005) noted that the aim of Pillar 3 is to allow market discipline to operate by requiring institutions to disclose details on the scope of application, capital, risk exposures, risk assessment processes, and the capital adequacy of the institution. It must be consistent with how the senior management (including the board) assesses and manages the risks of the institution.

2.4.4 Bank's Capital under Basel II

We discuss the regulatory capital within this title because regulatory capital characteristics under Basel II are the same with the regulatory capital features under the Basel Accord. The most notable change in Basel II was in capital adequacy ratio equation which was the replacement of the approach of crude risk weighting methodology under the capital accord with a more risks sensitive approach. Under the Basel accord, the BCBS has agreed that the capital is mostly consisted of paid up share capital and disclosed reserves; where capital components were available permanently in the situation of insolvency to fulfill banks' obligations towards their

shareholders and the other creditors (Basel Capital Accord 1988). The capital is divided by Basel Committee Accord into two tiers (BCBS 2004).

2.4.4.1 Tier 1 Core Capital

As under Basel I, the components and definition of capital do not change in Basel 2. However, under Basel II the instruments of innovative capital occupy the upper levels of Tier 1 capital, implying that the remaining components of this Tier under Basel II consists of shareholders' equity, i.e. paid-up ordinary and issued shares and common stocks that are naturally permanent; preference shares that are non-cumulative but perpetual and disclosed reserves. Furthermore, this is applicable to a composition of core capital for all banking group within Basel II (Quansah 2014). The incorporeal values such as goodwill should be excluded from the Tier 1 capital.

2.4.4.2 Tier 2 Supplementary Capital.

The supplementary capital is the fund that is considered to support the core capital and it consists of revaluation fund of fixed assets of bank, revaluation provisions of fixed assets for investments in the subsidiaries, general provision for the loans, provisions that held for expected losses and rise on securities' values (revaluation) fund, and subordinated debt (see Al-Sabbagh 2004; Bayram, 2007). Total supplementary capital should not exceed 100% of the total core capital, which reduces the reliance on the supplementary capital, and focuses on the core capital, which is 100% owned by the shareholders, including the bank's board of directors (BCBS, 2004; Al-Sabbagh 2004). The followings are short explanations of elements of supplementary capital

Undisclosed reserves: It consists of post-tax surplus which banks make from retained profit;

Revaluation Reserves: It might accrue following an immovable assets revaluation or fixed assets such as any bank premises. Revaluation of such type might be done just to reflect any fluctuations of the value for such asset and is reflected on a balance sheet;

General provisions for debt: Should not exceed 1.25% of weighted risk assets, so the banks do not rely on them as capital;

Hybrid capital instruments: It may apply to absorb any losses even if the bank continues to operate as a going concern;

Subordinated debt: Should not exceed 50% of the core capital, which makes it less powerful than the core capital in the protection of depositor funds.

2.5 Deductions from Capital under Basel II

Under Basel II, not only the intangible ones such as goodwill is subject to exclude from the capital components, but also there are other items to be deducted from the capital components. These items can classify under the following broad categories (Quansah 2014; Abba 2016):

1. Investments in securities owned by majority and other financial subsidiaries;
2. Investments by the banks in any insurance subsidiaries;
3. Significant investments owned by minority;
4. Significant investments in the commercial entities;
5. Investments in the unconsolidated entities.

2.6 Risks and Measurement under Basel II

The most significant change in Basel II is the introduction of the approach of risk-sensitive towards the measurement of risk. because of measure the risk is one of the most important item when concerning the capital adequacy ratio in banks, so we

study this approach of calculating all banks' risk exposure which is illustrated in the table below (Williams 2005; Abba 2016).

Table 2: Calculating the Risk Exposure of Banks

Risk Type	Credit Risk	Market Risk	Operational Risk
Calculation Method	Standard Method	Standard Method	Basic Indicator Approach (BIA)
	Internal Ratings Method (IRB)	Internal Model Approaches	Standard Approach
	Advanced IRB		Advanced Measurement Approach (AMA)

Source: Willem Yu, New Capital Accord Basel II, Vrije Universiteit, Amsterdam, 2005, p14.

2.6.1 Credit Risk under Basel II

The standard approach that is used to measure credit risk under Basel I was replaced with a new approach which provides better and robust results yet to measure risk. Quansah (2014) argues that, the reason behind this replacement is to ensure that the risk profile of any asset should be matched with capital charge that is calculated for a risk weighted of those particular assets.

The Basel committee proposed three mechanisms to compute credit risk which are as follows (Al-Sabbagh 2004)

The first one is Standard Method which is very similar to the approach used to calculate risk in Basel 1 in exception to the fact that this method relies on the input of rating agencies such as MOODY'S, STANDARD & POOR's and FITCH IBCA.

These companies would rate the overall institutions' risk exposure and include Governments, Banks, and Companies (Ghenimi et al., 2017);

The other mechanism is Internal Ratings Method (IRB) & Advanced IRB. Abba (2016) showed that the foundation approach is considered as an advanced method to compute risk in which banks evaluate their own risk by computing only the probability of default. On the other hand, when it comes to the advanced IRB, bank computes all risk components. After doing this the bank would be able to know how much to hold in reserves in the case of default so that it can maintain its operations.

2.6.2 Market Risk under Basel II

The Basel committee maintained the same calculation method in Basel II as it was in Basel I when it comes to market risk where they divided the types of risk into 4 categories: interest rate risk, currency exchange risk, stock price risk and commodities price risk. It also proposed introducing a third tier of capital to face market risk, which is subordinated debt. There are two methods used to measure this risk which are as followings (Quansah 2014):

Standard Method

According to this method, the market risk was divided into four main categories as mentioned above; through this method the minimum amount of capital requirement needed to offset defaults is calculated per the type of risk involved within a specified amount of time (Al-Sabbagh 2004).

Internal Ratings Method (IRB)

Al-Sabbagh (2004), Quansah (2014) and Abba (2016) argued that this method relies on the issue that bank prepares or computes its own risk assessment based on their operations. To do this, the bank should have own full-fledged assessment team that

works independently from the bank. The Basel committee also stressed that these assessment teams had to do so whilst abiding by the rules and regulations of the country that they are involved in.

2.6.3 Operational Risk under Basel II

Ghenimi et al., (2017) noticed that this type of risk usually occurs as a result of inadequate internal procedures or the lack of man power or proper systems. This type of risk can also occur due to external reasons such as political turmoil or natural disasters. The Basel committee adapts the following methods to face such risks:

Basic Indicator Approach (BIA): This approach is considered to be the simplest one in comparison to the other methods when it comes to calculating capital requirement to face operational risk. The BIA requires that the banks should maintain a percentage (α) which is usually equal to 15% of their average annual gross income over the previous periods (three years, not taking into consideration negative figures). The computation can be done by the following equation (Williams 2005).

$$KBIA = \frac{[\sum_{i=1}^{n}(gi \times \alpha)]}{n}$$

KBIA is the required amount of capital to face operational risk according to the basic indicator;

gi is the average annual gross income (three years, excepted the negative amounts);

n is the previous 3 years;

α = 15% which has been determined by the Basel committee through the basic indicator approach.

Standard Approach: This approach depends on dividing the banks' operations into 8 categories where each category is given a special Beta factor, which is no

less than 12% and no greater than 18% (BCBS, 2006). The table 3 shows the beta factor of each category following the standard approach.

Table 3: Categories of Banks Operations

Category	Beta Factor	Category	Beta Factor
Corporate finance	18%	Payment and settlement	18%
Trading and sales	18%	Agency services	15%
Retail banking	12%	Asset Management	12%
Commercial banking	15%	Retail Brokerage	12%

Source: BCBS, 2006.

Advanced Measurement Approach (AMA): Thumbi (2014) showed that the most sophisticated and complex option under Basel II is the AMA. This approach allows a bank to calculate its regulatory capital charge using internal models based on internal risk variables and profiles, but not on exposure proxies such as gross income. This is the only risk-sensitive approach for operational risk allowed and described in Basel II. The bank should use the appropriate method to measure the CAR depending on the following formula

$$\frac{Capital\ (\ Tier\ 1 + Tier\ 2 + Tier\ 3)}{Risk\ Weighted\ Assets + (Market\ Risk\ Measurment + Operational\ Risk\ Measurment\ ) \times 12.5} 100\% \geq 8\%$$

2.7 Main Differences between Basel I and Basel II

From previous illustration, we will explain the main difference between Basel I and Basel II as shown in the following table.

Table 4: The Main Different between Basel I & II

Basel I	Basel II
1. Concentrated solely on the requirements of minimum capital for banks.	1. It depended on three pillars which were, minimum capital requirement, supervisory reviews and market stability.
2. Was only implemented on banks.	2. Basel II was implemented on all banking and financial institutions in exception to investment banks and insurance companies.
3. It placed 8% as the minimum capital requirement to shield it from credit and market risk.	3. Basel II maintained the 8% as the minimum capital requirement but added the exposure of operational risk to the already existing credit and market risks.
4. Basel I used the standard method to calculate the level of risk	4. Basel II implemented the use of several methods to calculate exposure and risk.

Source: Author Own Words

2.8 Capital Adequacy under Basel III

After the 2008 financial crisis (mortgage crisis), the BCBS reconsidered its agreements by changing and/or amending its key policies which led to the initial formation of Basel III in December 2009. A final draft had then been presented at a meeting of the BCBS and the Federal Reserve Board of Governors in the headquarters of the Bank for International Settlements (BIS) in Basel city (Switzerland) on the 12th of December 2010 (Quansah 2014). It was later approved by all the concerned bodies in the meeting in Seoul (the capital of South Korea) on the 12th of November 2011. The new regulation of Basel which is based on a pillar 1

of previous agreement was expected to be adapted at the end of 2014 (Mili et, al.,2014). However, changes from April 1st in 2013 have been postponed to 31st of March 2018; thenafter, it was further extended to 31st of March 2019.

The following diagram shows that Basel III basically is a combination of amendments, changes and corrections to its previous predecessors Basel II (Hasan 2014).

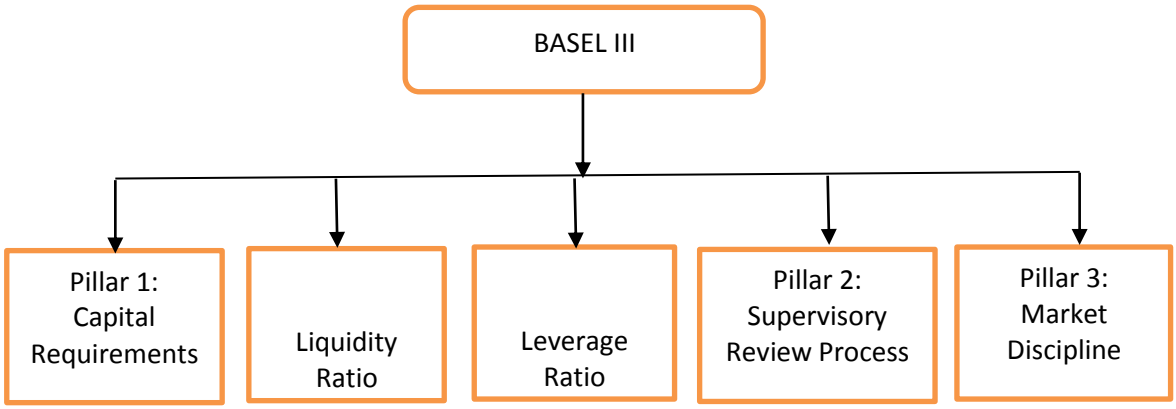

Figure 2: Framework of Basel III

The BCBS made sure in the third agreement that the three main pillars were significantly improved and further two pillars were developed which were the percent levels (%) of liquidity and leverage ratios that banks may or are exposed too.

2.8.1 Pillars of Basel III

2.8.1.1 First Pillar (Capital Requirements)

The BCBS improved the foundation and transparency of capital requirements to protect banks form various risks through the following mechanisms:

It narrowed the definition or concept of capital adequacy (requirement) to incorporate just two tiers; one being the core capital and the second being supplementary capital;

The original Basel III rule from 2010 required banks to fund themselves with 4.5% of common equity from the original 2% required in the Basel II agreement of RWAs. Since 2015, a minimum Common Equity Tier 1 ratio of 4.5% must be maintained at all times by the bank (Quansah 2014);

A mandatory Capital Conservation Buffer (CCB) should be 2.5% of RWAs. Considering the 4.5% Common Equity Tier 1 (CET1) capital ratio as required, banks need to maintain a total of 7% CET1 capital ratio, from 2019 onwards;

A "discretionary counter-cyclical buffer" allows national regulators to require up to an additional 2.5% of capital during periods of high credit growth. The level of this buffer ranges between 0% and 2.5% of RWA and must be met by the CET1 capital.

Table 5: Change of Capital Adequacy Ratio after 2013 (as Percentages)

	2013	2014	2015	2016	2017	2018	2019
Min CET1	3.5%	4%	4.5%	4.5%	4.5%	4.5%	4.5%
CCB	n/a	n/a	n/a	0.625	1.25	1.875	2.5
CET1 + CCB	3.5%	4%	4.5%	5.125	5.75	6.375	7
Deductions from CET1	n/a	20%	40%	60%	80%	100 %	100 %
Minimum Tier1 Capital	4.5%	5.5%	6%	6%	6%	6%	6%
Minimum Total Capital	8%	8%	8%	8%	8%	8%	8%
Minimum Total capital + CCB	8%	8%	8%	8.625 %	9.25 %	9.875 %	10.5 %

Source: https://www.bis.org/publ/bcbs189_dec2010.pdf

The increase in the percentage of capital occurred gradually starting from the year 2013 until the year 2019 as shown in the table above (BCBS, 2010).

Now when it comes to risk exposure, apart from the solutions of the Basel II accord covered, the Basel committee stressed that risks from debt associated with stocks, bonds and Repo's should also be covered; they did this by applying extra charges to such instruments which reduced its exposure to market fluctuations.

As argued by Quansah (2014), the Basel committee also stressed that banks and financial institutions should not tie their complete yearly activities and forecasts with the income they receive through their lending activities. This was proposed due to the fact that when the market is flourishing and expanding, the flow in banks is positive and investment in the other activities is at a rise. Yet if the market goes through a decline and/or a recession it would affect banks' inflows which would impact on the other investments negatively. The Basel committee also proposed that banks and financial institutions make reserves in their liquidity while the market is healthy to help them maintain a standard of growth in the times of declines or recessions. It also proposed reserves for loans that have a low probability of being paid so it does not affect the overall cash flows of the banks and financial institutions.

2.8.1.2 Leverage Ratio

The Basel committee introduced a new factor to reduce risk exposure which was the leverage ratio that is an international regulatory banking accord proposed by the BCBS in 2009. The ratio uses Tier 1 capital to evaluate how adequately leveraged a bank is when it comes to its overall assets. The higher the leverage ratio is, the greater is a chance that the bank can have through shocks in the market with being severely harmed. The banks were expected to maintain a leverage ratio no less than 3% under Basel III effective as of Jan. 1, 2018 (Ghenimi et al., 2017).

2.8.1.3 Liquidity Ratio

Francis & Osborne, (2010) showed that the financial crisis of 2008 uncovered a great problem when it comes to cash reserves which made the whole banking industry and the financial markets go through massive liquidity problems. Due to this problem, the Basel committee introduced a mechanism to calculate a percentage of liquidity that all institutions and banks should maintain in order for them to remain solvent during periods of decline and recession. It introduced two ways to calculate liquidity; one relying on short-term investments that do not exceed 30 days and the other was to calculate liquidity for long-term investments. The first one which was intended for short-term investments was the Liquidity Coverage Ratio (LCR). The LCR requires that banks should hold sufficient high-quality liquid assets to cover their total net cash outflows over 30 days while the other ratio which intended for long-term investments was the Net Stable Funding Ratio (NSFR). The NSFR requires that banks should hold an available amount of stable funding more than the required amount over one-year period during the decline or recessions (Quansah 2014). The standard requires that in the absence of financial stress situation, the value of the ratio should be no lower than 100%. Banks are expected to meet this requirement on an ongoing basis and hold a stock as a defense against the potential onset of liquidity stress (Francis & Osborne, 2010).

2.8.1.4 Second Pillar: Process of Revision and Review

As we have seen previously in Basel II, the process of review and supervision did not just rely on the factor of capital requirements to face exposure but was also intended to entice banks to advance technologically by implementing the best ways

to face such exposures and the introduction of Basel III further enforced this happening.

The Basel committee pointed out that Margin Calls would also be an issue and that a special unit should be introduced to calculate and implement margin calls. Since 1st September 2016, new Initial Margin (IM) and Variation Margin (VM) requirements for non-centrally cleared Over-The-Counter (OTC) derivatives have been introduced and applied to a number of jurisdictions globally (Abba 2016).

These margin rules originate from a global policy framework and timetable that were published by the Basel Committee on Banking Supervision and the International Organization of Securities Commissions (BCBS-IOSCO). They are a key part of the reform agenda put in place by the Group of Twenty (G20) as a response to the 2008 financial crisis and seek to reduce systemic risk in the non-centrally cleared OTC derivatives markets by ensuring that appropriate collateral is available to offset losses caused by the default of a counterparty (Quansah 2014).

2.8.1.5 Third Pillar: Market Stabilization (Discipline)

As we have seen previously in Basel II, this pillar aims to complement the minimum capital requirements and supervisory review process by developing a set of disclosure requirements. These requirements will not only allow the market participants to gauge the capital adequacy of an institution but also allow market discipline to operate by requiring institutions to disclose details on the scope of application, capital, risk exposures, risk assessment processes, and the capital adequacy of the institution (Thumbi 2014).

2.8.2 Evaluation of the Basel III Agreement

After we have theoretically presented Basel III and tried to concentrate on what was new in this agreement compared to Basel II, we can say that this agreement has received both positive and negative views from the financial institutions in the market. A large portion of the financial institutions have welcomed the new agreement while others feared that the new agreement might create more pressure on banks which will eventually lead those banks to give out fewer loans automatically impacting on the growth of that economy negatively.

A large percentage of all companies and businesses especially the medium to small ones rely heavily on loans and services provided by banks. As these loans and services decrease gradually, a large number of companies will either go out of business or will not start to begin with which will lead to unemployment because either the companies are downsizing or no new opportunities are being created.

On the other hand, people that are against the agreement see that the old regulations (which enforce that all banks hold only 2% of their overall capital as reserves) will make the banks venture into loans and investments that are of very high risk without having enough liquidity to cover them. In the case those loans or investments fail, this will expose the banks to massive liquidity problems and might even lead to bankruptcy which was proven in the financial crises of 2007 & 2008; during this period, large banks made very risky investments and those investments failed which nearly bankrupted those large banks if it was not intervened by the governments (Abba 2016).

We conclude from the two opinions mentioned above that some parties believe that this agreement will protect banks from collapsing in the case of a crisis or market decline. Whilst the other parties believe that this agreement will force banks to place billions of dollars in reserve while they should be giving out loans and investing it, especially in the current time period. We could say that these two opinions were clearly shown in how the developed countries tried to implement it, for example, the United States and Great Britain wanted to implement the agreement as fast as possible being in 2018 at the most, while Germany wanted to implement it by the year 2023 to ensure that their economy has recovered from the economic downturn and the financial crisis.

In this section, the importance of capital requirements (adequacy) and its vital importance in banks and their exposure to risk which lead to the establishment of an international organization (The BCBS) have been documented. The Basel Committee has introduced a global standard for the capital requirement in 1988 in Basel (Switzerland). It started by introducing the Basel I also in 1988 where it concentrated on the levels of credit risk only, the later amended it to incorporate market risk in the year of 1996. Nevertheless, Basel I could not meet the expectations of the market due to the several financial crises that occurred. The committee again amended the agreement by introducing Basel II in 1999; but it also was ineffective, which proved so through the financial crisis of 2008 (Mortgage Crisis) that affected a lot of major banks and insurance companies and led to the bankruptcy of some of them. With the experience gained from the Basel I and Basel II agreements, the committee reevaluated the rules by introducing Basel III in 2009. Finally, we would like to add that the agreements of Basel I and Basel II were affected by the crises especially during the last financial crisis of 2008. Yet, the

Islamic Banking system did not expose to these crashes like the other banks; why is that so? And how do the Islamic Banks manage their capital requirements and exposures?

2.9 CAR in Islamic Banks.

Islamic banking had a large improvement in the international arena due to an increased demand for their services especially after the 2008 financial crisis which made it a very strong competitor to the conventional banking system. Due to their different strategies in the banking system, Islamic banking would have a unique way of calculating capital adequacy ratio.

Actually, the capital requirement is one of the most important factors that can be used to protect the wealth of the depositors from the risks that the bank's assets are exposed to both Conventional and Islamic banks. Abusharba et al. (2013) and Errico & Farahbak, (1998) argued that the minimum requirement of capital in Islamic banks needed for risk coverage have to be higher compared to the conventional banks. The reason for that is the profit-loss sharing asset which is uncollateralized.

This section concentrates on the capital requirements in Islamic banks and on the attempts of international Islamic institutions to incorporate the Basel Accords with the structure of the Islamic banking system taking into consideration the regulations imposed on the Islamic banking systems. Islamic banks have several unique aspects to its system when comparing with the conventional banks; one of the most important differences between them is that Islamic banks do not deal with RIBA (interest). This means that Islamic banks have a system in which risk and/or exposure is actually shared between the bank and the depositors (Haron 2009). Hasan (2014) noticed that due to a fundamental difference between Islamic banks

and the other banks, some Islamic institutions tried to recommend special accords for capital requirements of Islamic banks. We will illustrate these recommendations through some points. The first point is Basel accords and Islamic banking; while second one is capital requirements of Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI); and the last one is capital requirements of Islamic Financial Services Board (IFSB).

2.9.1 Basel Accords and Islamic Banks

There is a difference in the way that Islamic banks define the assets and liabilities in comparison to conventional banks which results in a difference in defining the capital adequacy ratio. Due to that, Hasan (2014) recommended a different approach when it came to incorporating the Basel accords to Islamic banking.

After the introduction of the Basel I in 1988, some Islamic institutions and researchers tried to modify the Basel accords in order to comply with the Islamic banking system by recommending the following:

a) Minimum requirements of capital adequacy ratio: Abusharba et al. (2013), Haron (2009), and Errico & Farrahbaksh (1998) suggested that the CAR in Islamic banks should be higher than conventional banks; this was due to the fact that the different nature of assets in the Islamic banking leads to a higher risk of exposure such as the size of the percentage of risky assets to total assets is much higher in Islamic banks in comparison with conventional banks. On the other hand, there is a lack of a regulatory body for financial investments in Modaraba, because the Islamic law states that the owner of the capital (investor) has no right in interfering with the Modarib (banks) during the Modaraba (Waemustafa & Sukri, 2016).

Abusharba et al. (2013) have realized that the level of minimum requirements of capital adequacy is higher than those in conventional banks; but they argued that a solid percentage was hard to calculate due to the rules and regulations of each Islamic country. Therefore, they recommended that banks can calculate a different percentage according to their region or country.

b) Risk weighing factors: the assets in the Islamic banking system were divided into two main types which are Participatory modes and Sale modes. Each type had its own capital requirement percentage which is as follows (Archer & Abdel Karim, 2006)

In the case of the Participatory modes which are Mudaraba (equity finance), Musharakah and diminishing partnership had a capital requirement of 100% (Suryanto, 2015).

In the case of Sale modes which include Murabahah (cost plus an agreed amount of profit), Istisna (It is a sale transaction where commodity is transacted before it comes into existence), Salam (agreed advance payment for goods that will be supplied at a later date), Ijarah (Leasing) and goodwill loans are divided into two types. The first one has a capital requirement of 100% due to the fact that it has no collateral in case it fails, while the second one has a capital requirement of 50% because it is backed up by collateral such as real estate. The banks have right to increase the ratio if they realize that the risk would be more in any type of assets (Ghandour 2017; Haron, 2009).

Hasan (2014) noted that for the other regulatory rules proposed in the Basel accord, the Islamic banking system would just simply follow the same regulatory structure as the conventional banking system where there is no difference in the operations.

Ghandour (2017) recommended that the Islamic finance and banking should implement the IRB approach because it is the most applicable one for the Islamic banking system due to two reasons; the first one is that lending practices implemented in Islamic banks are different from those in the conventional ones that makes risk on assets also different (Yunus, 2016). This difference makes the approach in calculating the capital requirement more complicated due to the diverse types of investments in Islamic banking; while the second reason is that the IRB approach would advance the evaluation of risk in Islamic banks which will help in reducing risk and strengthen their stability and productivity.

Hasan (2014) argued that there is one problem facing Islamic banks when it comes to this approach, which is its ability to adapt it due to a high standard of information technology. The IRB approach relies on four aspects which are (1) the ability to calculate the probability of default, (2) the ability to forecast the losses from default, (3) the size of exposure of assets and other variables used, and finally (4) the maturity date of all investments. All these may not be able in most of the Islamic banks; because of that, the Islamic banks would initially try to implement the Basic Indicator Approach which relies on the external evaluation of their practices. This method would be used because initially, it is easier for Islamic banks until they have the know-how or availability in implementing the other approaches.

2.9.1.1 Islamic Banks and the Basel III Accords

Due to the 2008 financial crisis, many conventional banks had very high-levels of exposure to risk which made some of them go bankrupt. The Islamic banking system did not suffer severely compared to conventional banks; this was published by the finding of the company ERNEST & YOUNG aftermath of the crisis (World Islamic Banking Competitiveness Report 2012-2013). The main reason for the introduction of the Basel III accords was to shield those banks from such incidents and to protect them from the crisis. For this reason, the Islamic banking sector needs to implement the Basel III accords (Ghandour 2017).

The Basel III accord has some advantages for Islamic banks such as (Kennedy 2012; Ghandour 2017):

1- The Basel III accord aims to strengthen and shield banks from the level of exposure to risk by improving the type, structure, and transparency of the capital requirement pillar; this was done by increasing the minimum requirement for capital adequacy from 8% to 10.5% as illustrated previously. Islamic banks gain from this increase by strengthening its vulnerability to exposure, but this effect is minimal due to the advancements in Islamic banking and its ability to maintain a higher level of capital requirements than the one required; and this is illustrated in Figure 3 below;

2- One of the main additions to Basel III was the aspect of liquidity which was one of the main problems that the conventional banking system faced. Liquidity was introduced with two different types of percentages; one for short-run investments and the other for medium to long-term investments (LCR, NSFR). The Islamic

banking system was the one to gain from these percentages for the fact that previously Islamic banks had a problem of over liquidity;

3- The implementation of the Basel III accords in the regulatory and supervisory boards has been done by establishing reserves during the flourishing economic periods to help them maintain stability during economic declines or recessions;

4- The fact that the full implementation of the Basel III accords is not due until the year 2019 helps the Islamic banking system to establish a core structure table to adopt these accords;

5- Finally, the ability of Islamic banks to follow and implement the Basel III accords would give them a competitive advantage when it comes to credibility in the international arena.

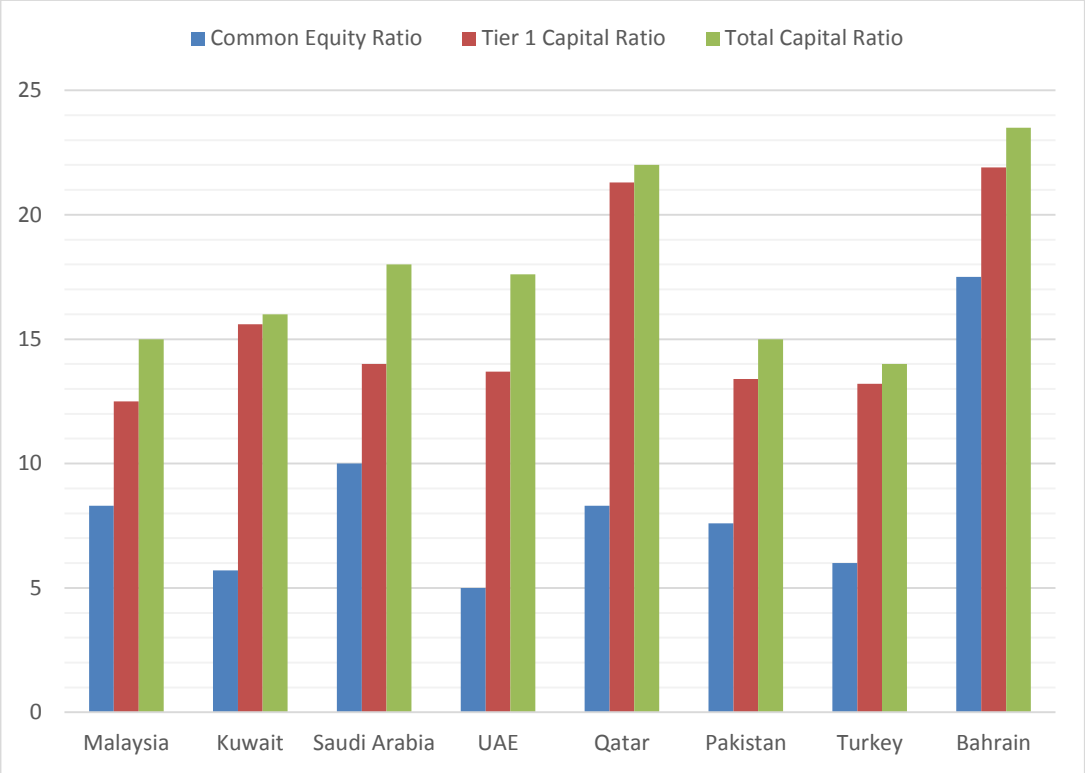

Figure 3: Level of CAR for Islamic Banks in Several Countries vs. Basel III (end of 2012)
Source: Islamic Financial Services Industry, Stability Report, 2013

Figure 3 shows the level of the CAR for Islamic Banks in several countries vs. Basel III at the end of 2012 (Islamic Financial Services Industry, Stability Report, 2013). The figure shows that Gulf countries have the highest CARs, especially, Bahrain and Qatar, followed by Saudi Arabia, UEA, and Kuwait. On the other hand, Turkey, Pakistan, and Malaysia have the lower CARs, but it is still more than the requirement of Basel III.

2.9.1.2 Challenges Facing Islamic Banks in Implementing Basel III.

The Basel III accords were introduced after the financial crisis of 2008 to save and protect the conventional banking system from any future crisis (Quansah 2014). Basel III was basically a set of amendments to its predecessor Basel II meaning that it was established by taking conventional banking into consideration, not Islamic banking which gave Islamic banking a few challenges such as (Harzi 2012; Haron 2009):

1. One recommendation of Basel III is to implement liquidity requirements into 2 types; one for short-term and another for medium to long-term investments. This recommendation will be a challenge for Islamic banks, because they have various types of investments, and they should divide them according to the liquidity percentage, but the Islamic banks do not have instruments that can be converted to liquid assets in a fast manner or in a less risky fashion;
2. The NSFR aspect would affect the lending activities of conventional banks, whilst in the Islamic banking system it will affect the financing abilities substantially;
3. A decline in the Islamic bank profitability is due to the fact that it holds an excess in reserves to use in the time of economic recession and or decline;

4. The introduction of Basel III in the Islamic banking system will increase the amount of unused liquid assets, which will automatically affect the operations and profitability of the banks in a negative way.

Finally, from our realizing of the challenges that the Islamic banks will face when implementing the Basel III accords, it becomes clear that the advantages and opportunities that the Islamic banking sector will gain from them are far greater than the disadvantages. The greatest challenge that the Islamic banking system will face is the ability to integrate the Basel III accords with the Islamic laws of finance in the banking system and that's what the IFSB worked on doing by adding a few amendments to the accords in the year 2005.

2.9.2 Capital Requirements of AAOIFI in 1999.

Brief on AAOIFI

Accounting and Auditing Organization for Islamic Financial Institutions is known as being a non-profit organization; its aim is to advance the way that accounting and auditing are implemented in the Islamic financial institutions through training, seminars, press releases, research and other mediums. It is also responsible for the preparation, interpretation, revision, amending and publishing standards of accounting and auditing for the Islamic financial institutions according to the Islamic law. The establishment of the authority came into place with the agreement of several Islamic institutions on the 26th of February 1990 in Algeria and was officially registered on the 27th of March 1991 in Bahrain (Haron 2009).

Standard of Capital Adequacy Issued by the AAOIFI in 1999

In the year 1999, the AAOIFI published a statement on the purpose of the CAR in Islamic banking and how to calculate it according to the Basel I accord, whereas it

believes that the CAR of the banks is basically its capital over risk-weighted assets which is illustrated in the following equation (Ghandour 2017)

$$capital\ adequacy\ ratio = \frac{bank's\ capital}{risk\ weighted\ assets}$$

From the equation, we can state that the bank's capital can be split into two types; the first being the permanent capital of the bank with its reserves but not including the re-evaluated reserves and the reserves for risk, profit, and investment levels. The second consists of the re-evaluating reserves, profit loss reserves and the reserves from investment risk, taking into consideration that when these levels are added up they should not exceed 50% of the first aspect.

After taking all these considerations we realize that a lot of these aspects resemble the accords of Basel I more than Basel II in exception to the elements of interest from the original capital invested, with new additions and that's what makes the AAOIFI a pioneer in placing a level of capital adequacy in Islamic banking; this was not taken nicely by Islamic banks due to the fact that it went far beyond the requirements recommended (Hasan 2014).

2.9.3 Capital Requirements of IFSB

IFSB was established in November 2002, and it worked effortlessly in establishing a standard that would absorb the specific attributes of the Islamic banking system and its natural risk exposure whilst trying to maintain the standards put forward by Basel II & III which are illustrated as follows (Hasan 2014)

I) Standard of Capital Adequacy According to the IFSB (IFSB-02): The board of financial Islamic services issued a document in 2005, which is a standard of capital adequacy for institutions that provide Islamic financial services in exception to insurance institutes. This document is primarily a set of recommendations based on

the Basel II accord and the amendments are that of the Basel I accord in 1996 (Abusharba et al., 2013) while taking into consideration the way Islamic banking system operates in order to find the percentage of capital requirements that is capital to risk-weighted assets. The capital is measured as presented by AAOIFI in 1999.

For the measurement of Risk; the IFSB determined that Islamic banks mainly go through three types of risks which are credit risk, market risk, and operational risk. A recommendation to calculate the percentage of capital adequacy was proposed for each type of risk (IFSB Stability Report, 2013).

Ghenimi et al. (2017) noticed that the first type of risk is credit risk, which would take the form of settlement /payment risk that arises when one party in a specific deal has to pay upfront first (e.g. in a Salam or Istishna' contract) or delivers assets (e.g. in a Murabahah contract) before receiving its own assets or cash; thereby, exposing it to a potential loss. In the case of profit-sharing modes of financing, the credit risk will be a non-payment of the share of the bank by the entrepreneur when it is due. This problem may arise for banks due to the asymmetric information problem in which they do not have sufficient information on the actual profit of a specific firm. As Murabahah contracts are trading contracts (Suryanto, 2015; Kia, 2014; Cavalier, 2013), credit risk arises in the form of counterparty risk due to the non-compliance of a trading partner, the non-compliance can be due to external sources (Ghandour 2017).

The second type is market risk; as Islamic banks do not deal with interest rate; it may appear that they do not have market risks arising from changes in the interest rate. Changes in the market interest rate, however, introduce some risks in the

earnings of Islamic financial institutions (Abusharba et al., 2013). Financial institutions use a benchmark rate to price different financial instruments. Specifically, in Murabahah contracts the mark-up is determined by adding the risk premium to the benchmark rate (usually the LIBOR). The nature of fixed income assets is such that the mark-up is fixed for the duration of the contract. As such if the benchmark rate changes, the mark-up rates on these fixed income contracts cannot be adjusted. As a result, Islamic banks face risks arising from fluctuations in market interest rate (Sujianto & Effendi, 2016; Abusharba et al., 2013).

The last type of risk is operational risk; given the newness of Islamic banks, operational risk in terms of personal risk can be acute in these institutions. Operational risk in this respect particularly arises as the banks may not have enough qualified professionals (capacity and capability) to conduct the Islamic financial operations (Ghandour 2017; Amilin, 2016). Given the different nature of business, the computer software available in the market for conventional banks may not be appropriate for Islamic banks. This gives rise to system risks of developing and using informational technologies in Islamic banks (World Islamic Banking Competitiveness Report 2012-2013).

After measuring all these types of risks, the assets funded by the profit sharing investment account (PSIA) is deducted from over requirement, where the credit risk and market risk of these assets are borne by investors. In practice, banks as Modarib may give up their right of profit to give the investors a higher rate of return on their money in order for the bank to stay more competitive. The reason behind that is to reduce the percentage of shareholders' profits, or treat as binding by supervisory authorities as a precautionary measure. Banks do this to secure

investors by determining a percentage of assets financed by unrestricted Profit Sharing Investment Account (PSIA) symbolized by the symbol ∝ added to the denominator of CAR; as shown in the standard equation and supervisory discretion equation as follows (IFSB, 2005; Harzi 2012)

1. Standard Equation that is used to calculate the CAR as the following equation

$$CAR = \frac{eligible\ capital}{\left\{\begin{array}{c} total\ of\ RWA(credit + market\ risks) + operational\ risks \\ - \\ RWA\ funded\ by\ PSIA(credit + market\ risks) \end{array}\right\}}$$

2. Supervisory Discretion Equation

The numerator of this equation exactly is the same as previous one while the denominator is more expanded as it clears from the following equation

$$CAR = \frac{eligible\ capital}{\left\{\begin{array}{c} total\ RWA(credit\ risk + market\ risk) + operational\ risks \\ - \\ RWA\ financed\ by\ restricted\ PSIA(credit\ risk + market\ risk) \\ - \\ (1-\alpha)[RWA\ financed\ by\ unrestricted\ PSIA(credit\ risk + market\ risk)] \\ - \\ \alpha[RWA\ financed\ by\ IRR\ and\ PER\ of\ unrestricted\ PSIA(credit\ risk + market\ risk)] \end{array}\right\}}$$

Where the total risk-weighted assets include the assets that are financed by restricted and unrestricted PSIA, the formula takes into account both on-balance and off-balance sheet exposure for credit risk and market risk. Harzi (2012) argued that as the funds of Islamic banks are combined, the risk-weighted assets that are funded by profit sharing investment accounts are computed based on its pro rata share for relevant assets. The balance of PSIA includes Profit Equalization Reserve (PER) and equivalent reserve or investment risk reserves (IRR), where PER has the effect of reducing any displaced commercial risk and IRR has the effect of reducing potential future losses within the investment that are funded by PSIA. The value ∝ is to indicate the percentage of assets financed by unrestricted profit sharing

investment accounts that are specified by the supervisory authorities. Supervisory authorities would estimate the value of α depending on each case.

The IFSB recommended that the banks should start the application of the capital adequacy standard in 2007, it gave the supervisory authority the right to apply any equation. This standard has been applied by many Islamic banks. However, with the developments of the economic reality this standard became exhausted, especially after the financial crisis of 2008, as the Basel committee moved from Basel II to Basel III, in 2013, also in December 2013, IFSB issued a new standard (Standard No. 15) which is revised standard for capital adequacy (Harzi, 2012).

II) IFSB's Revised Standard for Capital Adequacy (IFSB-15): On the 1st of November 2012 the IFSB prepared a draft for a revised standard to capital adequacy for institutions that provide Islamic financial services in exception to Islamic insurance companies. By December 2013 the IFSB released the final draft for revised capital adequacy that would also adhere to the standards of Basel III (IFSB Stability Report, 2013).

The actual content of the new draft did not vary widely from the old one in exception to amended elements concerning the types of risk may it be credit, market or operational, it also supports the leverage ratio, in this section; we will illustrate the most important elements of CAR and its main changes from the old draft.

Eligible Capital: The new standard for capital adequacy gave detailed information on factors for capital which were divided into two tiers; the first tier including common equity tier 1 and additional capital tier 1, while the second one included supplementary capital.

First Tier: Common Equity Tier 1 and Additional Capital Tier 1

The common equity is the best form of capital to secure depositor's fund in Islamic banks which consists of common shares that are issued by IIFS, share premium (stock surplus), retained earnings, other reserves that are disclosed, comprehensive income which includes the interim profit (loss), and common shares that are issued by consolidated subsidiary in IIFS with less regulatory adjustment and deductions which is applicable to common equity tier 1 (Hasan 2014; Harzi 2012).

Additional capital is the element that has the capacity to absorb losses, which consist of instruments issued via IIFS such as Musharaka Sukuk, any premium received as a result of the issuance of these instruments that are not included to tier 1 common equity, and add the capital instruments to this issued via consolidated subsidiaries, less regulatory adjustment and deductions which are applicable to tier 1 additional capital (Quansah 2014).

Second Tier: Supplementary Capital

The tier 2 capital consists of instruments issued via IIFS, such as agency and Mudaraba Sukuk, which can be converted into equity under specific conditions of the contract; this tier also include premiums paid on the issue of instruments of tier 2 capital, general reserves or provisions held for future losses adding qualifying instruments, capital issued via consolidated subsidiaries for IIFS, less from that regulatory adjustment and deductions which are applicable to tier 2 capital (Ghenimi et al., 2017).

The Basel committee prepared initial deadlines that would allow capital requirements to reach the desired stage and that is illustrated in the table below (IFSB Stability Report, 2013).

Table 6: Time Line for Adoption of Capital Requirements According to IFSB-15

Date of implementation	Percentage %	Leverage ratio
01 January 2015	4.5%	Minimum Common Equity Capital Ratio
01 January 2015	6%	Minimum Tier 1 Capital
01 January 2014	8%	Minimum total capital

Source: IFSB Stability Report, 2013.

Conservation Buffer of Capital

This is a newly added element to the existing standard which is a fixed percentage of 2.5% of the total Tier 1 capital. The purpose of the conservation buffer is the ability to absorb losses during periods of financial and economic difficulties; this surplus is usually gained during peak financial and economic cycles.

For the conservation buffer, the IFSB recommended a timeline that would eventually lead to the final 2.5% needed; this timeline is illustrated in the table below (IFSB, 2013).

Table 7: Time Line for Reaching Designated 2.5% for the Conservation Buffer

Date	Required percentage of conservation buffer
01 January 2016	0.625%
01 January 2017	1.25%
01 January 2018	1.875%
01 January 2019	2.5%

Source: IFSB Stability Report, 2013.

In conclusion, we find that by the 1st of January 2019 a total of the capital requirements plus the conservation buffer will reach 10.5%.

Measuring Risk: the process of measuring risk did not change completely from the previous standard when it came to specifying the types of risk that Islamic financial institutions may face; these risks are mainly divided into 3 categories which are credit, market and operational risks. A system was recommended to calculate each type of risk to each type of financial instrument of Islamic banking, so it may decrease the overall exposure to Islamic banks (Harzi, 2012).

Quansah (2014) argued that after measuring and calculating these risks, the funds from investment accounts which are based on profit and loss for both the bank and the investor (Mudaraba & Musharaka) are deducted; this is because the investors carry the risk of loss and/or profit like the bank does. It should be added with a lot of cases the actual Islamic bank waives its right to its share of the profit in order to satisfy the investor. This is done so that the bank can stay competitive but it leads to a decline in the profitability of the shareholders of the bank (Katircioglu et al., 2018).

Leverage Ratio: The financial crisis of 2007/08 exposed the disastrous effects of the leverage and the economy where it became clear that individual banks would inflate their leverage in order to increase their amount of investment and lending. Due to that, the IFSB placed a limit to debt through regulating the percentage of the leverage ratio on banks which limited their abilities in lending and direct investment, the equation used to calculate the leverage ratio is as follows (Hasan 2014)

$$Leverage\ Ratio = \frac{Tier\ 1\ Capital}{Total\ Exposure} \geq 3\%$$

Tier 1 Capital: we illustrated previously how Tier1 is calculated which usually consists of common equity and additional Tier1 capital;

Total Exposure: the sum of total exposure usually consists of (1) All on-balance sheet assets minus all on balance sheet derivatives and securities; (2) Derivatives exposure which include credit risk; (3) Securities financing transaction exposure which is a combination of the bank acting as a principle and where the bank acts as an agent; (4) Other off-balance sheet exposures which may include commitments, direct credit substitutes, letters of credit, failed transactions and unsettled securities.

In general, it's quite clear that Islamic banking is less prone to such risk through its activities, this is because Islamic law states that all investments have to pertain to true economic situation of that specific period of time (Cavalier, 2013). The Islamic institutions are also prone to the risk of leverage; a study done by IFSB showed the most of the IIFS have leverage ratio in almost all cases not exceeding the proposed percentage of IFSB and Basel accord which is 3% (Harzi 2012).

The CAR is calculated in Islamic banks through the Basel accords or the Islamic regulatory systems. We realize that it is different than the way it is calculated in conventional banks and investment institutions; but at overall, they follow the main foundation and procedures in achieving proper capital requirements and in reducing risk.

2.10 General Comparison of CAR between Islamic and Conventional Banks.

This part will focus on a general comparison between the capital requirements of the Islamic and conventional banking systems, and specifically the CAR in the two types of banks. Also, the rules and regulations of the Basel accords and the rules and regulations of the Islamic institutions will be compared.

Islamic Banks have elements in their activities that distinguish them from conventional banks, especially in their use of money influxes and resources (Kia, 2014). Through this section, we will identify the main distinguishing elements that Islamic banks have over conventional banks when it comes to capital adequacy. In order to do so, we will divide this section into two parts; the first part is the comparison of the standard of CAR of Islamic regulatory bodies and the Basel committee; while the second one is how well is the standard of CAR incorporated to reaching its goals in Islamic banking compared to conventional banking?

2.10.1 Islamic Regulatory Standard vs. the Basel Committee

After we have recognized the calculation of capital adequacy following the Basel committee and the illustration of the standard implemented by Islamic regulatory institutions (AAOIFI and IFSB), we can compare them from two aspects.

1. **How it was published**: the first published method of computing capital adequacy was through Basel which is also named Basel I and was offered in the year 1988 (BCBS, 2004), right after the establishment of the committee. The standards were later amended in the year 1996 by the same committee. By the year 1999, AAOIFI introduced their own method of computing the capital requirement. In 2004, the Basel committee introduced a new accord named as Basel II, which is

an amended and improved version of Basel I and was followed by similar amendment and improvements made by the IFSB in 2005. In the year 2010, the Basel committee introduced Basel III which again was an improved and amended version of its predecessor Basel II, which again was followed by an amended version of the IFSB in the year 2013 (BCBS, 2010).

By illustrating the release dates of the regulations imposed on computing capital adequacy, we can clearly see that the Basel committee was the pioneer in recognizing the issues at hand and acting upon them. Accordingly, we can also see by the dates in which the accords were amended may they be through Basel or the IFSB that the Basel committee was always on hand in ensuring that the accords went hand in hand with the current financial and economic situation of the period.

2. How CAR was calculated: from our previous illustrations we can compare the difference in computing the CAR of Islamic banks and conventional banks using the followings:

Comparison of the CAR According to AAOIFI and Basel I

as shown previously for the standard of the CAR according to Basel accord and AAOIFI we conclude that: when it comes to capital; both Basel accord and AAOIFI have the same method in computing; on the other hand, when it comes to risk, we realize that the Basel committee took market risk into consideration while the AAOIFI did not (Ghandour 2017).

Comparison of the CAR According to IFSB (2005) and Basel II

After both agreements were amended, we realize that in the Basel accords, capital consists of three tiers whilst according to the IFSB capital consists of only two tiers; this is because third tier (short terms subordinated debts that cover market risk) has

not been taken into consideration due to the fact that any interest based transaction or investment is prohibited in Islam (Suryanto, 2015). We also see that interest fluctuations are incorporated in market risk when it comes to Basel II while in Islamic banking it is not again so due to Islamic law (Haron, 2009; Harzi 2012). On the other hand, in Islamic banking, fluctuations in exchange rates are incorporated. So in conclusion, we derive that the two agreements are similar in a lot of ways in exception to any interest-based activities.

Comparison of the CAR According to the IFSB (2013) and Basel III

The components in the CAR of IFSB15 are basically like the standards of its predecessors. There are no any elements that go against any Islamic regulations meaning that all activities in the Islamic banking system go through the system of profit/loss sharing for all individuals and activities performed in the bank in exception to interest-based activities, which are prohibited in Islam (Haron, 2009; Hasan 2014). We also notice that there is no difference when it comes to the percentages designated in computing capital requirements and its implementation dates.

Finally, by illustrating the differences when it comes to publishing dates and the elements used in computing the CAR, we realize that in an overall structure the standards presented by the Islamic regulatory institutions in computing the CAR better serves Islamic banks while at the same time adheres in the fundamentals of the standards imposed by the Basel accords.

2.10.2 The Extent to which CAR's Standard Achieved its Goals

Harzi (2012) noticed that one of the main aspects in Islamic banking is its core value which is the sharing of profit/loss between the financers and the investors where the bank plays a proxy role between the two parties. In the case of a profit, both parties

gain and in the case of loss both parties loose; and this is clearly shown in all Islamic banking statements, especially in the investment account which usually holds the biggest weight in Islamic banking activities. On the other hand, in conventional banking this system is not incorporated meaning that the parties involved in lending do not have to share in the profit/loss system where as if an investment fails, the financers still get their money back with the added interest. Karim et al. (2013) showed that conventional banks have to calculate the standard of capital requirement in a different method than Islamic banks. From that and what was illustrated previously, we realize that the capital requirement in Islamic banks is slightly less than that of conventional banks; again this is because of the sharing of profit/loss between the depositors and the investors. Therefore, in the case of loss the bank is not critically exposed while in conventional banks in the case of loss the depositors do not lose their money and all losses are the banks' responsibility.

Karim et al. (2013) noticed that capital adequacy is not solely calculated to safeguard depositor's money; it is also placed to ensure a balance when it comes to risk exposure of any sort. It also maintains a balance between common equity and depositor's interests whereas the higher the percentage of capital adequacy means the higher the actual capital, which increases the investment in common equity. This achieves one of the principles of new governance. It also safeguards banks against financial crises and economic slumps such as the one in 2008, which resulted in the bankruptcy of many investment companies and banks (Francis & Osborne, 2010).

In conclusion, we realize that when it comes to the goals of the CAR, Islamic banks have a lower percentage to achieve the goal of safe guard their depositor's money at

all costs than conventional banks. On the other hand, when it comes to another goal of capital adequacy which is achieved through governance principles, we realize that Islamic banks have a higher percentage to achieve this goal than conventional banks.

Ghandour (2017) argued that Islamic banks are distinguished from the other banks due to a lot of activities not performed by conventional banks such as its core fundamental approach of not interacting or investing in any interest-based activities and the sharing of profit/loss between the depositors and the investors. Due to that type of operation standard Islamic banks manage to reach a lot of their religious, social and economic goals. Due to the adhering of special standards in their activities and investments Islamic banks have managed to grow substantially even with the crisis of 2008 and the economic slump (Abusharba et al., 2013). We also realized that due to their activities, Islamic banks did not have to maintain a high capital requirement percentage which gave it a competitive advantage over conventional banks, and that was clearly proven on how Islamic banks did not get critically exposed in the 2008 financial crisis (Haron, 2009). This enticed the Islamic regulatory bodies to enhance and develop a better method of computing capital requirement whilst adhering to the Basel accords.

2.11 Empirical Framework

The CAR plays a main role in the banking security; it also describes an image of the banks as a whole, and potentially attracting the confidence of the public to invest in the banks. The CAR is set by a regulatory authority in the banking sector, and it can be used to test the banking system health. The CAR has a mandatory requirement that is imposed by a state bank because the ratio can be used to ensure

if the ability of the bank is enough to absorb a reasonable amount of the losses. This ratio ensures that banks are in a capacity to meet their liabilities and other risks as credit risk (Bokhari et al., 2013).

Mili et al. (2014) noted that several researchers have focused on the determinants of regulatory capital because of its importance in ensuring the banking systems stability; most of them focused on the bank-specific variables as a function of the CAR (Buyuksalvarci & Abdioglu, 2011; Nuviyanti & Anggono, 2014), while the other researchers investigated the impact of macroeconomic variables on the CAR (Blum & Hellwig, 1995). On the other hand, there are a few studies that have focused on both bank-specific and macroeconomic variables such as the study of Aktas et al. (2015) which focused on the commercial banks in the SEE region; Williams (2011) has focused on the Nigerian banking industry. Yahaya et al. (2016) noted that some macroeconomic factors like inflation, money supply, real exchange rate, and GDP are significant determinants of the CAR. However, to the best of our knowledge, studies that investigate the impact of bank-specific and macroeconomic factors on the CAR for Islamic banks are rare in the relevant literature.

From previous literature on conventional banks, we conclude that the explanatory variables that can be used as a function of the CAR may be divided into different methodological paths, such as bank-specific and macroeconomic variables.

2.11.1 The Relationship between Bank-Specific Variables and CAR

The first path focused on the bank-specific variables as a function of determinants of the capital adequacy ratio; these variables are such as bank's size, profitability, leverage, deposit ratio, loan, liquidity risk, and credit risk. Demsetz & Strahan

(1997) and Altunbas et al. (2007) showed that when the capital level is low, large banks will have more ability to operate than smaller banks. Their finding means that large banks will have an advantage from diversification; therefore, they can operate with less capital. Dreca (2013) argue that the bank's size is a very important factor that influence the bank capital; rationality lies in the fact that a larger size would guarantee a greater stability as well as lower capital adequacy is needed. Gropp & Heider (2010) showed that the profitable banks mostly tend to have more regulatory capital, so the expected relationship between profitability and the CAR is positive. Bank profitability can be measured by return on assets (ROA), return on equity (ROE), and net interest margin (NIM) (Erol et al., 2014), but many researchers believe that ROA is better than other ratios to measure the profitability of banks (Hassan and Bashir, 2013). On the other hand, some researchers found an inverse relationship between the CAR and ROE (Buyuksalvarci & Abdioglu, 2011), and Dreca (2013) found a negative relationship between the CAR and ROA. The financial leverage is important factor that affect bank capital structure, most researchers used total equity to total liabilities ratio as a proxy of financial leverage (Buyuksalvarci & Abdioglu, 2011; Polat & Al-Khalaf, 2014). Shareholders will find high leveraged bank if it is riskier when compared to another bank; therefore, the shareholders' required rate of return is expected to increase. Thus, the high leveraged bank may find that raising new equity (to increase the ratio) is difficult (Buyuksalvarci & Abdioglu 2011; Ahmed et al. 2008). Consequently, high leveraged banks hold less equity compared to low leveraged banks. Therefore, the relationship between leverage and the CAR is expected to be positive. On the other hand, as equity increases, the leverage ratio will increase and the CAR as well; so the relationship between leverage and CAR can also be positive.

The study of Ghenimi et al. (2017) showed that there is some financial risk that banks faced, which include the liquidity risk when there is unexpectedly withdrawing of the deposits by the depositors. Credit risk is when borrowers do not pay their loans on the time, and operational risk is when computer systems of banks will fail or its buildings would burn down, etc. Nevertheless, through these risks, liquidity risks and credit risks are the most important types of risks that banks can face; also these risks are related to what banks do as well as why banks fail. Aleksandra et al. (2014) noted that Basel committee attempts to improve liquidity risk and the CAR by introducing some new assessment of stringent risk to strengthen the capital.

Ahmad et al. (2008) argue that despite some studies on the bank capital, the direction of the relationship between bank risk and bank capital remains unclear and rarely researched. In the unregulated environment where no capital regulation and government guarantees, banks would continue to hold capital just because the market requires them to do so. Capital regulations used by bank regulators to secure that the market capitalization is recognized and regulated to reduce bank risk. Some researchers focused on the relationship between risks and the CAR (Shrieves & Dahl, 1992; Aggarwal & Jacques, 2001), where they argue that the regulators and supervisor's actions are the important factors that contribute to the positive relation between risk and capital. According to that regulatory hypothesis, regulators encourage the bank to increase its capital in line with the amount of bank's risk taken (Altunbas et al., 2007). On the other hand, the alternative hypothesis suggests an inverse relationship between risk and capital (Bokhari et al., 2013) and show that bank has the incentive to exploit the current flat deposits & insurance schemes. The hypothesis of moral hazard may become especially relevant when the bank's

leverage and its risk position are already high, suggesting that banks will raise their risk position as the capital declines (Kahane, 1977; Koehn & Santomero, 1989; Kim & Santomero, 1988).

2.11.2 The Relationship between Macroeconomic Variables and the CAR

The other path that includes the macroeconomic variables as a function of the CAR; these variables are such as inflation, GDP, exchange rate, stock market price, etc. Each of these variables is included because they do have a direct and indirect effects on the CAR (Buyuksalvarci & Abdioglu, 2010; Saqib & Waheed, 2011; Karacaer & Kapusuzoglu, 2010). For example, inflation rate affects the value of assets (loans) and amount of borrowing (deposit); in the case of higher inflation, one would expect real value of assets the banks hold to decline and inflation increases the amount of debt that banks pay. In addition to this, higher inflation rate means higher expected nominal interest rate which affects banks directly (Heidari et al., 2013; Chimobi, 2010). A famous "Fisher Hypothesis" Theory illustrates this relationship and according to the Fisher Theory real interest rate is equal to nominal interest rate less inflation rate. Therefore, this deems necessary to consider inflation into our study. The impact of the gross domestic product on the banks' value and capital is expected to be very high (Bayram, 2007). For instance, an increase in income of a country is a signal of a positive sign that a county is growing and there is an opportunity for investment from international investor and as well as domestic investors (Katircioglu, 2011; 2009; Katircioglu & Naraliyeva, 2006). Also, an increase in investment means that there is more demand for fund from corporations and from individuals to increase the capacity of the firm which directly affect the rate of interest the banks charge on the deposit rate. Exchange rate is also expected to have direct impacts on the banks capital (Fethi et al., 2013). For example, a local

currency appreciating against foreign currency would mean that the value of assets the bank holds is worth more and depreciating local currency could imply that the value of the asset that banks hold is lower in value. So exchange rate affects the value of banks directly and it's important that we include its effect in our study. In addition to this, exchange rate affects the export and imports which might have an effect on the banks' performance (Fethi et al., 2013). From exchange rate theory, it's expected that depreciation in local currency would increase the export to the foreign country (Heidari et al., 2012) which means that more fund demanded by a local firm will occur in the case of a depreciation in the domestic currency. The effects of stock market development and stock prices on the bank value is expected to be direct and indirect. An increase in the book value is considered to be a very good news and positive sign by local and international investors while declining in the value of stock price imply that the bank is facing some problem although other factors could lead to a decline in the stock price. The stock market is included since the increased (decreased) value of bank has a direct effect on the CAR. The following literature is put forward to support the above discussion. The proponents of including macroeconomic variables suggest that there is an impact of the national economic environment on the bank's solvency; therefore, these variables should be taken into account when determining bank capital adequacy (Hortlund 2005; Williams 2011; Manuel & Albina, 2016). Yahaya et al. (2016) argue that when the deposit-taking institutions want to determine their capital level needing to be secured, the macroeconomic variables such as economic growth, inflation, the real exchange rate and the employment rate should be considered as factors significantly affecting risk management process (Shaeri et al., 2016). Yahaya et al. (2016) investigated the relationship between macroeconomic variables and the

CAR; he found that exchange rate, GDP, and inflation have negatively significant effects on the CAR, and Williams (2011) found similar result regrading inflation and exchange rate. Bokhari et al. (2013) noted an inverse but insignificant relationship between GDP and the CAR. The question of "how an increase (decrease) in the stock market prices affects the company's profitability and market capitalization" is well investigated in the financial literature. For example, an increase in bank profitability is normally reflected positively on the stock market price of the bank (Cantor & Johnson, 1992). The stock market development is considered vital for the banks since financial development well help saver obtain access to the best rate and likewise banks to obtain at a favorable rate (Lai & Ye, 2017). Therefore, this study included stock market development and market capitalization to observe if they have impacts on the capital adequacy ratio in addition to inflation, exchange rate, and GDP.

Chapter 3

DATA AND METHODOLOGY

3.1 Data and Descriptive Statistics

This study focus on Islamic banks in the eight countries of Asia as we mentioned earlier. The QISMUT will continue as key of driving the market (World Islamic Banking Competitiveness Report, 2016); these countries have a majority of Muslim population who look for investment in Islamic banks. Customers in these countries represent about 67% of the global Islamic banks' customer base (Yildirim 2015). The QISMUT represent approximately 80% of the internationally participated banking assets, while about 10.1% of this volume are based out of Kuwait (World Islamic Banking Competitiveness Report, 2016). Bahrain is recognized as a pioneer in the Islamic banking system; also it is considered as a center of the Islamic banking due to its progressive approach and extensive heritage to the Islamic finance (Basu 2015).

This study utilizes a balanced annual data from 2005 to 2014. The data was obtained from data base of Bankscope; annual financial reports and the world development bank indicators were used for missing data. The control variables include return on assets, return on equity, leverage, liquidity risk, credit risk, size, inflation, GDP, market capitalization, exchange rate, and stock traded, while the dependent variables are the capital adequacy ratio and the equity to assets ratio.

We use bank's capital adequacy ratio as dependent variable because of its importance as security indicator for the depositors' fund; it helps to reduce the risk which might the banks be exposed. As we mentioned earlier banks use capital adequacy to evaluate the banks' performance whether they are conventional or Islamic banks. Also, many researchers have studied on this topic; but most of them were with conventional banks. We use another dependent variable, equity to assets ratio, which is used to measure the risk of banks' default to confirm if our independent variables have the same effects on the dependent variables. For independent variables, we divided them into two categories, which are bank-specific and macroeconomic variables.

Out of bank-specific variables, the size of banks is an important factor that affect the bank's capital. We recognize the relationship between banks' size and the CAR to check if regulations imposed on the capital differ between large and small banks. Because of its importance many researchers have used it in their studies (Gropp & Heider, 2010; Brewer et al., 2008). Since total assets are at different aggregates, we used their logarithm to proxy "bank size". We also used profitability as independent variable, which is known as earnings and is a component of tier 1 capital. Therefore, it is an important factor that effects the CAR. We choose ROA and ROE as two proxies of profitability (Katircioglu et al., 2018; Al-Tamimi & Obeidat, 2013; Nuviyanti & Anggono, 2014). We use "total equity-to-total liabilities" to proxy leverage similar to previous studies (Ahmad et al., 2008; Polat & Al-Khalaf, 2014); the leverage ratio is important factor that affect the CAR, many researchers have used it most of which are in the cases of conventional banks (Aktas et al., 2015; Bateni et al., 2014). Finally, as Ghenimi et al. (2017) noticed, the liquidity risks and credit risks are the most important types of risks that banks might face.

They have a direct link to what the banks do as well as why probability of banks' failure increases. We use cash and cash equivalent over total assets as measures of liquidity risks as mentioned by Iqbal (2012).

Macroeconomic variables have also been studied by some researchers as factors that affect the banks' CAR. As we mentioned earlier, in the case of higher inflation, one would expect real value of assets the banks hold to decline and to increase the amount of debt that banks pay, which reflect to change in the banks' leverage and CAR. Most of the previous studies used inflation as a factor affecting the CAR in the case of conventional banks. Therefore, it's important to consider this variable in our study. As we mentioned earlier, the relationship between GDP and banks' capital is expected to be very high; that is, in the case of high economic growth, the risk level will be lower, and the banks may hold lower CAR (Mili et al., 2014). There are some studies that focused on this relationship in conventional banks. Exchange rate is considered to be another important variable that effects the CAR. There are a few studies that take this variable into consideration as a determinant of the CAR. Most of this studies were in the cases of conventional banks; so this is why we select this variable to test its effect on the CAR for Islamic banks. As far as stocks traded and market capitalization are concerned, there is no study considering them in the case of Islamic banks, and we think that both have impacts on the CAR as well as ETA. As we argued previously, stock market development is vital for the banks. Market capitalization is used as a measurement for investors to determine their investment returns. It represents the public consensus on the value of a company's equity. The Efficient Market Hypothesis (EMH) was firstly defined by Fama (1970) stating that the share prices on the stock market are the best available

estimates of their real value because of the highly efficient pricing mechanism inherent in the stock market. That is why we choose them as independent variable.

Table 8 below reports descriptive statistics for all the variables. Results obtained from the descriptive summary demonstrate that our variables are free of outliers. As we can see from the table, the capital adequacy ratio's mean is about 17.4% which is higher than minimum ratio set by Basel accord meaning that the CAR in Islamic banks are considered safer as well as they can meet their financial obligation. The Bank Syariah Mandiri in Indonesia has a minimum capital adequacy ratio (10.65%) in 2010, while Al Rajhi Bank in Saudi Arabia has a higher CAR (41.53%) in 2006. Moreover, the standard deviation of the CAR that is the spread's average measure of the observed annual CAR from the mean value of 17.4% is 0.0625%. This means a low disparity among the CARs of various Islamic banks. On the other hand, the ETA has a mean value of 15.47% which is highly enough for the banks, with a standard deviation of 0.11 which is not high. The bank's balance of the profits and losses for any period is one of the important components of Tier I Capital in the Basel Accord. Thus, the profitability is the core factor that affects the CAR. There are different measures that can be used as a proxy of profitability. For our study, we use the most common measures which are ROA and ROE as mentioned earlier. The mean of bank's return on equity which is one measure of profitability is about 8.64%, which is not bad; we can see that the minimum ROE is negative because of negative net income. However, it does not mean that the banks have a bad investment; on the other hand, the highest ROE is 52.77% which is very high. For return on assets, the banks' mean value is 1.5% which means a good performance. On the other hand, mean of the leverage is about 7.2 meaning that the total liabilities in Islamic banks are 7 times more than total equity and hat the Islamic banks depend on external

funding. The liquidity risk of Islamic banks has a mean value of 0.309 meaning that the liquid assets are not highly enough to cover the liabilities; thus, Islamic banks should make more efforts to manage their liquidity as well as to control their liquidity risk. The mean of Islamic banks' credit risk is about 0.60 which is very risky for banks.

Table 8: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	280	0.0151	0.0224	-0.0888	0.1255
ROE	280	0.0864	0.3160	-4.6681	0.5277
LR	280	0.3089	0.2994	0.0010	3.5958
CR	280	0.6020	0.3658	0.0119	6.1434
Size	280	10.5251	2.7709	5.7705	17.3345
Lev	280	0.2079	0.3201	-2.0219	3.0505
CAR	280	0.1740	0.0625	0.1065	0.4153
Inf	280	4.9719	3.7339	-4.8633	15.0501
GDP	280	5.4112	4.7322	-7.0761	26.1704
MC	280	79.0017	46.3014	16.1000	196.7072
ST	280	45.5127	54.0872	0.9589	372.2542
ER	280	1048.6530	3039.0010	0.2688	11865.21
ETA	280	0.1547	0.1104	0.0190	0.2753

Note: ROA (return on assets), ROE (return on equity), LR (liquidity risk), CR (credit risk), Size (logarithm of assets), Lev (leverage), CAR (capital adequacy ratio (Basel II)), INF (inflation consumer prices (annual %)), GDP (gross domestic product growth (annual %)), MC (market capitalization of listed, domestic companies (% of GDP)), ST (stocks traded, total value (% of GDP)), ER (official exchange rate (LCU per US$, period average)), ETA (equity to assets ratio).

Table 9 shows the correlation matrix of the variables under consideration. Correlation analysis is used to analyze the linear relationship between dependent and independent variables (CAR and ETA); it is also used to test for multicollinearity between independent variables in regression models. The results reveal that except the correlation between leverage and equity to assets ratio, the

levels of correlation between the variables is below 50%, which could be a good indicator that the variables are not highly correlated and so the probability of multicollinearity in a regression model will not be higher.

Table 9: Correlation Matrix

	ROA	ROE	LR	CR	Size	Lev	CAR	Inf	GDP	MC	ST	ER	ETA
ROA	1												
ROE	0.579	1											
LR	0.123	0.002	1										
CR	-0.087	0.015	-0.0799	1									
Size	0.061	0.112	-0.3776	0.058	1								
Lev	-0.409	-0.486	-0.1099	-0.047	0.131	1							
CAR	0.314	0.090	0.0142	-0.048	-0.324	-0.386	1						
Inf	0.214	0.101	-0.0457	0.001	0.293	-0.085	-0.1817	1					
GDP	0.274	0.075	0.0732	-0.116	-0.056	-0.14	0.1409	0.195	1				
MC	-0.060	-0.082	0.2432	-0.031	-0.468	0.174	0.1917	-0.371	0.139	1			
ST	0.262	0.100	0.0465	0.035	-0.002	-0.104	0.2536	-0.001	0.026	0.352	1		
ER	0.060	-0.006	0.0529	-0.116	-0.014	-0.03	-0.2762	0.205	0.020	-0.292	-0.208	1	
ETA	0.319	0.054	0.4926	-0.006	-0.33	-0.589	0.2330	0.216	0.213	-0.029	0.075	0.304	1

3.2 Excepted Sign

This study uses two dependent variables which are capital adequacy ratio (CAR) and equity to assets ratio (ETA). We use different methods to check the relation between independent variables (bank-specific and macroeconomic variables) and dependent variables.

For bank-specific variable, the banks' size may affect their diversification strategies, as well as their risks. Small banks will have a less diversification than the large ones, and therefore, they operate with a higher CAR. On the other hand, some banks prefer to have a good rating; so they have higher reserves and larger sizes (Buyuksalvarci & Abdioglu, 2011). Also, we expect a negative relationship between size and another dependent variable (ETA), because as the bank size increases the denominator of this ratio increase, so the ratio will decrease.

ROA, on the other hand, can increase by increasing net income or decreasing total assets, which means that risky assets may decrease, so the CAR also increase. We expect a positive relationship between ROA and CAR. On the other hand, when total assets decline, the ETA will decline as well.

ROE, which also measures profitability, can be calculated as net income over shareholder equity. As the banks seek to have a high CAR; this will lead them to invest in low risky assets such as low-risky loans, thus achieving a lower ROE.

Leverage ratio is calculated as total equity to total liabilities as did by previous researchers. As equity increases, the leverage will increase as well as CAR and ETA. Therefore, high leverage means more equity or less liabilities; so, the CAR

and ETA will increase. On the other hand, Buykusalvarci and Abdioglu (2011) argued that banks that have high leverage hold less equity compared to low leveraged banks; as a result, the CAR will decline as well as ETA. As we mentioned earlier, the relationship between liquidity and credit risks with CAR and ETA can be positive or negative depending on the different hypotheses.

Liquidity risk is calculated as liquid assets over total liabilities as mentioned by Al-Tamimi and Obeidat (2013), while we measure credit risk as mentioned by Genimi et al. (2017) which is calculated as impaired loans over gross loans. The liquidity risk will increase even if liquid assets increase or total liability decreases. This will increase the CAR and the ETA, because when liquid assets increase, risky assets may decrease. Also, as total liability decreases, total equity increases; then, the CAR and ETA will increase. On the other hand, following the moral hazard hypothesis, if the bank's leverage and its risk position are already high, this suggests that as capital declines, banks will raise their risk position meaning that the relationship between risks and CAR can be negative. Table 10 below shows the expected sign between our bank-specific variables and dependent variables (CAR and ETA).

Table 10: Expected Signs of Bank-Specific Variables

Bank specific variables	CAR as dependent variable	ETA as dependent variable
Bank’s size (log size)	+/-	+/-
ROA	+	+
ROE	-	-
Leverage	+/-	+/-
Credit Risk (CR)	+/-	+/-
Liquidity Risk (LR)	+/-	+/-

For macroeconomic variables, inflation is expected to have negative effect since an increase in inflation results in lower true value of an assets. Besides, higher inflation rate means higher rate on deposit and loan.

Considering GDP, its expected effect is positive since an increase in income will lead investors to borrow more from banks. Higher growth results in an expansion by firms and businesses for investments and thus more demand for funds. On the other hand, in the periods of positive economic growth, the risk will be lower; so, as a result, banks will retain with lower capital ratios. Therefore, relationship might be negative.

Exchange rate is expected to have positive impact on the bank's capital. For example, a local currency appreciating against foreign currency would mean that the value of assets the bank holds is worth more and while depreciating local currency could imply that the value of the assets that banks hold is lower in value.

Stocks traded and market capitalization are expected to have positive signs since improvement in these items implies that financial system development and as literature argued leads to more inflows of capital and international investors into a local market.

Table 11: Expected Signs of Macroeconomic Variables

Macroeconomic variables	CAR as dependent variable	ETA as dependent variable
Inflation	-	-
GDP	+/-	+/-
Exchange Rate	+	+
Market Capitalization	+	+
Stock Traded	+	+

3.3 Graphical Illustration

This section of study shows the significant movements of both dependent variables which are CAR & ETA for the period of 2005- 2014 for our selected countries. The figures can be used as indicators of impact of 2008 financial crisis on the CAR as well as on the ETA. Owing to the name of our sample countries (QISMUT plus other two countries which are Kuwait and Bahrain), the illustration started by the first letter, which is Q (Qatar), and so on.

3.3.1 CAR & ETA in Qatar

As figure 4 shows, the average CAR in Qatar Islamic bank is higher than both the minimum standard proposed by Basel committee as well as CAR on conventional banks (Elsiefy 2013). As we can see, there is volatile trend in the ratio of bank capital during the study period. The CAR has increased from 2005 until 2007 where it reached about 24%, which is the highest range. After 2007, the ratio decreased for one year; then, it had stable trend until 2010; after that, it had volatile trend; and on the last year of our period, it was close to 15%. In spite of this decline, it's still higher than minimum requirement of Basel accord. These results are approximately close to those results of the Islamic Financial Services Industry Stability Report (2016), where this report studies the majority of Islamic banks around the world. A decline in the average CAR does not mean that Islamic banks hold less capital in reality. The CAR reduction can be explained as a signal of efficient improvement in the use of capital to expand financing portfolio as well as raise the availability of lender of last resort facilities (IFSB 2016).

Looking now to ETA, the figure shows post crisis that the ETA has gradually increased for about three years then declined until reaching the lowest ratio in 2012;

thenafter, it fluctuated. An increase in the financial leverage ratios of Islamic banks means that they depend more on external funding.

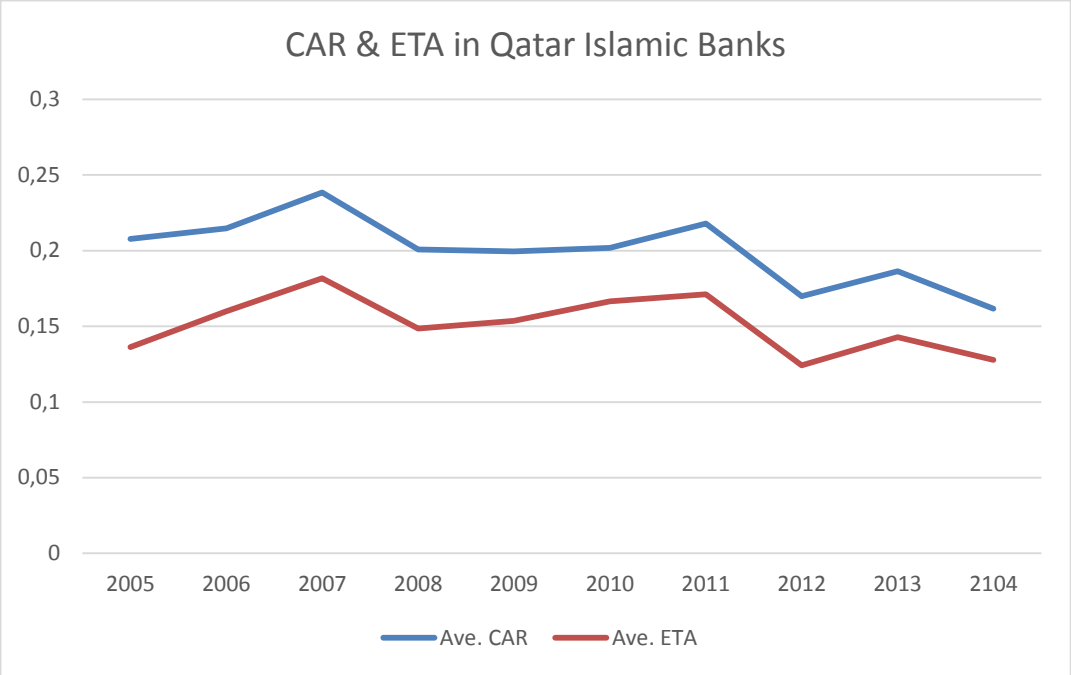

Figure 4: Trend in CAR & ETA in Qatar

3.3.2 CAR & ETA in Indonesia

The CAR in the Indonesian Islamic banks has volatile figures during the period, but it is still more than both minimum requirement of Basel agreement and conventional banks' capital adequacy, which also had volatile figures (Nuviyanti & Anggono 2014). From 2008 to 2009, the CAR reached the highest range; after 2009, the figure shows that there is a gradual decline in the CAR, which can be explained by the impact of the 2008 financial crisis. The CAR has dropped dramatically after 2011 until it reached the lowest ratio, which was about 12.5%. Afterwards, it had noticeable increase with the range close to 18%, which is high enough against any unpredictable situation for Islamic banks. Looking to ETA, the figure shows that the ETA also had volatility during all periods of our study with

the range of 9.5% to 12.5%. It reached the highest ratio in 2013, and the figure shows that the ETA had also a gradual decline after 2008, which can be as a result of financial crisis.

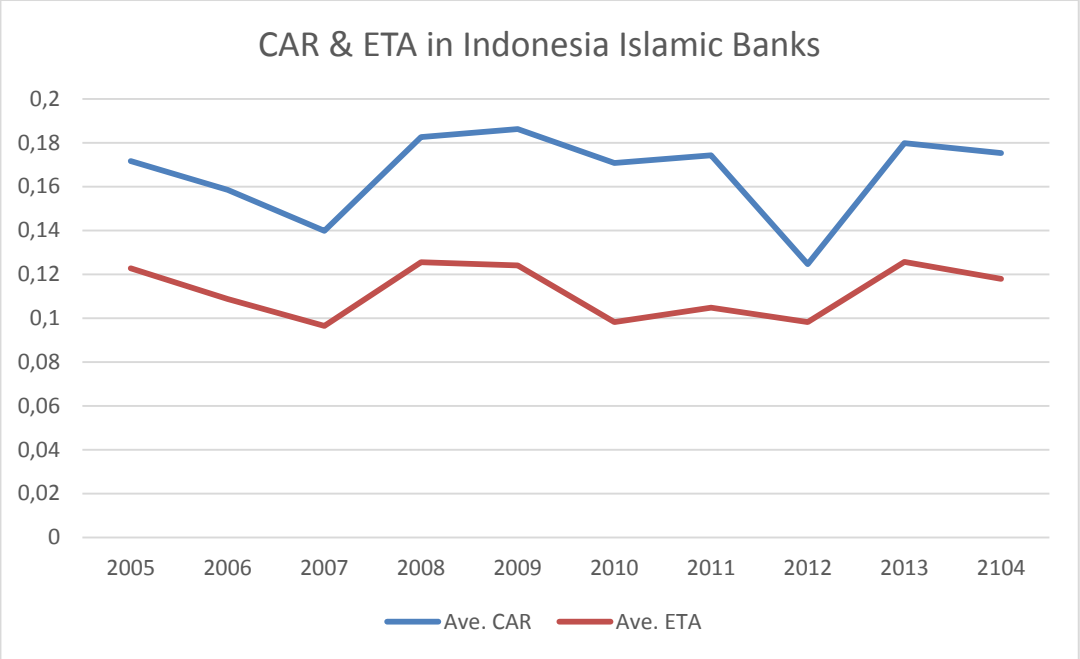

Figure 5: Trend in CAR & ETA in Indonesia

3.3.3 CAR & ETA in Saudi Arabia

The average CAR in the Saudi Arabian Islamic banks reached the highest ratio in 2006; it was above 31% in 2006; when this ratio has been drooping, it stood at about 17% in 2014. The average CAR is still above the minimum ratio imposed by the Basel agreement. The figure also shows that after 2009, the average CAR was stable. As mentioned earlier, there is no serious problem that Islamic banks can face with such decline. On the other hand, average ETA shows similar movement with the CAR; it reached the highest ratio in 2007, then it has gradually declined where it reached about 12% in 2014. There is no clear impact of the 2008 financial crisis, because the figure shows that both the CAR and the ETA have gradually declined after 2006.

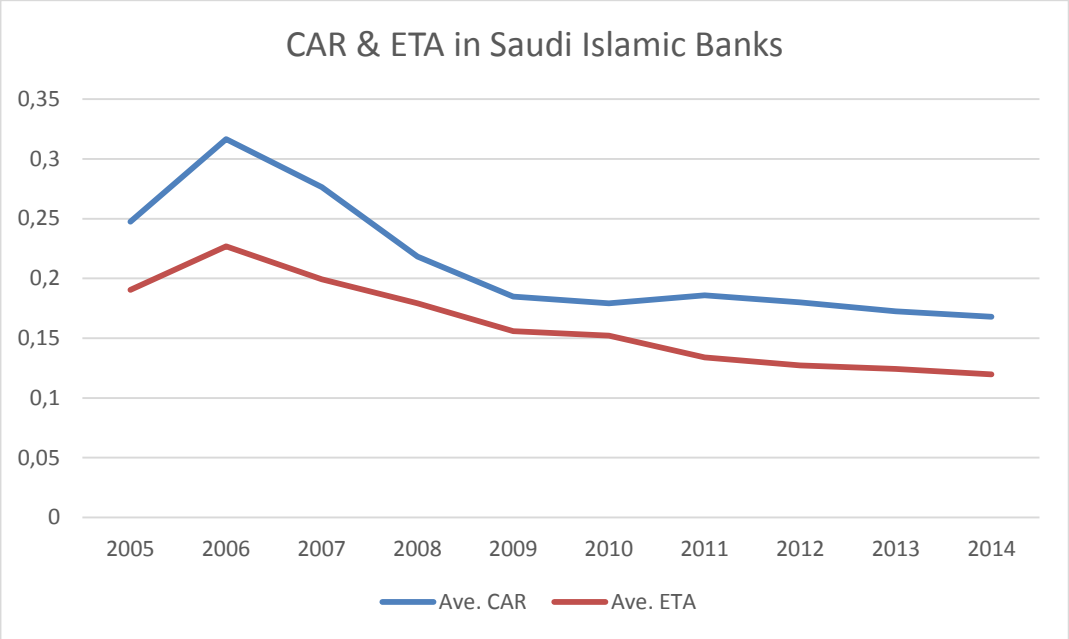

Figure 6: Trend in CAR & ETA in Saudi Arabia

3.3.4 CAR & ETA in Malaysia

Figure 7 shows that the average CAR in the Malaysian Islamic banks is in range between 14% and 18% with small volatilities. The average CAR has slightly increased after 2005; then after, it gradually declined after 2006 but increased again until 2010. After 2010, it was higher than 16.5%. The CAR is higher than 16% after 2009, which is a good signal for Islamic banks. On the other hand, the average ETA has gradually declined, but this ratio maintained in the range between 8% and 10%. The figure shows that the CAR and ETA had small increases after 2008, which is different from most of the other countries in our sample. The reason of that may be because Malaysian government have managed and controlled the crisis by using considerable monetary stimulus to its economy. Also, as the figure shows that the trends of CAR and ETA are similar.

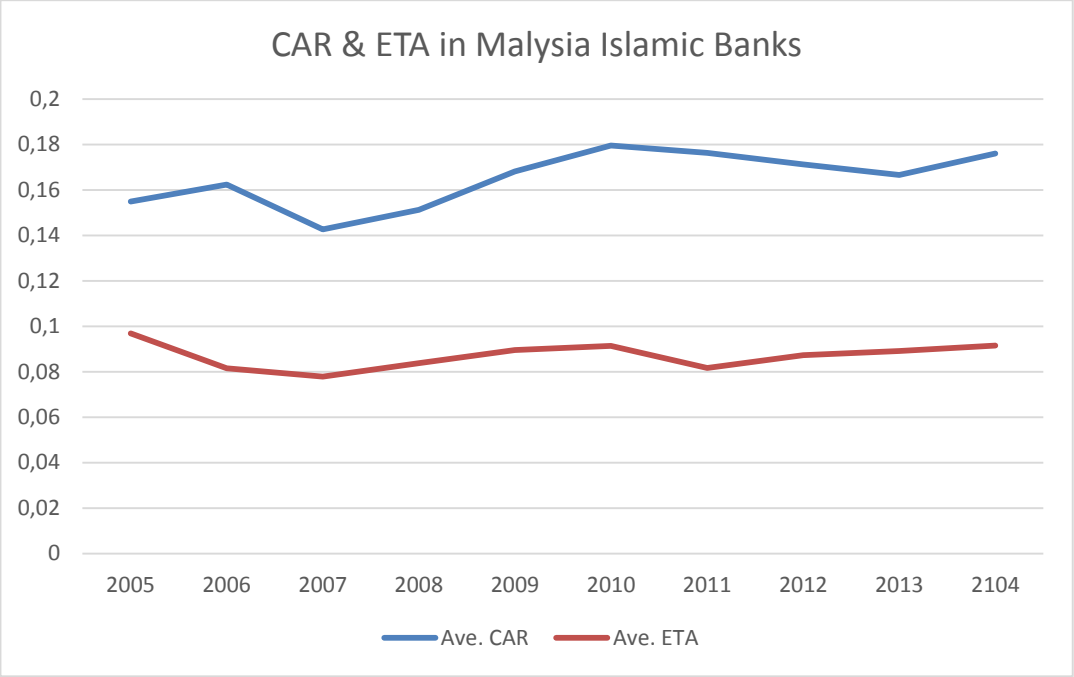

Figure 7: Trend in CAR & ETA in Malaysia

3.3.5 CAR & ETA in UAE

Figure 8 shows the average CAR in the UAE Islamic banks where it shows a stable trend before 2008; then after, it has dramatically increased from 2008 to 2009, which can be explained as a reaction of the 2008 financial crisis. So, Islamic banks increased their CARs to save them from any uncertainty loss. It had stable trend again after 2009 until 2013, where it declined and stood at 17% approximately. But, during all the period of our study, the average CAR is above the minimum requirement of the Basel agreement. While for the average ETA, it has dramatically increased at the beginning, then it had stable trend from 2006 to 2014 with a range of 13% to 15%. Like in the case of the Malaysian's Islamic banks, the CAR and the ETA in the UAE Islamic banks have increased after 2008.

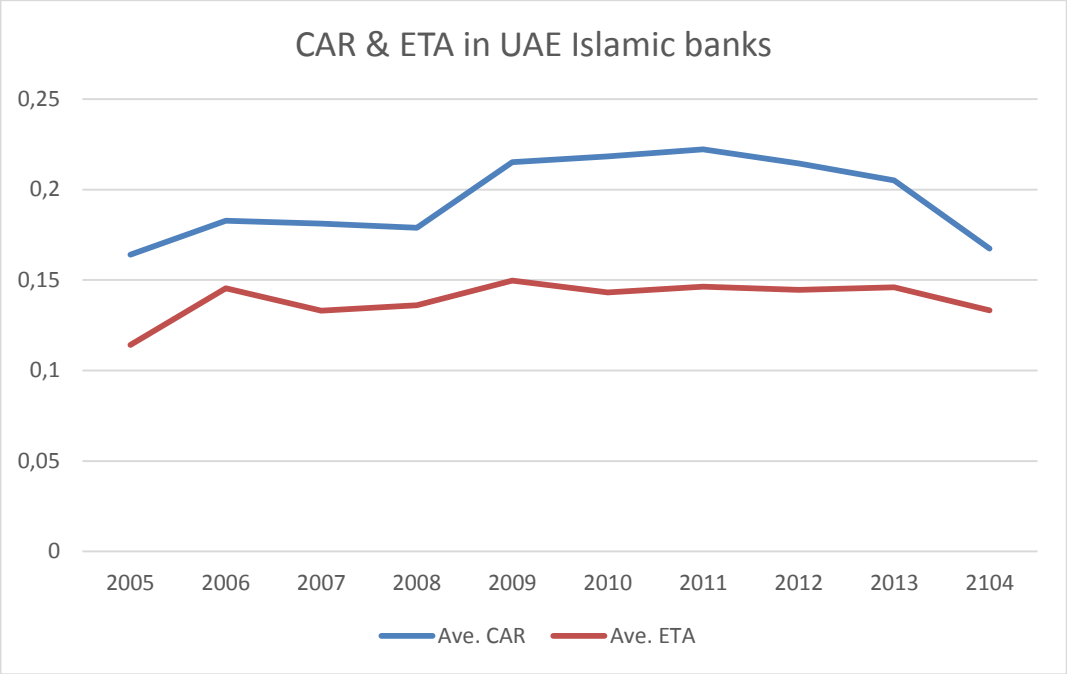

Figure 8: Trend in CAR & ETA in UAE

3.3.6 CAR & ETA in Turkey

The averages of the CAR & ETA in Turkey stood at 14% and about 10%, respectively, (see Figure 9), and still they are above the minimum requirements imposed by the Basel agreement. The average CAR in the Turkish Islamic banks had a slight volatility during the study period. Compared with that ratio in the conventional banks, the CAR in Islamic banks is less than that in conventional banks (AYDOĞAN 2015). The average ETA has reached about 14% in 2008, which is the highest ratio; afterwards, with the effect of the 2008 financial crisis, the ratio has declined. Unlike ETA, the CAR had stable trend from 2008 until 2010.

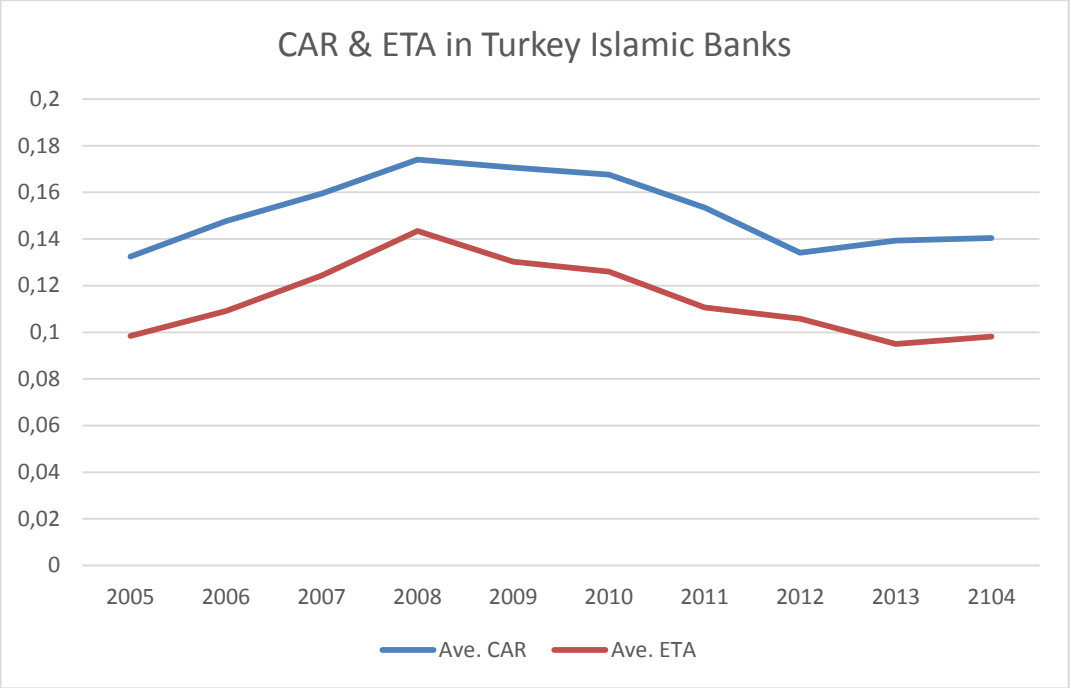

Figure 9: Trend in CAR & ETA in Turkey

3.3.7 CAR & ETA in Kuwait

The average CAR in Kuwait has gradually declined until 2009, where it reached the lowest ratio of 17% approximately, then it has dramatically increased; from 2010 to 2012 the figure 10 shows a stable trend. After 2012, the ratio declined gradually and it stood to 18.5% approximately. It's clearly that the ratio maintains above the minimum requirement of regulations. On the other hand, trend of the average ETA is close to that trend in the CAR. Both the CAR and the ETA have decreased from 2005 until 2009; then, the figure shows high increase for one year, after that they have slightly decreased.

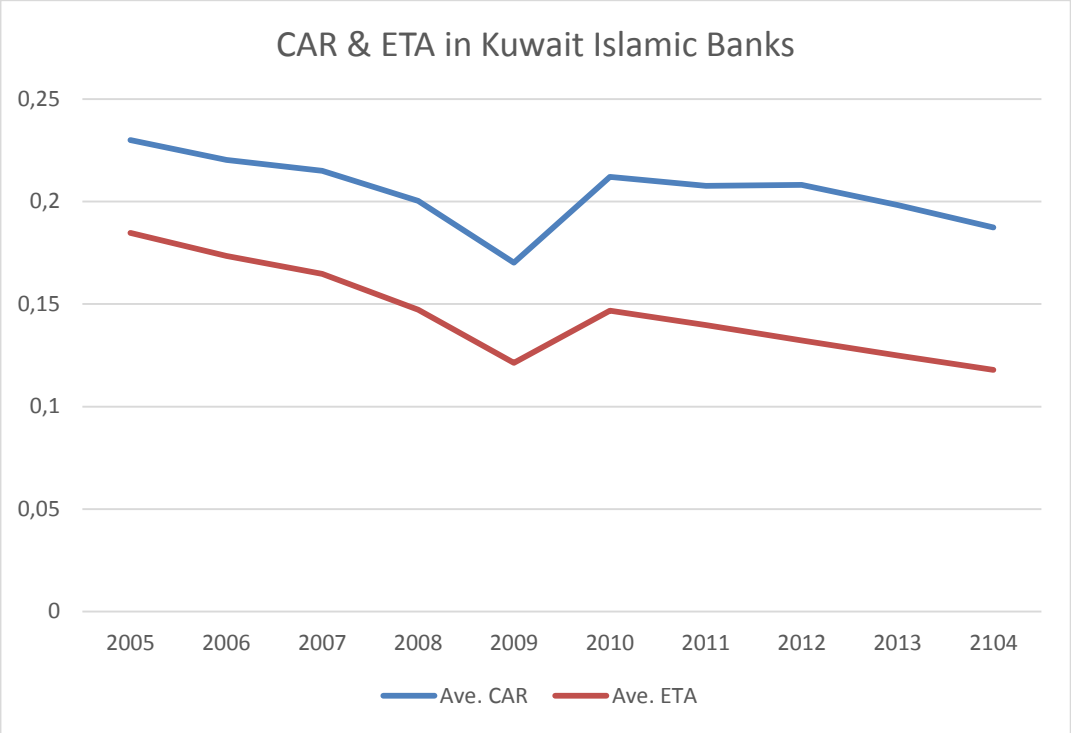

Figure 10: Trend of CAR & ETA in Kuwait

3.3.8 CAR & ETA in Bahrain

Figure 11 shows that the average CAR in Bahrain Islamic banks which has reached the highest ratio of more than 35% in 2007, but it has dramatically decreased until it reached the lowest level in 2010 with about 17%; after then it increased again, but it never reached to a high level as in 2007. The average ETA has same fluctuation as in the average CAR. Decline in both the CAR and the ETA in Bahrain Islamic banks might be due to the impact of 2008 financial crisis.

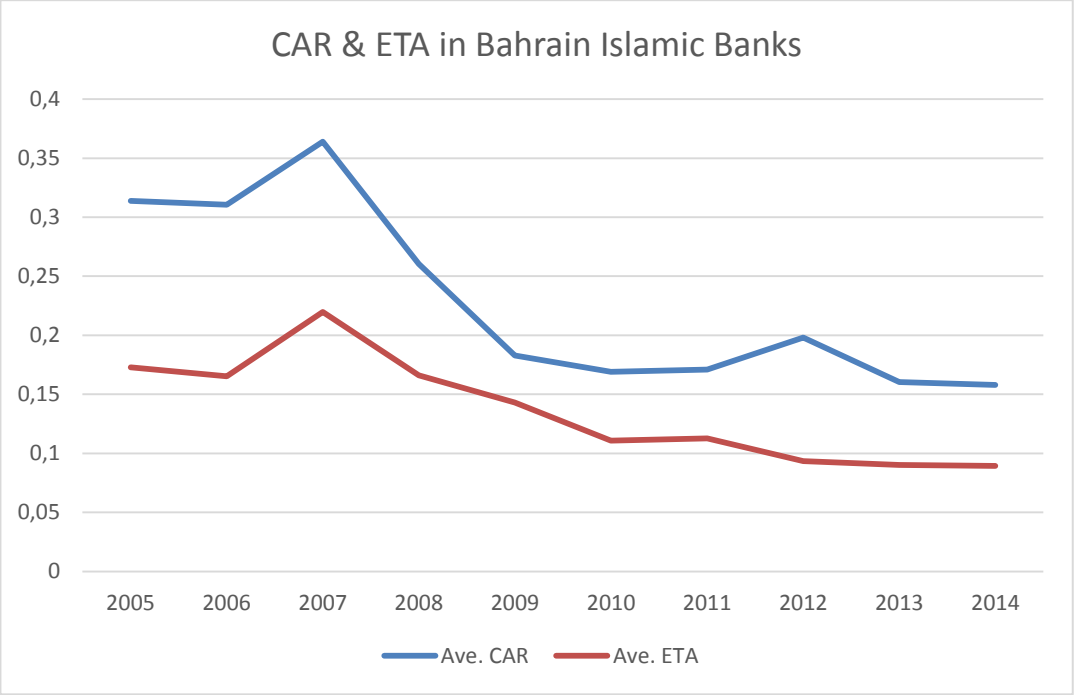

Figure 11: Trend of CAR & ETA in Bahrain

In conclusion, from previous figures, we conclude that there is similar trend for both the CAR and the ETA, because from the figures as the CAR increases also ETA increases, and vice versa. As the previous figures show, the CAR of Islamic banks are more than the requirement of the Basel accord. This ratio is used to protect the depositors and to promote the efficiency and stability of the banks' financial system. Islamic banks in our sample maintained a high CAR meaning that Islamic banks had the abundant capital, so they can manage any uncertainty shock to balance sheet. A high ratio denotes their ability to preserve confidence in a system of Islamic banking as well as to protect their lenders and depositors.

3.4 Methodology

When studying cross-sectional and panel data, pooled (Ordinary Least Squares (OLS)), fixed, and random effects are usually used. However, panel estimation using the OLS neglects the cross-sectional and time series nature of the data. The estimation for fixed and random effects have been criticized by researchers due to

some issues that results are biased, because the techniques don't take correlation among independent variables into the account and also don't take the individuality among the banks (cross sections) into account. Individuality is important since we have considered several countries with different size, demography, economic structure, and banking system. Therefore, to support our results we had to consider a model which that takes those weaknesses of the above models into account. Unlike the other methods, the generalized method of moments (GMM) dynamic panel data estimator developed by Arellano and Bond (1991) has been popular due to several reasons. For example, dynamic panel regression accounts for the causality between the variables in the model. It can also tackle the presence of unobserved country fixed effects. So, our study mainly uses three methods which are fixed effects, random effects, and ordinary least squares while the GMM dynamic panel data estimators is used for robustness check in this study. The specific form of the equation we estimate using the dynamic panel regression is given below:

$$CAR_{i,t} = \beta_0 + \beta_1 CAR_{i,t-1} + \beta_2 LEV + \beta_3 X_{i,t} + \vartheta_t + \epsilon_{it} \qquad (1)$$

where CAR is the capital adequacy ratio at time t for country i; $CAR_{i,t-1}$ is the one period lagged capital adequacy ratio, which measures the persistence of the dependent variable; LEV (financial leverage) and X are a set of control variables (such as bank-specific variables and macroeconomic indicators); β_0 represents the constant; ϑ_t is the country-specific effect; and ϵ_{it} is an error term that captures unobserved shock. Similarly, the specific form of the equation for the equity to assets ratio is given below:

$$EQUITY\ TO\ ASSETS_{i,t} = \beta_0 + \beta_1 EQUITY\ TO\ ASSETS_{i,t-1} + \beta_2 LEV + \beta_3 X_{i,t} + \vartheta_t + \epsilon_{it} \quad (2)$$

Ordinary Least Squares (OLS)

The OLS regression can be defined as a generalized linear modeling technique which might be applied to model an individual response variable that has been recorded on at least the interval scale. The OLS regression is the common statistical technique of analysis which estimates the relationship between a single and multiple explanatory variables (x) and a dependent variable (y); it estimates this impact by minimizing a sum of the squares in a difference between the predicted and observed values of y configured as a straight line. The following equation explains the relationship between response variable, Y, and explanatory variable, X

$$y = \beta_0 + \beta_1 x$$

Where β_0 is the intercept, and β_1 is the slope.

The OLS regression can be extended to include the multiple explanatory variables, where there is more than one explanatory variable, and the formula will be extended as follow;

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_{3+\ldots}$$

The power of this technique can be extend by using coding of dummy variables to add grouped of explanatory variables and methods of data transformation. This method is powerful in particular, because it is easy to check the assumptions of the Classical Linear Regression Models such as constant variance, linearity, and the outliers' effect using normal graphical methods (Baltagi, 2005).

Fixed Effect Model

This model is used when the researchers are interested to analyze the impact of variables that vary over time. It explores the relationship between the predictor and

outcome variables in an entity (Islamic banks in our study). Each entity has its own individual characteristics which may or may not affect the predictor variables. When using fixed effects, we assume that some factors in the individual may affect or bias the predictor or outcome variables; so we should control for this happening. This is the reason to assume that there is a relation between the error term and the predictor variables. This model removes the effect of these time-invariant characteristics which allow us to assess the net effect of the predictor on the outcome variables. Also this model assumes that the characteristics of time-invariant are specified to the individual so should not have any relationship with another individual characteristic (Reyna, 2007).

The fixed effect equation can be expressed as follow:

$$Y_{it} = \alpha_i + \beta_1 X_{it} + u_{it}$$

Where;

Y_{it} is dependent variable with i is entity (Islamic banks), and t is time (year);

α_i is unknown intercept for each entity;

β_1 is coefficient of the independent variable X;

X_{it} is independent variable;

u_{it} is the error term.

The fixed effect model will not work well when there is minimal cluster variation or when the variables have slowly changed over time.

We can add time effect or binary variables to the model. When binary variables are used, the equation of fixed effect model becomes as follow:

$$Y_{it} = \alpha_0 + \beta_1 X_{1,it} + \cdots + \beta_k X_{k,it+} \gamma_2 E_2 + \cdots + \gamma_n E_n + u_{it}$$

Where;

γ_2 represent the coefficient for the binary entities;

E_n is entity n.

Random Effect Model

Random effect is an alternative model of fixed effect, and it does not control unmeasured, and individuals' stable characteristics. The reason of that is the unit specific variation which is stable for long period is assumed virtually to be not correlated with a measured variable that is included in that model. Also, in random effects, we can estimate the effects of the stable covariates like race and gender. Furthermore, because it uses a variation for both within as well as between individuals, random effects technique typically has minimal sampling variability compared to fixed-effects (Baltagi, 2005).

In the random effects method, random variables are assumed to be measured by the measurement error; and a number of the values for the research are small compared to the value of the variables as they appear in a population they are drawn from (Reyna, 2007).

Chapter 4

EMPIRICAL RESULTS

4.1 Empirical Result Using OLS

We use the OLS technique to check the relationship between control variables (bank-specific and macroeconomic variables) and dependent variables (CAR and ETA) similar to the previous studies.

4.1.1 The CAR as Dependent Variable

As table 12 shows, we firstly test for bank-specific variables which are ROA, ROE, leverage, LR, CR, and size using the OLS; the coefficients of all variables are highly and statistically significant except for that of liquidity risk which is insignificant.

In addition, the variables like ROE and size are negatively related with the CAR, while the remaining bank-specific variables affect the CAR positively. As we add one more variable like GDP to the model we see that the coefficients of all previous variables are still highly significant, while the new one has a negative impact on the CAR, but it is insignificant. In the third model, we add inflation and realize that there is no change in the significance of coefficients of all previous variables.

When we add exchange rate to the previous model, we realize that most of the coefficients becomes significant, except for that of ROE becoming insignificant while the coefficients of credit risk and inflation are still significant but at 10%

level. As table 12 shows, in model 5 where we add market capitalization, whose coefficient is positively related with CAR but is insignificant, there is no significant change in the significance of previous variables' coefficients except that the inflation becomes significant at the 5% level. In the model 6, we add stocks traded instead of market capitalization and conclude that there is no change in the significance of previous variables' coefficients, and the coefficient of stocks traded is significant and positively related to the CAR. For model 7, we add both market capitalization and stocks traded; the results are almost the same except the case that the coefficient of market capitalization becomes significant at the 5% level.

Finally, in the last model, when add dummy variable, we see that the coefficients of all the previous variables have the same significance. As a conclusion, regarding the OLS approach, the series such as ROA, size, leverage, inflation, exchange rate, market capitalization, and stock traded highly impact on the CAR in Islamic banks. Similar to the conventional banks the Islamic banks have been significantly affected by the 2008 global financial crisis.

Looking at the last model, ROA affects the CAR positively, as net income increases or total assets decrease or both, ROA and CAR will increase; so this is why we have a positive relationship between these two variables. On the other hand, the negative relationship between ROE and CAR was expected, because, as the equity increases the ROE will decrease. At the same time, increasing equity means increasing the total capital which means an increase in the CAR.

The positive relationship between leverage and the CAR can be acceptable, because high leverage ratio means that high equity or low liabilities with high CAR. Bank's

size is an important factor that affects the CAR; larger bank may have a better diversification than smaller bank, which means they will operate with a lower CAR. This is why we have negative relationship between size and the CAR as expected. The table shows a positive relationship between both of liquidity and credit risks and the CAR meaning that high capital level will generate high risk. Banks that accumulate high capital level can protect themselves against excessive risk taking.

Looking at the relationship between macroeconomic variables and the CAR, inflation and GDP have negative effects on the CAR, while the other macroeconomic variables have positive effects. The reason for the negative relationship between inflation and CAR is that high inflation environment erodes bank capital, which results in an inverse relationship between the inflation rate and the CAR as argued by Williams (2011). The table shows a positive relationship between exchange rate and the CAR; banks will be exposed to the fluctuation of the exchange rate because they do the activities which are related directly to the foreign currencies. Banks are affected by the fluctuation of the exchange rate since their activities have a direct relationship with the foreign currency.

As local currency appreciates against foreign currency, the value of assets the bank holds is worth more. GDP has a negative coefficient; as we explained earlier, in the period of positive economic growth, the risk will be lower, so as a result the banks will retain lower capital ratio. The stocks traded and market capitalization have positive effects on the CAR as expected; the improvement of these items will lead to development in the financial system. As literature studies argued, financial development leads to more inflow of capital and international investors into local markets.

Table 12: Empirical Result Using OLS (CAR)

CAR	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	.2834 (.016)***	.2841 (.017)***	.2831 (.016)***	.2641 (.015)***	.2791 (.019)***	.2597 (.015)***	.2876 (.019)***	.2753 (.019)***
ROA	.9693 (.175)***	.9758 (.182)***	1.0642 (.179)***	1.1835 (.170)***	1.1887 (.170)***	1.089 (.175)***	1.0510 (.175)***	1.0320 (.168)***
ROE	- .0363 (.013)***	-.0365 (.013)***	-.0401 (.013)***	-.0158 (.011)	-.0164 (.011)	-.0139 (.011)	-.0142 (.011)	-.0115 (.011)
CR	.0036 (.001)***	.0036 (.001)***	.0039 (.001)***	.0243 (.013)*	.0205 (.014)	.0241 (.013)*	.01638 (.014)	.01766 (.013)
LR	.0011 (.009)	.0010 (.009)	.0013 (.008)	.0069 (.009)	.0058 (.009)	.0063 (.009)	.0036 (.009)	.0021 (.008)
LTASize	- .0078 (.001)***	-.0078 (.001)***	-.0062 (.001)***	-.0083 (.001)***	-.0089 (.001)***	-.0083 (.001)***	-.0094 (.001)***	-.0099 (.001)***
LEV	.0355 (.011)***	.0355 (.011)***	.0339 (.011)***	.0432 (.013)***	.0395 (.013)***	.0435 (.013)***	.0362 (.013)***	.0361 (.013)***
GDP		-.0001 (.001)	-.0003 (.001)	-.0003 (.001)	-.0005 (.001)	-.0004 (.001)	-.0008 (.001)	-.0008 (.001)
INF			-.0034 (.001)***	-.0015 (.001)*	-.0018 (.001)**	-.0015 (.001)*	-.0021 (.001)**	-.0015 (.001)*
ER				.000 (.000)***	-.000 (.000)***	.000 .000)***	-.000 .000)***	.000 (.000)***
MC					.0001 (.0001)		.0002 (.0001)**	.0002 (.0001)***
ST						.0001 (.0001)**	.0002 (.0001)***	.0002 (.0001)***
D1								-.0278 (.0056)**
F	21.35	18.24	18.56	22.71	20.63	21.07	19.93	21.86
R^2	0.3194	0.3195	0.3540	0.4309	0.4340	0.4392	0.4499	0.4956

Note: ***, **, and * are statistically significant at 1%, 5%, and 10%, respectively.

4.1.2 ETA as Dependent Variable

As table 13 shows, we run 8 models with the ETA as dependent variable as we did with another dependent variable. For the first model, the coefficients of all bank-specific variables are highly statistically significant except for that of liquidity risk which is insignificant. In addition, leverage is negatively related to the ETA, while the other bank-specific variables affect the ETA positively.

On the other hand, the results indicate that the ETA is not affected by liquidity risk. In the second model, where we add macroeconomic variable like GDP, we find that the results from the previous variables do not change, and the new variable has a negative and significant effect on the ETA.

As table shows, for the remaining models from 3 to 8, we try to see the effect of macroeconomic and dummy variables on the ETA as well as on the other variables. The coefficient of liquidity risk is still insignificant as we add inflation and GDP; however, it becomes significant at the 10% level when we add the other macroeconomic variables, then it returns to be insignificant when we add dummy variable.

We conclude that as we add the variables ER, MC, ST, and dummy, results for the bank-specific variables do not change. As a conclusion from the OLS approach, most of the bank-specific factors highly impact on the ETA of Islamic banks, while just GDP and exchange rate as the macroeconomic factors highly impact on the ETA.

On the other hand, the ETA in the Islamic banks is not affected by variables such as liquidity risk, inflation, market capitalization, and stocks traded, while the ETA is affected negatively by the 2008 financial crisis. Comparing this relationship with the CAR, we conclude that most of the variables have the same relationship with the ETA as in cases with the CAR, except for ROE and stocks traded. The variable, ROE, has positive relationship with the ETA while this relationship was negative when it comes to the CAR. Stocks traded have a different relationship with the two dependent variables, as table 13 shows it has a negative impact on the ETA, while it affected the CAR positively.

Table 13: Empirical results using OLS (ETA)

ETA	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	.2391 (.021)***	.2293 (.022)***	.2309 (.022)***	.2172 (.020)***	.2115 (.025)***	.2147 (.020)***	.2138 (.025)***	.2043 (.025)***
ROA	1.233 (.230)***	1.132 (.237)***	1.046 (.237)***	1.005 (.217)***	1.0025 (.218)***	.9548 (.226)***	.9561 (.227)***	.9357 (.227)***
ROE	.1345 (.017)***	-.1313 (.017)***	.1285 (.017)***	.1245 (.015)***	.1252 (.016)***	.1234 (.016)***	.1235 (.016)***	.1236 (.016)***
CR	.1346 (.015)***	.1345 (.015)***	.133 (.015)***	.1304 (.013)***	.1297 (.014)***	.1302 (.013)***	.1301 (.014)***	.13157 (.014)***
LR	.0079 (.011)	.0096 (.011)	.009 (.011)	.0176 (.010)*	.01751 (.010)*	.01725 (.010)*	.01725 (.0103)*	.0152 (.0103)
LTASize	-.0033 (.0016)**	-.0032 (.002)**	-.0046 (.002)***	-.004 (.002)***	-.0037 (.0017)**	-.004 (.0015)**	-.0039 (.0017)**	-.0034 (.0018)*
LEV	.0132 (.001)***	-.0131 (.001)***	.0129 (.001)***	.0128 (.001)***	.01295 (.001)***	.01282 (.001)***	.01284 (.001)***	.01289 (.001)***
GDP		-.0015 (.0009)*	-.001 (.001)	-.0014 (.001)*	-.0013 (.001)	-.00142 (.0008)*	-.0014 (.0009)	-.0019 (.0009)**
INF			-.0031 (.001)***	-.0015 (.001)	-.0016 (.0011)	-.00148 (.0011)	-.0015 (.00114)	-.0010 (.0012)
ER				.00001 (.000)***	.00001 (.000)***	.00001 (.000)***	.00001 (.000)***	.00001 (.000)***
MC					.00004 (.0001)		.00001 (.0001)	.000002 (.00011)
ST						-.00006 (.00007)	-.000058 (.00008)	-.00006 (.00008)
D1								-.01841 (.0101)*
F	78.35	67.98	61.77	70.90	63.63	63.81	57.79	53.72
R^2	0.6326	0.6363	0.6458	0.7027	0.7029	0.7034	0.7034	0.7071

Note: ***, **, and * are statistically significant at 1%, 5%, and 10%, respectively.

4.1.3 Test for Multicollinearity

There is another problem that might violate the assumptions of Classical Linear Regression Models, that is multicollinearity; it arises when two independent regressors are in the near perfectly linear combinations of one another. The Variance Inflation Factor (VIF) is used to check whether there is a correlation between our independent variables which s mislead the study's results. Gujarati (2004) notes that if variables have a VIF more than 10 or tolerance value less than 0.10, then there might be multicollinearity among repressors'.

Table 14: Multicollinearity Diagnostic

variable	**VIF**	**Tolerance (1/VIF)**
ROA	1.92	0.5215
ROE	1.84	0.5445
LR	1.05	0.9516
CR	1.23	0.8143
Size	1.73	0.5787
Leverage	1.65	0.6060
Inf.	1.35	0.7403
GDP	1.24	0.8057
MC	2.20	0.4545
ST	1.41	0.7075
ER	1.19	0.8372
Mean VIF	1.53	

The VIFs as they were computed using the STATA 12 software are found to be consistently less than 10. The tolerance values are computed as well with the results smaller than 1. As below table shows, our VIF levels for all variables are in the

range between 1.05 to 2.20 with a mean value of 1.53. This provides a strong evidence that there is no multicollinearity problem in the regression model.

4.1.4 Breusch-Pagan/ Cook-Weisberg Test

In order to check if there is heteroscedasticity in the error terms, we run the Breusch-Pagan test. The null hypothesis for this test is that the variance of the residuals is homogenous, while the alternative is not homogenous. The p-value is higher than 0.05, so we accept the null, that means a variance is constant. Therefore, error terms are not heteroscedastic, they are homoscedastic. Our test results regarding the Breusch-Pagan test are as: Chi2 (11) = 15.85, and Prob > chi2 = 0.1469.

4.2 Panel Data Diagnostics

The pooled OLS technique does not make any differentiation in the coefficients, because it assumes that the banks are the same. Therefore, this technique does not differentiate between the different banks, which means by combining and pooling 28 banks, we deny the problem of heterogeneity or individuality that might exist among these banks. To conclude, when we run a pooled OLS, we already assume that all the coefficients together with intercept are similar for all individuals. This means that we cannot use the results of the pooled OLS even if we found a significant p-value. In addition to the pooled OLS we run the other techniques such as random and fixed effects.

To decide which model we should apply, we run several tests. First, we run F Test which is used to decide which model is appropriate between the pooled OLS or fixed effects. We use F test for both models that we have (CAR and ETA). The results regarding the CAR are F(11, 27) = 18.34, Prob > F = 0.0000, and the results

regarding the ETA are F(11, 27) = 17.32, Prob > F = 0.0000. So in both models, the null hypothesis is rejected, which means there is a significant fixed effect, and the fixed effects model is preferred instead of the pooled OLS.

Then we run Breusch and Pagan Lagrangian Mltiplier (LM Test) to choose between the pooled OLS and random effects, we found that χ^2 for CAR is 182.74 with P = 0.0000; while χ^2 for ETA is 241.61 with P = 0.0000.

From our results, we conclude that the null hypothesis is rejected, which mean random effect is preferred instead of the pooled OLS for both models (CAR and ETA).

Finally, we run Hausman Test to determine the suitable model between fixed and random effects. When it comes to the CAR, the test shows that p-value is higher than 0.05, which means that we fail to reject the null of the random effects model. Our results are as follow: $\chi^2(11)$ = 9.55 and Prob > χ^2= 0.5715. Also, when it comes to the ETA as dependent variable, we run Hausman test to choose between fixed effect and random effect. Results show that p-value is lower than 0.05, which means that we rejected the null hypothesis of random effects, so the appropriate model is fixed effect. Our result is as follow: Chi2 (11) = 25.23 and Prob > chi2 = 0.0084.

4.2.1 Panel Data Diagnostic Using CAR as Dependent Variable

4.2.1.1 Fixed Effect

We run cluster robust of fixed effects with 7 models; we exclude that last model that we did with the OLS because we cannot run the fixed effects with dummy

variables. The CAR is dependent variable, while the control variables are bank-specific and macroeconomic variables.

We start with just bank-specific variable; As table 15 shows, the coefficients of ROA, ROE, and leverage are statistically significant at the 5% level, while the coefficients of credit and liquidity risks are insignificant. It is suggested that an increase in ROA and leverage will lead to an increase in the CAR, while a decrease in ROE will negatively affect the CAR. As we add GDP, we find that it has a negative and insignificant relationship with the CAR. The table shows that the significance of the previous variables did not change, which means that GDP does not have a significant effect in the model. Model 3 in the table shows the results that when we add one more variable which is inflation, we find that all of the previous results are still the same except GDP which becomes highly significant; the new macroeconomic variable is highly significant and has a negative impact on the CAR.

As we add more macroeconomic variables (exchange rate), we find that the results of the previous variables do not change, and the new variable which is exchange rate has a positive but not significant impact on the CAR. In models 5 and 6, we add market capitalization and stocks traded respectively, because we think that these two variables are highly related with dependent variables, so we try to check the impact of each one separately on the model. Both variables have positive impact on the CAR; but, the coefficient of stocks traded is insignificant.

In the last model, where we add both of them, we find that the market capitalization become insignificant, while there is no change in the result regarding the other variables.

Looking at the results concerning the last model, the coefficients of bank-specific variables such as the ROA, ROE, and leverage are statistically significant at the 5% level. This means that these variables explain the variation in the dependent variables and hence an increase in ROA and leverage will lead to an increase in the CAR, whereas an increase in ROE will lead to a decline in the CAR. The bank's size has a positive relationship with the CAR, but it is not statistically significant, which means that it does not affect the CAR.

On the other hand, capital adequacy in Islamic banks is not affected by risk factors such as credit and liquidity risks. Our finding of positive relationship between liquidity risk and the CAR is in line with the previous studies (Williams, 2011; Iqbal, 2012). Barrios & Blanco (2003) found the same relationship regarding credit risk and liquidity risk.

Our finding regarding ROA is in line with the previous studies (Aktas et al. 2015; Gropp & Heider, 2010). In addition to this, our finding of negative relationship between ROE and CAR is line with the previous studies (Francis and Osborne, 2010; Bokhari et al., 2013). Our result concerning with profitability (ROA & ROE) is also in line with the previous studies (Nuviyanti & Anggono, 2014; Buyuksalvarci & Abdioglu, 2011).

According to the theory of trade-off, as a result of an increase in the company size, it would be easier to access capital markets with lower transaction costs. Our result concerning leverage is in line with the previous studies (Pola & Al-Khalaf, 2014; Dreca 2013).

Considering now the results concerning the macroeconomic variables, the coefficient of GDP is statistically significant, all other macroeconomic variables are not significant. Our result concerning inflation is in line with the previous studies (Yahaya et al., 2016; Williams 2011), and the result concerning exchange rate is consistent with the results of Bohachova (2008). An increase in GDP will negatively contribute to the CAR, and, Aktas et al. (2015) and Yahaya et al. (2016) found a similar relationship between GDP and the CAR.

On the other hand, exchange rate, market capitalization, and stocks traded have positive relationships with the CAR, but their coefficients are not statistically significant, which mean that the CAR in the Islamic banks is not affected by these macroeconomic factors. Mili et al. (2014) found a positive relationship between exchange rate and the CAR.

Table 15: Empirical results using Cluster Robust Fixed Effect (CAR)

CAR	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	.2651 (.056)***	.2483 (.050)***	.2858 (.054)***	.2862 (.054)***	.2320 (.048)***	.2583 (.046)***	.2288 (.046)***
ROA	.8865 (.305)***	.8600 (.311)***	.8927 (.310)**	.8927 (.311)***	.8538 (.281)***	.8272 (.250)***	.8335 (.244)***
ROE	-.0234 (.009)**	-.0203 (.009)**	-.0232 (.009)**	-.0232 (.009)**	-.0230 (.009)**	-.022 (.008)***	-.0225 (.008)***
CR	.0156 (.0111)	.0152 (.011)	.0180 (.010)*	.0181 (.0104)*	.01528 (.0101)	.0156 (.0103)	.0147 (.010)
LR	.00096 (.005)	.0023 (.004)	.0015 (.0037)	.0015 (.0038)	.0025 (.0037)	.0018 (.0039)	.0025 (.0038)
LTASize	-.0016 (.005)	-.0003 (.0047)	-.0034 (.0049)	-.0034 (.0050)	-.0001 (.0043)	-.0014 (.0041)	-.0002 (.0040)
LEV	.0094 (.002)***	.0095 (.002)***	.0090 (.002)***	.009 (.002)***	.0089 (.002)***	.0089 (.002)***	.0088 (.002)***
GDP		-.0008 (.0005)	-.0010 (.0004)**	-.001 (.0004)**	-.0009 (.0004)**	-.0010 (.0004)**	-.0009 (.0004)**
INF			-.0016 (.0008)*	-.0016 (.0008)*	-.0013 (.0008)	-.0015 (.0008)*	-.0013 (.0008)
ER				.000001 (.000003)	.000001 (.000003)	.000001 (.000003)	.000001 (.000003)
MC					.0002 (.0001)*		.00017 (.0001)
ST						.0001 (.0001)	.00004 (.0001)
F	5.10	5.04	5.26	12.45	17.53	14.96	18.34
R^2	0.4265	0.3770	0.4924	0.5046	0.4491	0.4585	0.4361

Note: ***, **, and * are statistically significant at 1%, 5%, and 10%, respectively

4.2.1.2 Random Effect

We run cluster robust of random effects with 8 models as we did with the OLS, and with the same dependent and independent variables. Looking at the first model in table 16, where we used only bank-specific variables as independent variables, we realized that the coefficients of all variables are statistically significant except that of liquidity risk.

On the other hand, all variables have a positive relationship with the CAR except for ROE and size. In model 2, we add GDP to the model and find that the previous results did not change; but, GDP has a negatively insignificant impact on the CAR. As we add one more macroeconomic variable in the model which is inflation, we find that including inflation with the model will affect the significance of GDP which becomes significant, while the results for the bank-specific variables do not change.

In models 4, 5, and 6, we add exchange rate, market capitalization, and stocks traded respectively, we find that the results of the previous variables do not change. The exchange rate, market capitalization and stocks traded has a positive impact on the CAR, but its coefficient is significant at the 10% level in the model 6.

In model 7, where we add both market capitalization and stocks traded, the result regarding stocks traded has changed where it becomes insignificant as well as the coefficient of "size" is still significant at the 5% level. In last model with dummy variable, the results almost are the same, also the CAR has been affected by the 2008 financial crisis negatively.

Looking at the results of last model in table 16, the results are close to the results using the fixed effects model. The coefficients of the most of the bank-specific and macroeconomic variables are statistically significant. The table shows that liquidity risk and credit have a positive relationship with the CAR but their coefficients are insignificant while the coefficients of the most of other bank specific variables are statistically significant at the 5% level. This means that these variables explain the variations in the CAR and hence an increase the bank's ROA and leverage will lead to an increase in the CAR, while an increase in the bank's ROE and size will lead to decline in the CAR.

Considering now the results concerning the macroeconomic variables, the coefficients of GDP and inflation are statistically significant while the coefficients of the other macroeconomic variables appeared insignificant.

We conclude that our main results are the same across different methods in panel data analysis. The coefficients of liquidity risk and credit risk as bank-specific variables are insignificant when we adapt different methods, while for macroeconomic variables, the coefficients of market capitalization and stock traded are not significant in both approaches.

Table 16: Empirical results using Random Effect (CAR)

CAR	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	.2994 (.025)***	.2949 (.024)***	.3024 (.023)***	.3044 (.023)***	.2719 (.0267)***	.2950 (.025)***	2726 (.026)***	.2696 (.027)***
ROA	.8109 (.290)***	.7934 (.298)**	.8398 (.297)***	.8437 (.298)***	.8127 (.271)***	.7824 (.236)***	.7926 (.234)***	0.7812 (.238)***
ROE	-.0211 (.008)***	-.0207 (.008)***	-.0216 (.008)***	-.0218 (.008)***	-.0215 (.009)**	-.0205 (.007)***	-.0210 (.007)***	-.0209 (.007)***
CR	.0185 (.0097)*	.0187 (.0096)**	.0189 (.0091)**	.0190 (.009)**	.0183 (.0085)**	.0182 (.0089)**	.01807 (.0086)**	.01794 (.0085)**
LR	.0001 (.0029)	.00071 (.0037)	.0010 (.0033)	.0007 (.0036)	.0011 (.0035)	.0005 (.0038)	.0010 (.0036)	.00065 (.0037)
LTASize	-.0052 (.002)***	-.0050 (.002)***	-.0052 (.002)***	-.0052 (.002)***	-.0035 (.002)***	-.0048 (.002)***	-.0036 (.0016)**	-.0034 (.0016)**
LEV	.0086 (.001)***	.0086 (.001)***	.0083 (.001)***	.0084 (.001)***	.0084 (.001)***	.0082 (.002)***	.0083 (.002)***	.0083 (.001)***
GDP		-.00043 (.0005)	-.00075 (.0004)*	-.00074 (.0008)*	-.0006 (.0004)*	-.0007 (.0004)*	-.0007 (.0004)*	-.0008 (.0004)**
INF			-.00183 (.0008)**	-.0018 (.0008)**	-.0015 (.0008)*	-.0018 (.0008)**	-.0015 (.0008)*	-.0017 (.0009)*
ER				.000002 (.000002)	.000001 (.000001)	.000002 (.000002)	.000001 (.000002)	.000001 (.000002)
MC					.00017 (.0001)*		.00014 (.00012)	.00014 (.0001)
ST						.00009 (.0001)	.00004 (.0001)	.00003 (.0001)
D1								-.0040 (.0048)**
Wald chi2	46.80	48.37	53.18	54.29	72.02	54.10	85.95	82.57
R2	0.5139	0.5044	0.5282	0.5488	0.5304	0.5470	0.5326	0.5294

Note: ***, **, and * are statistically significant at 1%, 5%, and 10%, respective

4.2.2 Panel Data Diagnostic Using ETA as Dependent Variable

4.2.2.1 Fixed Effect

AS we did in the previous models (CAR), we also run seven models as shown in table 17. Firstly, we run just with bank-specific variables, the results reveal that the coefficients of the most of the bank-specific variables are statistically significant, where just the coefficients of liquidity risk and size are insignificant.

On the other hand, the variable "size" have a negative impact on the ETA, while all other bank-specific variables are positively contributing to the ETA. This means that enhancing ROA, ROE, leverage, and credit risk will positively contribute to the ETA, while the ETA is not affected by liquidity risk and size.

As we add one more variable like GDP, the result of bank-specific variables does not change except for liquidity risk whose coefficient becomes significant at the 10% level. The variable, GDP has a negative and significant impact on the ETA.

Also, when we add another macroeconomic variable such as inflation, we find that most of the previous results are still the same except for ROA and liquidity risk. The coefficient of ROA becomes insignificant, while that of liquidity risk becomes significant at the 5% level. But when we add exchange rate to the model, we see no change in the results of the previous variables.

In models 5 and 6, where we add market capitalization and stocks traded respectively, almost all the previous results are still the same. The market capitalization has positive relationship with the ETA but with an insignificant

coefficient. The coefficient of stocks traded is statistically significant and has a negative impact on the ETA.

Finally, the last column of table 17 shows that the coefficients of ROE, credit risk, liquidity risk, and leverage are statistically significant, while the coefficients of ROA and size become insignificant. It implies that an increase in ROE and leverage will lead to a decline in the ETA while an increase in credit risk will lead to an increase in the ETA.

Considering now the results concerning the macroeconomic variables, the ETA is affected negatively by most of the macroeconomic variables except exchange rate and market capitalization; however, the coefficient of most of them are insignificant. The coefficient of GDP is statistically significant at the 10% level while the coefficients of the other macroeconomic variables are insignificant. This means that these variables do not explain the variations in the ETA; but an increase in GDP will lead to a decline the ETA.

Table 17: Empirical results using Fixed Effect (ETA)

ETA	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	.3059 (.137)**	.2841 (.129)**	.2693 (.119)**	.2696 (.120)**	.1688 (.090)*	.1969 (.096)**	.1552 (.0859)*
ROA	.4809 (.267)*	.4508 (.263)*	.4448 (.270)	.4455 (.273)	.3659 (.225)	.2609 (.246)	.2694 (.219)
ROE	.0499 (.024)**	.0499 (.023)**	.0509 (.022)**	.0510 (.022)**	.050 (.020)**	.0462 (.020)**	.0471 (.019)**
CR	.1072 (.040)**	.1076 (.040)**	.1087 (.041)**	.1087 (.041)**	.1139 (.042)**	.1151 (.041)***	.1164 (.041)***
LR	.0087 (.0056)	.0105 (.005)*	.0108 (.005)**	.0108 (.005)**	.0127 (.004)***	.0115 (.004)***	.0125 (.004)***
LTASize	-.0136 (.0127)	-.0120 (.0119)	-.0108 (.0106)	-.0108 (.0107)	-.0043 (.0073)	-.0052 (.0086)	-.0028 (.0071)
LEV	.0064 (.003)**	.0065 (.003)**	.0066 (.003)**	.0066 (.003)**	.0065 (.002)***	0064 (.002)**	.0064 (.002)***
GDP		-.001 (.0004)**	-.0009 (.0003)**	-.0009 (.0004)**	-.0008 (.0004)*	-.0009 (.0004)**	-.0008 (.0004)*
INF			-.0006 (.0017)	-.0006 (.0017)	-.0014 (.0018)	-.0009 (.0015)	-.0013 (.0018)
ER				.000006 (.00001)	.000002 (.00001)	.000001 (.00001)	.000001 (.00001)
MC					.00037 (.0002)		.00024 (.0002)
ST						-.0002 (.0001)*	-.00016 (.00015)
F	14.16	22.05	19.64	24.91	20.45	21.11	17.32
R^2	0.50	0.537	0.576	0.561	0.472	0.591	0.511

Note: ***, **, and * are statistically significant at 1%, 5%, and 10%, respectively.

4.2.2.2 Random Effect

Table 18 shows the different models that we run using cluster robust of random effects. The first model as we did in the previous approaches is for bank-specific variables; the sign of these variables are exactly the same as in the previous approaches. We find that the coefficients of all bank-specific variables are statistically significant except that of "size" which appeared insignificant.

As we add macroeconomic variables in each model, it is seen that the results are also close to the ones in the fixed effect approach except the case that ROA becomes significant. On the other hand, the coefficient of GDP is statistically significant especially when we add dummy variable.

Looking at the last column, the coefficients of all bank-specific variables are statistically significant except the coefficient of size which appeared insignificant. The table shows that the coefficients of macroeconomic variables such as inflation, exchange rate, market capitalization and stocks traded are not statistically significant while the coefficient of GDP is statistically significant; thus, GDP has a negative relationship with the ETA.

The results concerned with the ETA are approximately similar to the results regarding the fixed effect methods except for the case of GDP where it becomes significant at the 1% level rather than 10%; also ROA becomes significant at the 10% level. The reason can be explained by the effect of dummy variable that we used in the random effects model.

As a conclusion, all bank-specific variables have the same impact on the ETA and the coefficients of all of them are statistically significant except the coefficient of “size”, which was not significant using both techniques. On the other hand, all macroeconomic variables have the same sign of coefficient for the ETA, but most of them are insignificant using different techniques.

From all approaches, we conclude that the appropriate technique when we use the CAR as dependent variable is random effect with R square of 0.53, which is highly sufficient to conclude that control variables explain the dependent variable, which is CAR. On the other hand, when we use the ETA as dependent variable, the appropriate technique is fixed effect with R square of 0.511, which is also highly sufficient to conclude that control variables explain the dependent variable, which is ETA.

Table 18: Empirical results using Random Effect (ETA)

ETA	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	.2524 (.080)***	.2391 (.075)***	.2298 (.072)***	.2205 (.060)***	.1712 (.065)***	.1975 (.058)***	.1759 (.066)***	.1480 (.064)**
ROA	.6544 (.248)***	.5974 (.252)**	.5873 (.271)**	.5861 (.268)**	.5322 (.246)**	.4074 (.252)	.4179 (.232)*	.4025 (.228)*
ROE	.0699 (.022)***	.0682 (.022)***	.0707 (.022)***	.0706 (.022)***	.0703 (.020)***	.0637 (.021)***	.0649 (.020)***	.0647 (.017)***
CR	.1127 (.035)***	.1121 (.035)***	.1128 (.035)***	.1135 (.034)***	.1147 (.035)***	.1155 (.034)***	.1157 (.035)***	.1179 (.0349)***
LR	.0111 (.005)**	.0128 (.005)**	.0129 (.005)**	.0138 (.006)**	.0144 (.006)**	.0131 (.005)***	.0135 (.005)**	.0114 (.005)**
LTASize	-.0074 (.0057)	-.0069 (.0053)	-.0062 (.0047)	-.0062 (.0043)	-.0037 (.0037)	-.0051 (.0041)	-.0039 (.0038)	-.0024 (.0036)
LEV	.0083 (.003)***	.0082 (.003)***	.0086 (.003)***	.0086 (.002)***	.0086 (.002)***	.0081 (.002)***	.0082 (.002)***	.0081 (.002)***
GDP		-.0012 (.0007)*	-.001 (.0005)**	-.0011 (.0005)**	-.0009 (.0004)**	-.0010 (.0005)**	-.0009 (.0004)**	-.0018 (.0006)***
INF			-.0013 (.0018)	-.0011 (.0018)	-.0016 (.002)	-.0011 (.0018)	-.0014 (.0021)	-.0007 (.0021)
ER				.00001 (.00001)	.00001 (.00001)	.00001 (.00001)	.00001 (.00001)	.00001 (.00001)
MC					.00026 (.0002)		.00014 (.0002)	.00023 (.0002)
ST						-.0002 (.00014)	-.0002 (.00014)	-.0001 (.00014)
D1								-.0215 (.009)**
Wald chi2	220.15	226.70	242.68	360.22	432.41	380.30	376.34	432.96
R^2	0.6661	0.6805	0.7148	0.7805	0.7607	0.7676	0.7608	0.7531

Note: ***, **, and * are statistically significant at 1%, 5%, and 10%, respectively.

4.3 The Result of GMM Test

Table 19 presents the results concerning the relationship between the dependent variables (CAR and ETA) and the control variables (bank-specific variables and macroeconomic variables) using the GMM test. We use this test after all previous tests because of its strength.

Looking firstly at the results concerning the CAR, it is revealing that the lagged dependent variable is explained by the variation in the independent variables. Additionally, the coefficients of bank-specific variables such as the return on assets, return on equity, size, leverage, and credit risk are highly statistically significant at the 5% levels. This means that these variables explain the variation in the dependent variables and hence increases in the bank's ROA, leverage, and credit risk will lead to increases in the CAR whereas increases in ROE and size will lead to declines in the CAR.

The liquidity risk has a positive relationship with capital adequacy ratio, but its coefficient is not statistically significant. Our finding regarding ROA and size are in line with the previous studies (Gropp & Heider, 2010; Brewer et al. 2008). In addition to this, our finding of negative relationship between ROE and CAR is line with the results of Francis and Osborne (2010).

Considering now the results and concerning the macroeconomic variables, inflation, market capitalization, and exchange rate, their coefficients are statistically significant at the 5% level, which reveals that higher inflation will lower the CAR while increases in market capitalization and exchange rates will positively contribute to the CAR. On the other hand, GDP has a negative relationship with

capital adequacy ratio while stocks traded has a positive relationship, but the coefficients of both of them are not statistically significant, which mean that the CAR is not significantly affected by these macroeconomic variables. Shehzad et al. (2010) and Francis and Osborne (2010) also find that GDP is negatively and insignificantly related to the CAR. However, the above mentioned literature findings are all for the case of conventional banks and none of them are for Islamic banks. So our study is the first one that checks these relationships in the case of Islamic banks.

Table 19: Empirical Results Using GMM

CAR as Depended Variable			ETA as Depended Variable		
CAR	Coef.	Std. Err.	ETA	Coef.	Std. Err.
L1.	.24879***	(.07299)	L1.	.0507***	(.01289)
ROA	.6017***	(.12526)	ROA	.1635***	(.03535)
ROE	- .0106***	(.00332)	ROE	.0055***	(.00174)
LEV	.0753***	(.02809)	Lev	.3005***	(.00858)
LR	.0207	(.01540)	LR	.0267***	(.00524)
CR	.0269**	(.01105)	CR	.1152***	(.00336)
Size	- .0116***	(.00378)	Size	- .0177***	(.00245)
INF	- .001**	(.00030)	Inf	-.0001	(.00017)
MC	.00013**	(.00005)	MC	.00006**	(.00002)
GDP	-.00025	(.00036)	GDP	-.00016	(.00013)
ST	.00005	(.00004)	ST	- .00002*	(.00001)
ER	.0001***	(.000003)	ER	.00057***	(.0000004)
D1	- .0108***	(.00238)	D1	- .00309**	(.00128)
Intercept	.19234	(.054783)	Intercept	.18075***	(.02812)
Diagnostic checking					
		P-value			P-value
Wald chi2	976.29	[0.0000]	Wald chi2	81718.11	[0.0000]
AR(1)	-2.2953	[0.0217]	AR(1)	-1.7715	[0.0765]
AR(2)	0.47165	[0.6372]	AR(2)	0.33732	[0.7359]

Note: ***, **, and * are statistically significant at 1%, 5%, and 10%, respectively.

In the second half of the table (where the ETA is dependent variable), results reveal that the coefficients of all the bank-specific variables are statistically significant meaning that enhancing ROA, ROE, leverage, liquidity risk, and credit risk will

positively contribute to the ETA, where just “size” has a negative impact on the equity to assets ratio. Considering now the results concerning the macroeconomic variables, we find that ETA is affected negatively by all macroeconomic variables except for exchange rate and market capitalization, but some of them are insignificant. Results show that the coefficients of market capitalization, stocks traded, and exchange rate are statistically significant, which mean that these variables explain the variation on the ETA. Hence, increases in exchange rate and market capitalization will lead to increases in the ETA while an increase in stocks traded will negatively contribute to the ETA. On the other hand, inflation and GDP have negative but insignificant effects on the ETA. Some variables become significant when we use the ETA as dependent variable such as liquidity risk and stocks traded while the coefficient of inflation was significant when we used the CAR as dependent variable. But, the coefficient of inflation becomes insignificant with the ETA; and the coefficient of GDP is not significant in both regressions. On the other hand, the sign of coefficient of some variables have changed to be positive for ROE and negative for stocks traded. Finally, we use a dummy to capture the impacts of the global financial crisis. In both regressions, the results reveal that the GFC negatively affected the performance of both the CAR and the equity to assets ratio in Islamic banks. The 2008 financial crises affected both the CAR and the ETA negatively, which mean that Islamic banks are affected by the crises like conventional banks. Moreover, the standard specification tests (the autoregressive (AR) model) on both the first and second difference are reported. The tests reveal that P-value of the second degree autocorrelation is about 0.63 and 0.74 using the CAR and the ETA (as dependent variables) respectively, which are higher than

0.10. This means the null of the first and second order autocorrelation could not be rejected. Therefore, the empirical model is both valid and correctly specified.

Chapter 5

CONCLUSION AND RECOMMENDATION

This study empirically investigated the relationship between the capital adequacy ratio and the equity to asset ratio as dependent variables and different bank-specific and macroeconomic variables for the selected 28 Islamic banks, 22 operating in QISMUT (Qatar, Indonesian, Saudi Arabia, Malaysia, UAE, and Turkey) and the other six operating in Kuwait and Bahrain. We used annual data ranging from 2005 to 2014. The bank-specific control variables are the return on assets, return on equity, leverage, size, liquidity risk, and credit risk, while the macroeconomic control variable are market capitalization and stocks traded (both as percentages of GDP), exchange rate, annual gross domestic product, and inflation.

In order to examine the impact of these different variables on the dependent variables, the study employed the generalized method of moments (GMM) dynamic panel data estimator developed by Arellano and Bond (1991), as well as we used the other methods such as fixed effect, random effect, and ordinary least square to check for robustness. The results of the study have many important policy and investment implications, and they can be summarized as follows

First, we document that there is a statistically significant relationship between the CAR and the bank-specific and macroeconomic variables. In particular, bank-specific variables such as the ROA, ROE, leverage, credit risk, and size do show strong associations with the CAR. On the macroeconomic side, inflation, market

capitalization and exchange rate do impact on Islamic banks of our sample. Of the above variables, size, leverage, and ROE from the bank-specific variables and inflation and exchange rate from the macroeconomic side negatively affect the growth of the CAR.

In addition, we run another model, where the ETA is dependent variable and similar control variables were adapted and revealed that except for the case of inflation, all the variables that have significant effects on the CAR AND also influence the equity to assets ratio significantly. Finally, we capture the impacts of the global financial crisis on Islamic banks and, contrary to the findings of the existing literature, our results reveal that the Islamic banks are highly affected by the GFC.

We also run three other methods to check for robustness, which are fixed effects, random effects, and ordinary least squares. In general, we conclude that except for the cases of liquidity and credit risk, all other bank-specific variables show strong associations with the CAR. For the relationship between risks and CAR, credit risk has a positively significant impact on the CAR in most of the model options we used. But the liquidity risk has got a positively insignificant impact on the capital adequacy ratio. On the other hand, most of the macroeconomic variables show significant effects on the CAR except for the cases of stocks traded which does not have an impact on the CAR. In spite of the fact that the Islamic banks have different natures than conventional ones, our findings are similar to the results of previous studies that concentrated on conventional banks meaning that there is no significant difference between Islamic banks and conventional banks as far as research questions of this study are concerned.

The results of this study have important policy and bank-related implications. Firstly, from the bankers' and investors' perspective, the bank's management should work toward enhancing the return on assets and return on equity by increasing the net income, which is mainly driven by lowering the operating costs and reducing non-performance. Therefore, increasing the size or total assets of the bank without reinvesting or investing existing funds in a lucrative project is not ideal.

The study concentrated on the impacts of macroeconomics variables and bank specific variables on the CAR and the ETA for the period of 2005 to 2014. However, due to the lack of the data and missing observation, the study did not employ longer time series data and more recent data. Indeed, the missing observation was behind why we considered 28 banks; therefore, further studies can be done to increase the number of banks and as well as the observations.

Considering longer data will also assist researchers to split the data before global financial crisis and during and post crisis in order to observe the impacts of the crisis on the Islamic banks. In addition to that, this study used balanced panel data and further study may consider unbalanced panel data to observe if the finding will change or not. Further study can also compare conventional banks with Islamic banks by including oil price volatility and without oil price since most of the Islamic countries are oil exporting countries and it would be good to look for whether the volatility has a role in such relationships. Lastly, variables such as unemployment rate, money supply, operational risk, deposit ratio can be considered in further studies.

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